***note: because important websites are frequently "here today but gone tomorrow", the following was archived from http://www.padrak.com/ine/RS_REFS.html#RS_REF_1 on December 19, 2008. This is <u>NOT</u> an attempt to divert readers from the aforementioned website.  Indeed, the reader should <u>only</u> read this back-up copy if it cannot be found at the original author's site.***

# Electrogravitic References

This file contains an electrogravitics reference list, copied ad hoc from various other files and sources with commentary by **Robert Stirniman** (**robert@skylink.net**) / March 1, 1996

> Danger, Will Robinson!  Some of the following information is serious and some is nonsense.  Some of the things that might at first seem to be nonsense are not.  And some things referenced below -- which come from serious credentialed scientists -- are in fact nonsense.  Whatever the case, it's been included.  Good luck sorting it out.

*Understanding Gravity is a matter of Time.*

### Internet Sites

Elektromagnum website by David Jonsson: http://nucleus.ibg.uu.se/elektromagnum

KeelyNet: http://www.protree.com/KeelyNet/

Los Alamos National Lab Physics E-Print Archive: http://xxx.lanl.gov/

Center for Gravitational Physics and Geometry: http://vishnu.nirvana.phys.psu.edu/

Bill Beaty's Weird Science, Anomalous Physics, Free-Energy, Tesla Society:
http://www.eskimo.com/~billb/

The Institute For New Energy, Patrick Bailey, homepage: http://www.padrak.com/ine/

Digital Equipment Corp's Alta Vista web search engine (note: If you can't find it with this, it ain't out there yet): http://www.altavista.digital.com/

Elsevier Science. Search or browse the table of contents of more than 900 science and technology journals.  Data since early 1995: http://www.elsevier.nl/cas/estoc/

Norman Redington's website, The Net Advance of Physics, recent preprints, and papers describing new developments in Physics: http://pobox.com/~redingtn

Embry-Riddle Aeronautical University's Aerospace Virtual Library:
http://macwww.db.erau.edu/www_virtual_lib/aerospace.html

Jack R. Hunt Memorial Library (aerospace): http://amelia.db.erau.edu/

American Institute of Aeronautics & Astronautics (AIAA) homepage:
http://www-leland.stanford.edu/group/aiaa/national

NASA Langley Research Center Library: http://blearg.larc.nasa.gov/library/larc-lib.html

NASA Scientific and Technical Information: http://www.sti.nasa.gov/STI-homepage.html

University of Alabama at Hunstville. Dr Ning Li and Dr Douglas Torr. Microgravity research consultants to NASA's Marshall Space Center: http://isl-garnet.uah.edu/RR93/uahmatsci.html

The Microgravity Research Experiments (MICREX) Data Base: http://samson2.msfc.nasa.gov/fame/exps/kaw-sl3.html

Interstellar Propulsion Society: http://www.digimark.net/ips/

National Science Foundation World Wide Web Server (find out where your science tax dollars are going!): http://stis.nsf.gov/

*Nexus* magazine web page: http://www.peg.apc.org/~nexus/

homepage of *New Scientist* magazine: http://www.newscientist.com/pstourist/index.html

The Farce of Physics: http://www.germany.eu.net/books/farce

The World Wide Web Virtual Library: Sumeria/Technology: http://lablinks.com/sumeria/tech.html

The Society for the Advancement of Autodynamics website: http://www.webcom.com/~saa

Popular Mechanics' Tech Update Article Archive: http://popularmechanics.com/cgi-bin/wais.pl

Fortean website: http://www.clas.ufl.edu/anthro/fortpages.html

homepage of *Apeiron* Magazine: http://montreal.aei.ca:80/~apeiron/

Borderland Sciences Research Foundation ftp site: ftp: northcoast.com/pub/bsrf

Homepage of the International Society of Unified Science for advancing the Reciprocal System Theory of Dewey B. Larson: http://infox.eunet.cz/interpres/sr/isus/index.html

Frank Lofaro's homepage including alternative science links and 2 articles by Whittaker written in 1903 and 1904 about scalar field theory and free energy: http://www.unlv.edu/~ftlofaro/

Homepage of the Oppositely Charged Twin Monopole (OCTM) theory of matter, "Gravity is a Push", US patent number 5,377,936: http://www.epicom.com/gravitypush

Dr Eujin Jeong's Dipole Theory of Gravity homepage: http://www.realtime.net/~ejeong/

Levesque's (laurent@ee.umanitoba.ca) website: http://www.ee.umanitoba.ca/~laurent

UFOs and the New Physics: http://www.hia.com/hia/pcr/ufo.html

**[SealthSkater note: some of these 1995 urls have been superseded and may be found at doc pdf URL ]**

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There is a fairly large body of evidence which supports the idea of a strong relationship -- and possibly an equivalent fundamental source -- for ElectroMagnetism and Gravitation. Many references to this effect are contained in this resource list. But for now, let's forget about the experimental evidence and theoretical ideas which are presented here and begin with first principles.

What if our knowledge of Physics had evolved differently? What if no one had ever given a thought to any theory of Gravitation before we discovered the principles and theories of ElectroMagnetics and the 2 nuclear forces.

We might have developed some fairly good theories which unify the "three" forces. We would know that clumps of matter are held together primarily by electromagnetic forces. And we would find

experimentally that if we separate some of these clumps of matter, a small force continues to exist which tries to bring them back together.

Would it seem rational to speculate that this force is something entirely new and completely different from ElectroMagnetics? Would it not be a great foolishness to invent something new and call it "Gravity" and claim that it has no relationship with the known forces and then write elaborate mathematical theories which describe it solely as geometry? Or would it be more rational to see it as what it probably is: a manifestation of the electromagnetic forces which we already know to hold matter together?

Could it be that electric charge is a fundamental thing and inertial mass is merely a shadow of something primal? And what we know as a gravitational field is merely the net result of other primary fields?

Geometrize it if you find it useful to do so. But please recognize that defining Gravity as geometry lends no information to the understanding of its <u>cause</u>.

Of all the forces we know, there is none stronger than a paradigm. *-- Robert Stirniman*


1. GENERAL RELATIVITY & QUANTUM COSMOLOGY, ABSTRACT GR-QC/9512027
   From: kldalton@cs.clemson.edu
   Date: Tue, 12 Dec 1995 11:30:30 -0500
   Author(s): Kenneth Dalton
   Journal-ref: Hadronic J. 17 (1994) 483-501

   Hypothesis: The <u>electromagnetic</u> <u>field</u> is the source of gravitation. This treatment of gravitation is consistent with the Quantum Theory of matter which holds that electric charge (or "generalized charge") is the most fundamental attribute of matter.

   Experimental predictions of the theory include:
   (1) any massive body generates a time-dependent gravitational field;
   (2) there is a linear correlation between the gravitational red-shift of a stellar source and the energy of cosmic rays emitted by that source, given by $ {\Delta \nu}/{\nu_0} = energy (eV)/10^{27} $;
   (3) the maximum energy of cosmic rays is $ 10^{27} $ eV;
   (4) this limit is associated with an infinitely red-shifted stellar object, an ``electrostatic black-hole,'' at the potential $ c^2/G^{1/2} = 10^{27} $ volts.

   Finally, the theory predicts that the gravitational potential near any charged elementary particle is many orders of magnitude greater than the Newtonian value.


2. HIGH ENERGY PHYSICS - THEORY, ABSTRACT HEP-TH/9601066
   From: Kenichi Horie
   Date: Sat, 13 Jan 1996 14:41:29 +0900
   Geometric Interpretation of Electromagnetism in a Gravitational Theory with Torsion and Spinorial Matter
   Author(s): Kenichi Horie (KEK Japan)
   Comments: Ph.D. thesis, 98 pages, LaTeX file, ca 276kB

Possible geometric frameworks for a unified theory of Gravity and ElectroMagnetism are investigated.  General Relativity is enlarged by allowing for an arbitrary complex linear connection and by constructing an extended spinor derivative based on the complex connection.  Thereby the space-time torsion not only is coupled to the spin of fermions and causes a 4-fermion contact interaction, but the non-metric vector-part of torsion is also related to the electromagnetic potential.

However, this long-standing relation is shown to be valid only in a special U(1) gauge.  It is a formal consequence of the underlying extended geometry.

3. The New Gravity: a new force, a new mass, a new acceleration: unifying gravity with light
   Kenneth G. Salem. 1$^{st}$ ed. Johnstown, PA.  Salem Books, c1994.  xiii, 181 p. : ill. ; 22 cm.
   LC CALL NUMBER: QC794.6.G7 S26 1994
   SUBJECTS: Unified field theories. Gravitation. Electromagnetic interactions.
   ISBN: 0962539813

4. Gravitation & the Electroform model: from General Relativity to Unified Field Theory
   by James A. Green. 7$^{th}$ ed. [Wichita, Kan.] : Greenwood Research, c1994. 33 p. : ill. ; 24 cm.
   LC CALL NUMBER: QC178 .G68 1994
   SUBJECTS: Gravitation. Unified field theories. Astrophysics. "Wichita State
   University Physics Graduate Seminar, Dec.1993 and Dec. 1994"

5. Another very interesting research on anti-gravity is done (and still going on) by the Japanese Prof. Shinishi Seike.  He published his findings in the book The Principles of Ultra Relativity. For his highly mathematical (no nonsense) book, write to:
   Shinichi Seike
   G Research Institute
   Box 33
   UWAJIMA/Ehime (798)
   JAPAN

7. Patents for anti-gravity devices and systems have been issued to Brown, Hooper, Wallace, and others:

   U.S. Patents Awarded to Townsend Brown
   ● #300,311 T.T.Brown  Nov. 15, 1928 / A Method of and an Apparatus or Machine for Producing Force or Motion
   ● #1,974,483 T.T.Brown      Sept. 25, 1934 / Electrostatic Motor
   ● #2,949,550 T.T.Brown      Aug. 16, 1960 / Electrokinetic Apparatus
   ● #3,022,430 T.T.Brown      Feb. 20, 1962 / Electrokinetic Generator
   ● #3,187,206 T.T.Brown      June 1, 1965 / Electrokinetic Apparatus
   ● #3,296,491 T.T.Brown      Jan. 3, 1967 / Method and Apparatus for Producing Ions and Electrically-Charged Aerosols
   ● #3,518,462 T.T.Brown      June 30, 1970 / Fluid Flow Control System

The late Dr. William J. Hooper (BA/MA/PhD) in Physics was affiliated with the University of California at Berkley and was Professor Emeritus when he died in 1971.  His works are documented and he gained two U.S. patents for his "ALL-ELECTRIC MOTIONAL FIELD GENERATOR".  He claimed

use of the "Motional Electric Field" to produce gravity and anti-gravity for use in SPACECRAFT and AIRCRAFT. Indeed, in U.S. patent #3,610,971 you can see a Flying Saucer diagram is used as an example in Figure 7. -- James Hartman, CaluNET Future Science Administrator

U.S. Patents Awarded to William Hooper
- #3,610,971. William Hooper, April 1969 / "All Electric Motional Electric Field Generator"
- # 3,656,013. William Hooper, April 1972 / "Apparatus for Generating Motional Electric Field"

Hooper, W. J. (1974). New Horizons in Electric, Magnetic, and Gravitational Field Theory, Electrodynamic Gravity, Inc. 1969

Frances G. Gibson, THE ALL-ELECTRIC FIELD GENERATOR AND ITS POTENTIAL, Electrodynamic Gravity, Inc., 1983

8. Electric Propulsion Study, Dr. Dennis Cravens, SAIC Corp, prepared for USAF Astronautics Lab at Edwards AFB, August 1990

Section 3.7 - Non-Inductive Coils
"Several authors have suggested that v x B term in the Lorentz expression should be called into question. Several unverified experimental results have ever been made. An experiment is suggested to test one or several of these theoretical views. This is an area where the experimental procedure is workable and the outcome could have direct results in the area of inertia forces.

"During the late 60s, William J. Hooper put forth an interesting theory involving the v x B terms dynamic electrical circuits. There was and is uncertainty as to the exact physical understanding of the Biot-Savart-Lorentz law and Ampere's law involving the set of reaction forces. Peter Graneau has studied these expressions. Hooper's view was that there are three different types of electric fields due to the distribution of electric field and two due to induction.

"At the heart of the issue is the connection of the magnetic field and its source in the charged particles. EM theory is presently consistent with the idea that spinning magnetic dipoles create effects indistinguishable from charged particles. There has been no critical experiment which can disprove whether a magnetic flux rotates with its source. If it does co-move with its source, then it is logical to assume that a motional electric field in a fixed reference frame of the current induces a magnetic field.

"This concept is likewise consistent with a field-free interpretation such as Ampere's original laws."
*(with 4 pages more about Hooper's theories)*

9. FREE FALL OF ELEMENTARY PARTICLES: ON MOVING BODIES AND THEIR ELECTROMAGNETIC FORCES by Nils Rognerud, 1994 (nils@ccnet.com) (available at the elektromagnum website)

This paper is a review of the problem of the observable action of gravitational forces on charged particles. The author discusses the induced electric fields and the sometimes overlooked unique physical properties. He analyzes several experiments, showing the reality of the induced electric fields. The current interpretation -- based on the idea of only one electric field with certain characteristics -- is compared with alternative approaches.

The Hooper Coil:

The author has tested a setup by pulsing strong currents (opposite and equal) through multiple parallel conductors. The configuration of the conductors in this type of experiment will cancel the B-fields while still producing an EM field in accordance with Eq. 4.2. This is similar to an experiment by Hooper (W. J. Hooper) who successfully predicted and measured the motional electric field (all in zero resultant B-field).

Interestingly, all of the above experiments can influence an electron with a zero B-field in the region of the electron. This has some profound implications -- one of which is that the motional electric force field is immune to electrostatic or magnetic shielding.

Experimentally, it can be confirmed that the motional electric field is immune to shielding and follows the boundary conditions of the magnetic (not electric) field. The only way to shield a motional electric field is to use a magnetic shield around the source of the magnetic flux (i.e., containing it at the source).

These effects are not startling if one remembers that the motional electric field is a magnetic effect and that a magnetic field has a different boundary condition than the electric field.


10. U.S. Patents Awarded to Henry W> Wallace
   ● #3626605 Henry Wm Wallace of Ardmore PA Dec 14, 1971 / "Method and Apparatus for Generating a Secondary Gravitational Force Field"
   ● #3626606 Henry Wm Wallace of Ardmore PA Dec 14, 1971 / "Method and Apparatus for Generating a Dynamic Force Field"
   ● #3823570 Henry Wm Wallace of Freeport NY July 16, 1973/ -- "Heat Pump" (based on technology similar to the above 2 inventions)


11. Gravity is a PUSH!  United States Patent Number 5,377,936
NET KINETIC ENERGY DIFFERENTIAL GUIDANCE AND PROPULSION SYSTEM FOR SATELLITES AND SPACE VEHICLES


12. In the early 1960s, Erwin Saxl conducted a series of experiments which seemed to illustrate a non-zero coupling between EM and Gravitational fields. He claimed to see a change in the period of a torque pendulum when its electric potential was raised.

   ● U.S. Patent # 3357253 E.J. Saxl, December 1967 / "Device and Method for Measuring Gravitational and Other Forces"

"An Electrically-Charged Torque Pendulum" by E.J. Saxl, *Nature* 203, Page 136, July 11 1963.


13. U.S. patent #5,076,971.
Barker places radioactive elements inside the sphere of a Van de Graaff generator; runs it at a negative potential for several minutes/hours/days; and finds that the **rate of radioactive decay is extremely <u>enhanced</u>** with some relationship to the magnitude of the negative potential.  **[SS: is this similar to the Tom Bearden claims of being able to eliminate nuclear waste repositories => doc pdf URL ?]**

The principal investigator undertook a series of experiments to test the "Barker effect" and the "Keller Catalytic Process" in changing the rate of radioactive decay of heavy elements (elements heavier than Lead such as Radium, Thorium, or Uranium -- all of which are radioactive). Barker claims that subjecting radioactive materials to high electrostatic potentials (50,000-to-500,000 volts) can increase or decrease the rate of radioactive decay, with short exposures of the high voltage capable of inducing erratic decay rates which slowly return to normal over a period of weeks.

Keller claims that subjecting radioactive materials to the high heat and fusing reaction of a chemical process (i.e., Keller Catalytic Process) can eliminate the radioactivity completely.
-- Michael Mandeville http://www.aa.net/~mwm/dexmrad1.html


14. Carr, Otis (1959). "Amusement Device," (i.e. A Flying Saucer), U.S. Patent # 2,912,244.

Otis Carr's work involved counter-rotating charged discs that supposedly produced thrust when they reached a certain speed in relation to the Earth's rotational speed and became activated by free energy from space. Maybe he did have something." *-- James E. Cox*

Carr's work is similar in some respects to Hooper's inventions. In both cases, an anti-gravitational effect is reported to result from equal and opposite electric currents. Furthermore, one of Hooper's embodiments -- the pancake coil -- has an uncanny resemblance to the gravitational shielding experiments which were recently conducted in Tampere Finland (1992 and 1995). Except that in the Tampere experiments, the equal and opposite current is generated in a superconductor disk by way of the Meissner effect.

Will we soon begin to recognize value of the discoveries that Carr made nearly 40 years ago, and Hooper made over 25 years ago? *-- Robert Stirniman*


15. EXPERIMENTAL RESULTS OF HOOPER'S GRAVITY-ELECTROMAGNETIC COUPLING CONCEPT
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH. MILLIS, MARC G. WILLIAMSON, GARY SCOTT JUN. 1995 12 PAGES
Presented at the 31st Joint Propulsion Conference and Exhibit, San Diego CA, 10-12 Jul. 1995; sponsored by AIAA, ASME, SAE, and ASEE NASA-TM-106963 E-9719 NAS 1.15:106963 AIAA PAPER 95-2601
Avail: CASI HC A03/MF A01

Experiments were conducted to test assertions from Patent 3,610,971 by W.J. Hooper that self-canceling electromagnetic coils can reduce the weight of objects placed underneath. No weight changes were observed within the detectability of the instrumentation. More careful examination of the patent and other reports from Hooper led to the conclusion that Hooper may have misinterpreted thermal effects as his "Motional Field" effects. There is a possibility that the claimed effects are below the detection thresholds of the instrumentation used for these tests. CASI Accession Number: N95-28893

I have 2 problems with the methodology used by the NASA scientists in the above experiment. First -- The amount of ampere-turns used in the NASA experiment was substantially lower than the amount used by Hooper. Hooper found that his effect increased in proportion the square of the

current.  If you were motivated to verify that the Hooper effect exists, would you not try to conduct the experiment with MORE current rather than less?

Second -- NASA conducted its tests by energizing the coils and making measurements in an immediate On.Off mode rather than letting things run for a while as Hooper did.  NASA's reason for doing this was to avoid errors due to thermal effects.  This makes sense.

But what does not make sense is that if you are trying to verify an original experiment and you make changes, you have an obligation to also conduct the experiment in its <u>original</u> mode.  To do otherwise is bad science.  But what could be wrong with testing things in an immediate On/Off mode?  Well, it can be seen in other experiments that a gravitational effect sometimes results from macroscopic spin alignment of the quantum angular momentum of a large number of microscopic particles.

It has been demonstrated in other experiments that it <u>takes</u> <u>time</u> for these particles to come into alignment.  For example, in the inventions of Henry Wallace it sometimes took minutes for the "kinemassic" gravito-magnetic field to fully manifest itself.  The reason that it takes time for particles to come into alignment could be much the same reason that it takes time to permanently magnetize a magnet.  Wallace found that the "kinemassic" effect occurs with elemental materials which have a component of unpaired spin in the atomic nucleus.  This includes all common isotopes of Copper.  Which of course is the material used in Hooper's coils.

Incidentally, NASA essentially has an economic monopoly in the lucrative market for microgravity materials research.  *-- Robert Stirniman*

16. The Hooper effect can be readily demonstrated in the "Two Moving Magnets Experiment".  In this experiment, magnetic flux is provided by equal strength opposite pole magnets moving uniformly in opposite directions.  The induced motional electric field that is generated in a conductor is found to be twice that which would result from a single magnet while, remarkably, the sum of the magnetic B field is zero.

This experiment is easy to setup and verify in any electronics laboratory with a pair of magnets, a wire, and a voltmeter.  In fact, you may wrap the conductor in electrostatic or magnetic shielding and find the same result.  *-- Nils Rognerud*

Oleg Jefimenko, <u>Causality, Electromagnetic Induction, and Gravitation</u>, Electret Scientific, Star City, (1992)

Oleg Jefimenko, "Force Exerted on a Stationary Charge by a Moving Electric Current or a Moving Magnet", *American Journal of Physics*, Vol 61, pages 218-222 (1993)

17. Apparently, there are some <u>very</u> interesting clues to the nature of the Universe that are related to the phenomenon of SPIN.  It might get very interesting if someone were to make a project of assembling in one place all the information that has been observed, alleged, suspected, or speculated about concerning unexpected effects related to spin along with all the traditional Newtonian results … stir … add some seasoning … and see what comes out.

For example, in Quantum Mechanics, if you want to measure the spin axis of an electron, you do an experiment in which you ASSUME an axis; make a measurement of the correlation (i.e., the

dot product) of that axis with the actual axis of spin for that electron; and theory says that you can determine at least how close your guess was.

It was a major surprise for the first experimenters with this to find that the guess was always right. Whatever spin axis that you assume turns out to be correct -- exactly dead accurate. You must be a VERY good guesser. Out of this experimental result came the concept of "isospin". Which in itself is kind of weird in that objects with zero radius can still exhibit spinx.

But I find the idea that the spin is wherever you guess it might be to be even weirder and to need a better model that predicts this result.  -- *John Sangster*

18. Paper: gr-qc/9311036
From: jaegukim@cc.kangwon.ac.kr
Date: Tue, 30 Nov 93 13:47:52 +0900
"Gravitational Field of a Moving Spinning Point Particle" by Jaegu Kim, 7 pages.
The gravitational and electromagnetic fields of a moving charged spinning point particle are obtained in the Lorentz covariant form by transforming the Kerr--Newman solution in Boyer-Lindquist coordinates to the one in the coordinate system which resembles the isotropic coordinates and then covariantizing it.  It is shown that the General Relativistic proper time at the location of the particle is the same as the Special Relativistic one and the Gravitational and ElectroMagnetic self forces vanish.

Jaegu Kim, "Gravitational Field of a Moving Point Particle", Journal of the Korean Physical Society, Vol 27 No 5, Oct 94, Pages 484-492

Jaegu Kim, "Gravitational Field of a Moving Spinning Point Particle", *Journal of the Korean Physical Society*, Vol 27 No 5, Oct 94, Pages 479-483

In the above papers, Dr. Kim derives solutions for the Einstein-Maxwell equations for (a) a charged massless point particle; (b) a point particle having mass but no charge; (c) a point particle having mass and charge; (d) a massless point particle with charge and spin; and finally (e) a point particle having charge, mass, and spin.  He determines that there is a region of space around a charged spinning mass in which the gravitational force is negative.

The ability to generate a negative gravity effect may come as no surprise to experimenters who have worked with Bose-Einstein condensates, superfluids, or superconductor material in which the angular momentum of quantum level particles can become aligned along a "Macroscopic" spin axis.

And it is probably also not a surprise to those who have looked at devices such as the inventions of Henry Wallace in which a Macroscopic body is mechanically spun at high speed in order to cause a "kinemassic" gravito-magnetic field due to spin alignment of the nucleus of elemental materials having an odd number of nucleons (un-paired spin).

19. Paper: GR-QC/9504023
Date: Mon, 17 Apr 1995 10:43:50 +0900
Title: "Pure spin-connection formulation of gravity and classification of energy-momentum tensors"
Author: Mathias PILLIN  Report-no: YITP/U-95-12

It is shown how the different irreducibility classes of the energy-momentum tensor allow for a pure spin-connection formulation. Ambiguities in this formulation especially concerning the need for constraints are clarified.

From: R.Bursill@sheffield.ac.uk (R Bursill)
Subject: Hi Tc SC and gravitational shielding
Date: Fri, 6 Oct 1995 03:14:41 GMT

Is anyone familiar with the experiments in Tampere, Finland by Podkletnov et. al. on weak gravitational shielding from a Meissner levitating, rotating disk of high-$T_c$ superconducting material? The paper is E. Podkletnov and R. Nieminen, *Physica C* 203 (1992) 441.

E. Podkletnov and A. D. Levit have another paper now -- a Tampere University of Technology report, January 1995 (Finland), the experiment having being <u>repeated</u>. (I assume no one believed it the first time?)

In the first experiment, a 5-g sample of silicon dioxide was found to loose around 0.05 % of its weight when placed at a distance of 15 mm from the SC disk. The SC disk had diameter 145 mm and thickness 6 mm. Under rotation of the disk, the effect increased up to 0.3 %.

In the second experiment, samples of different composition and weight (10-50 g) were placed at distances of 25mm to 1.5m from the disk. The mass loss went as high as around 2 %. I found out about this through a theoretical preprint by **Giovanni Modanese** -- a Von Humboldt Fellow from the Max Plank institute. The preprint no. is MPI-PhT/95-44, May 1995. A colleague got it from hep-th@babbage.sissa.it, paper 9505094.

Modanese thinks that it is something to do with the bose condensate from the SC interacting with the gravitational field. He uses some non-perturbative quantum theory on the Regge lattice to attempt to understand the effect. Must be a little bit like explaining cold fusion with the standard tools. i.e., couldn't be done. We all know what happened to cold fusion. But at the time, a professor from my department said in a public lecture that the product of the believability and the potential importance if true was of order 1. -- *Robert Bursill*

20. E. Podkletnov and R. Nieminen, "A Possibility of Gravitational Force Shielding by Bulk YBa2Cu3O7-x Superconductor", *Physica C* 203 (1992) pp 441-444.

E. Podkletnov and A.D. Levi, "Gravitational Shielding Properties of Composite Bulk YBa2Cu3O7-x Superconductor Below 70 C Under Electro-Magnetic Field", Tampere University of Technology report MSU-95 chem, January 1995.

HEP-TH/9505094
Theoretical analysis of a reported weak gravitational shielding effect. Author: G. Modanese (Max-Planck-Institut, Munich) Report-no: MPI-PhT/95-44 May 1995

Under special conditions (Meissner-effect levitation and rapid rotation), a disk of high-$T_c$ superconducting material has recently been found to produce a weak shielding of the gravitational field. We show that this phenomenon has no explanation in the standard gravity theories except possibly in the non-perturbative quantum theory on the Regge lattice. More data and independent repetitions of the experiment are, however, necessary.

21. ABSTRACT SUPR-CON/9601001
   From: Modanese Giovanni
   Date: Wed, 17 Jan 1996 21:54:45 +0100 (MET)
   Updating the analysis of Tampere's weak gravitational shielding experiment
   Author: Giovanni Modanese
   Report-no: UTF-367/96

   The most recent data about the weak gravitational shielding produced in Tampere by Podkletnov and coworkers through a levitating and rotating HTC superconducting disk show a very weak dependence of the shielding value ($\sim 1 \%$) on the height above the disk. We show that while this behavior is incompatible with an intuitive vectorial picture of the shielding, it is consistently explained by our theoretical model. The expulsive force observed at the border of the shielded zone is due to energy conservation.

22. NASA is conducting experiments similar to the anti-gravity shielding experiments done in Tampere Finland. A scientist named Ning Li at the University of Alabama Huntsville is reported to be consulting with NASA. She has written some interesting articles about the relationship between superconductors and gravtiation. Here are references to some of her published articles and a few related items:

   ● AUTHOR(s): Li, Ning and Torr, D.G.
      TITLE(s)      Effects of a Gravitomagnetic Field on pure superconductors
      In: *Phys. Rev. D*, JAN 15 1993 v 43 n 2 Page 457

   ● AUTHOR(s): Torr, Douglas G. Li, Ning
      TITLE(s):     Gravitoelectric-Electric Coupling via Superconductivity.
      In: *Foundations of Physics Letters*. AUG 01 1993 v 6 n 4 Page 371

   ● AUTHOR(s): Li, Ning and Torr, D.G.
      TITLE(s):     Gravitational effects on the magnetic attenuation of superconductors.
      In: *Physical Review B*, condensed matter. SEP 01 1992 v 46 n 9 Page 5489

   ● AUTHOR(s): Peng, Huei
      TITLE(s):     A New Approach to Studying Local Gravitomagnetic Effects on a Superconductor.
      In: *General Relativity and Gravitation*. JUN 01 1990 v 22 n 6 Page 609

   ● AUTHOR(s): Mashhoon, Bahram Paik, Jung Ho Will, Clifford M.
      TITLE(s):     Detection of the gravitomagnetic field using an orbiting superconducting gravity gradiometer. Theoretical principles.
      In: *Physical Review D*, Particles and fields. MAY 15 1989 v 39 n 10 Page 2825

   I haven't had the opportunity to read the articles by Drs. Li and Torr. But I am told that in one of her articles, Dr Li provides the following interesting comment:

   "… a detectable gravitomagnetic field. And in the presence of a time-dependent applied magnetic vector potential field, a detectable gravitoelectric field could be produced."

   There is also some information about Dr Ning Li at: http://isl-garnet.uah.edu/RR93/uahmatsci.html .

Dr Li is with the Applied Materials Lab at the University of Alabama at Huntsville.  She works closely with Dr Douglas Torr.  One of their primary interests is development and production of exotic materials in a microgravity environment -- a peculiar coincidence (or maybe not) with the writing of physical theories about how to produce anti-gravity in the laboratory.  Here's an unusual article from the website:

"Can Gravity be 'made' in the Laboratory?"

A theory that might lead to the creation of measurable manmade gravitational fields has been developed by physicists at UAH.

If the theoretical work is borne out in the laboratory, it will prove that physicist Albert Einstein was correct in predicting that moving matter generates **2 kinds of gravitational fields**: gravito-magnetic and gravito-electric.  The "artificial" gravitational field would be generated inside a container made of a superconducting material according to Dr. Douglas Torr, a research professor of physics and director of UAH's Optical Aeronomy Laboratory.  "I think we can at the very least generate a microscopic field ..."  **[SS: are these "2 kinds of gravitational fields" related to the "Gravity-A" and "Gravity B" of Bob Lazar (doc pdf URL) or to Richard Crandall's contention that gravity is the resultant of 2 more fundamental forces (doc pdf URL ) ?]**

If Einstein was right, the amount of gravito-magnetic energy produced by an object is proportional to its mass and its movement explained Dr. Ning Li, a research scientist in UAH's Center for Space Plasma and Aeronomic Research.  To create the artificial gravitational fields, Torr and Li propose placing a superconducting container in a magnetic field to align ions that are spinning or rotating in tiny circles inside the superconducting material.  Their theory predicts the existence of ionic spin or rotation in a superconductor in a magnetic field.

There are persistent rumors among UFO-buffs that NASA already has an operating microgravity chamber, located in Houston TX and/or Huntsville AL.  One person -- Robert Oechsler -- reports that he has personally been inside NASA's anti-grav chamber.  But that's another story.  For more info, see the books Alien Contact and Alien Update by Timothy Good.


23. Paper: hep-th/9412243
From: Vu.Ho@sci.monash.edu.au
Date: Sat, 31 Dec 1994 17:06:38 +1100
Title: Gravity as a coupling of two electromagnetic fields
Author: Vu B Ho
    A discussion on a possibility to represent **Gravity as a coupling of 2 equal and opposite electromagnetic fields [SS: e.g., "Crandall" above]**.  Classically the existence of equal and opposite electromagnetic fields can be ignored altogether.  However, the problem can be viewed differently if we want to take into account possible quantum effects.  We know that in Quantum Mechanics, the potentials themselves may be significant and may determine the dynamics of a particle in a region where the fields vanish.  (Aharonov and Bohm 1959, Peshkin and Tonomura 1983)

AN EXPERIMENT TO TEST THE GRAVITATIONAL AHARONOV-BOHM EFFECT Ho, Vu B.
    Morgan, Michael J. Monash University, Clayton, Victoria, Australia 1994 8 PAGES,
Australian Journal of Physics (ISSN 0004-9506) vol. 47, no. 3 1994 p. 245-252
HTN-95-92507

The gravitational Aharonov-Bohm (AB) effect is examined in the weak-field approximation to General Relativity. In analogy with the electromagnetic AB effect, we find that a gravitoelectromagnetic 4-vector potential gives rise to interference effects. A matter wave interferometry experiment -- based on a modification of the gravity-induced quantum interference experiment of Colella, Overhauser, and Werner (COW) -- is proposed to explicitly test the gravitoelectric version of the AB effect in a uniform gravitational field. CASI Accession Number: A95-87327

I recommend you get a copy of Aharonov and Bohm's classic paper "Significance of Electromagnetic Potentials in the Quantum Theory" published in *The Physical Review* in 1959. One of the important things that Aharonov and Bohm did was to demonstrate that the electromagnetic potentials are richer in properties than the Maxwell fields. The field is an artificial mathematical construct from which emerges the whole idea of a "continuum". When you can wean yourself of this intellectual crutch, you will be ready to do <u>real</u> physics. Both GR and QM are addicted to the same falsehood. *-- Charles Cagle*

In the Aharonov-Bohm effect, it has been determined theoretically and experimentally that there is a measurable effect on a charged particle due to the electromagnetic vector potential. Which of course would be no surprise except that the effect occurs even in areas of space where the value of the classical electromagnetic fields vanish. A quantum phase shift (detectable via particle interferometry) is found to occur due to the magnetic vector potential A. The effect on a charged particle occurs in regions which are completely shielded from classical electromagnetic fields.

A dual of the Aharonov-Bohm effect is the Aharonov-Casher effect where it is shown that measurable effects of spin-precession of a particle's magnetic moment can occur due to the electric potential. Even in areas of space where the classical electrical field is completely absent.

24. Prior to the revolutionary paper by Aharonov and Bohm in 1959, the importance of the electomagnetic potential and related interferometry effects was suggested in articles by **Edmund Whittaker** in 1903 and 1904. And what is now known as the "Aharonov-Bohm effect" was explicitly identified in an earlier paper on electron optics by Ehrenberg and Siday in 1949.

E.T. Whittaker, "On the partial differential equations of mathematical physics," *Mathematische Annalen*, Vol 57, 1903, pages 333-355. In this paper, Whittaker demonstrates that all **scalar EM** potentials have an internal, organized, bidirectional EM plane-wave structure. Thus there exists an electromagnetics that is totally internal to the scalar EM potential. Since vacuum/spacetime is scalar potential, then this internal EM is in fact "internal" to the local potentialized vacuum/spacetime. *-- Tom Bearden*

E.T. Whittaker, "On an expression of the electromagnetic field due to electrons by means of two scalar potential functions," *Proceedings of the London Mathematical Society*, Series 2, Vol 1, 1904, pages 367-372. In this paper, Whittaker shows that all of classical electromagnetics can be replaced by scalar potential interferometry. This ignored paper anticipated the Aharonov-Bohm (AB) effect by 55 years and drastically extended it as well. Indeed, it prescribes a Macroscopic AB effect that is distance-independent, providing a direct and <u>engineerable</u> mechanism for "action-at-a-distance". It also provides a testable hidden-variable theory that predicts drastically new and novel effects. *-- Tom Bearden*

W. Ehrenberg and R. W. Siday, *Proc. Phys. Soc. London*, B62, 8 (1949). 10 years earlier than Aharonov and Bohm, Ehrenberg and Siday formulated the science of electron optics by defining the

electron refractive-index as a function of electromagnetic potential.  Near the end of their paper, they discuss *"a curious effect"* which is <u>exactly</u> the AB effect.  On the 2 sides of a magnetic flux, the vector potential has different values.  This means a different refractive index for 2 geometrically equivalent paths.  This difference in refractive index would cause an observable phase shift.  *-- Jun Liu*

25. Y. Aharonov and D. Bohm, "Significance of Electromagnetic Potentials in the Quantum Theory," *Physical Review*, Second Series, Vol 115 no 3, pages 485-491 (1959)

Effects of potentials on charged particles exist even in the region where all the fields (and therefore the forces on the particles) vanish -- contrary to classical electrodynamics.  The quantum effects are due to the phenomenon of interference.  These effects occur in spite of Faraday shielding.  The Lorentz force does not appear anywhere in the fundamental Quantum theory but only as an approximation that holds in the Classical limit.  In QM, the fundamental physical entities are the potentials while the fields are derived from them by differentiation.

- Herman Erlichson, "Aharonov-Bohm Effect and Quantum Effects on Charged Particles in Field-Free Regions," *American Journal of Physics*, Vol 38 No 2, Pages 162-173 (1970).
- M. Danos, "Bohm-Aharonov effect. The quantum mechanics of the electrical transformer," *American Journal of Physics*, Vol 50 No 1, pgs 64-66 (1982).
- Bertram Schwarzschild, "Currents in normal-metal rings exhibit Aharonov-Bohm Effect," *Physics Today*, Vol 39 No 1, pages 17-20 (Jan 1986)
- S. Olariu and I. Iovitzu Popescu, "The quantum effects of electromagnetic fluxes," *Reviews of Modern Physics*, Vol 57 No2, April 1985.
- Yoseph Imry and Richard Webb, "Quantum Interference and the Aharonov-Bohm Effect", *Scientific American*, April 1989, pages 56-62
- E. Merzbacher, "Single Valuedness of Wave Functions", *American Journal of Physics*, Vol 30 No 4, pages 237-247 (April 1962)
- Yoseph Imry, "The Physics of Mesoscopic Systems", Directions in Condensed Matter Physics, World Scientific Publishing (1986)
- Richard Webb and Sean Washburn, "Quantum Interference Fluctuations in Disordered Metals", *Physics Today*, Vol 41 No 12 pages 46-53, Dec 1989
- <u>STAR WARS NOW! The Bohm-Aharonov Effect, Scalar Interferometry, and Soviet Weaponization</u> by T. E. Bearden, Tesla Book Company
- Peshkin M. and Lipkin H.J. "Topology, Locality, and Aharonov-Bohm Effect with Neutrons" *Physical Review Letters* APR 10 1995 v 74 n 15
- Yakir Aharonov and Ady Stern, "Origin of the geometric forces accompanying Berry's geometric potentials", *Physical Review Letters*. Dec. 21, 1992 v 69 n 25 Page 3593
- Yakir Aharonov, Jeeva Anandan, and Sandu Popescu, "Superpositions of time evolutions of a quantum system and a quantum time-translation machine." *Physical Review Letters*. JUN 18 1990 v 64 n 25 Page 2965

26. QUANTUM PHYSICS, ABSTRACT QUANT-PH/9506038
From: "Jun Liu"
Date: Sun, 25 Jun 1995 03:25:05 -0400
Potential Effect: Aharonov-Bohm Effect of Simply Connected Region
Author: Jun Liu
Comments: Prediction of a new effect.  Numerical estimate given for experimental verification.  The referees disagree with each other on the existence of this effect.

We study a generalization of Aharonov-Bohm effect, the potential effect. The discussion is focused on field-free effects in simply connected region which obviously cannot have any local field-flux. Among the published discussions about this kind of effects, it is generally agreed that this kind of effect does not exist due to gauge invariance.

However, there are also opinions that this effect is a trivial variation of Aharonov-Bohm effect and therefore there is no need to check its existence. To my knowledge, it has never been tested. My first goal here is to supply enough theoretical reason to motivate the experimental test of this effect. I start with an intuitive derivation. Then I introduce a wave-front theory as a theoretical consideration. Logically, the existence of potential effect implies the existence of the AB effect. But not vice versa. The purpose of this paper is to provide a physical connection in the opposite direction.

QUANTUM PHYSICS, ABSTRACT QUANT-PH/9510004
From: "Jun Liu"
Date: Thu, 5 Oct 1995 04:30:27 -0400
The Real Significance of the Electromagnetic Potentials
Author(s): J`un L'iu
    The importance of the potential is revealed in a newly discovered effect of the potential. This paper explore the same issue introduced in quant-ph/9506038 from several different aspects including electron optics and Relativity. Some people fail to recognize this effect due to a wrong application of gauge invariance.

In the above 2 papers, Dr Liu proposes a theory of the electromagnetic potential which is a radical extension of the well-known Aharonov-Bohm effect. In the second paper, he is barely able to contain his frustration about repeated publication rejections over the last 4 years from leading physics journals.

He provides a theoretical foundation for his potential theory as well as some relatively straight forward suggestions for experiments which might confirm the theory. But there is an enormous problem. Liu's theory violates the concept of invariance of physical parameters under an electromagnetic gauge transformation. Electromagnetic gauge invariance is a cornerstone in the foundation of Quantum Theory and QED. And it is also part and parcel linked with the dogma of light speed invariance. In other words -- heresy.

The AB effect is invariant under an electromagnetic gauge transformation. While a phase-shift occurs in the AB effect, it can be identified only over a closed path and is impossible to identify with any specific "local" region of space.

Furthermore, in the AB effect, there is no interaction relating to a transfer of energy or momentum. Maintaining the idea of gauge invariance is a little harder to do in the Aharonov-Casher effect. But it can be accomplished by "gauging away" the physical effects of magnetic spin precession by using a combination of factors from the classical Maxwell fields along with the electromagnetic potential. It has the look of an elaborate parlor trick. But so does most of QED.

Liu's theory predicts that the electromagnetic potential acts like a kind of "refractive index" to wave propogation and is similar in some respects to what was predicted in the earlier paper on electron optics by Ehrenberg and Siday in 1949. The result is that in some circumstances, an electromagnetic potential causes a change in wavelength and in other circumstances causes a change in phase (AB effect).

An effect on wavelength would be manifested as a change in the envelope of the interference pattern rather than merely a shift in the pattern. In Liu's theory, an exchange of energy and momentum becomes possible. His theory is relatively easy to test and verify. But oddly (or not), no one has yet done so. Maybe because we already "know" it can't be true?

One interesting prediction of Liu's theory is that electromagnetic potential will result in time dilation. He doesn't appear to be aware that there is already experimental evidence that this occurs. See references to inventions and experiments by people such as Saxl, Barker, and Keller which demonstrate time dilation in an electric potential.

Time dilation can be viewed equivalently as a shift in wavelength. Liu wishes for someone to conduct an experiment to test for a change in wavelength by using a quantum interferometer. A fine idea. But what about those experimenters who have already measured this effect with a clock? Also see a variety of references here to theories and experiments which relate the scalar electric potential to the gravitational field. And time dilation is a well-know -- and experimentally verified -- prediction of General Relativity.

**The Aharonov-Bohm effect has sparked a revolution in physical thought.** There are a variety of new ideas and experiments such as verification of Liu's theory which could soon begin to fan it to a flame. When the flame becomes sufficiently illuminating, watch the political scientists begin to scramble for a comfortable seat nearer the fire. -- *Robert Stirniman*

27. Over the last 5 years, there have been over 300 papers published about various aspects of Aharonov-Bohm and Aharonov-Casher effects, and quantum interferometry. The subject relates to nearly all aspects of modern physics. Here are selected examples:

- AUTHOR(s): Semon, Mark D.
  TITLE(s):      The Aharonov-Bohm Effect: Still a Thought-Provoking Experiment.
  In: *Foundations of Physics*. JUL 01 1988 v 18 n 7 Page 731

- AUTHOR(s): Furuya, Kazuhito
  TITLE(s):      Transient Response of the Aharonov-Bohm Effect.
  In: *Japanese Journal of Applied Physics*. part 1, FEB 01 1989 v 28 n 2 Page 303

- AUTHOR(s): Chetouani, L.; Guechi, L.; Hammann, T.F.
  TITLE(s):      Exact path integral solution of the coulomb plus Aharonov-Bohm potential.
  In: *Journal of Mathematical Physics*. MAR 01 1989 v 30 n 3 Page 655

- AUTHOR(s): Lee, Patrick A.
  TITLE(s):      Gauge field, Aharonov-Bohm Flux, and high-$T_c$ superconductivity.
  In: *Physical Review Letters*. AUG 07 1989 v 63 n 6 Page 680

- AUTHOR(s): Bezerra, V.B.
  TITLE(s):      Gravitational analogs of the Aharonov-Bohm effect.
  In: *Journal of Mathematical Physics*. DEC 01 1989 v 30 n 12 Page 2895

- AUTHOR(s): Reznik, B.; Aharonov, Y.
  TITLE(s):      Question of the nonlocality of the Aharonov-Casher effect.
  In: *Physical Review D,* Particles and fields. DEC 15 1989 v 40 n 12 Page 4178

● AUTHOR(s): Stovicek, P.
TITLE(s):    The Green function for the two-solenoid Aharonov-Bohm effect.
In: *Physics Letters: [part A]*  NOV 27 1989 v 142 n 1 Page 5


● AUTHOR(s): Ellis, J.R.
TITLE(s):    Dirac magnetic monopole and the Aharonov-Bohm solenoid in the Poincare
             gauge.
In: Journal of Physics A: Mathematical and General.  JAN 07 1990 v 23 n 1 Page 65


● AUTHOR(s): Gerber, A.; Deutscher, G.
TITLE(s):    AC-to-DC  conversion  and  Aharonov-Bohm  effect  in  percolating
             superconducting films.
In: *Physical Review Letters*.  MAR 26 1990 v 64 n 13 Page 1585


● AUTHOR(s): Hagen, C.R.
TITLE(s):    Exact equivalence of spin-1/2 Aharonov-Bohm and Aharonov-Casher effects.
In: *Physical Review Letters*.  MAY 14 1990 v 64 n 20 Page 2347


● AUTHOR(s): Afanase'ev, G.N.
TITLE(s):    Old and new problems in the theory of the Aharonov-Bohm effect.
In: *Soviet Journal of Particles and Nuclei*.  JAN 01 1990 v 21 n 1 Page 74


● AUTHOR(s): Silverman, M.P.
TITLE(s):    Two-solenoid Aharonov-Bohm experiment with correlated particles.
In: *Physics Letters: [part A]*  AUG 13 1990 v 148 n 3/4 Page 154


● AUTHOR(s): Gornicki, Pawel
TITLE(s):    Aharonov-Bohm Effect Vacuum Polarization.
In: *Annals of Physics*.  SEP 01 1990 v 202 n 2 Page 271


● AUTHOR(s): Gal'tsov, D.V.;  Voropaev, S.A.
TITLE(s):    Bremsstrahlung polarization in the Aharonov-Bohm effect.
In: *Moscow University Physics Bulletin*.  1990 v 45 n 1 Page 8


● AUTHOR(s): Padmanabhan, T.
TITLE(s):    Vacuum polarization around an Aharonov-Bohm solenoid.
In: Pramana.  MAR 01 1991 v 36 n 3 Page 253


● AUTHOR(s): Hagen, C.R.
TITLE(s):    Spin dependence of the Aharonov-Bohm Effect.
In: *International Journal of Modern Physics A*.   JUL 30 1991 v 6 n 18 Page 3119


● AUTHOR(s): Dupuis, Nicolas; Montambaux, Gilles
TITLE(s):    Aharonov-Bohm flux and statistics of energy levels in metals.
In: *Physical Review B: Condensed Matter*.  JUN 15 1991 v 43 n 18 Page 14390


● AUTHOR(s): Ortiz, M.E.
TITLE(s):    Gravitational anyons, Chern-Simons-Witten gravity, and the gravitational
             Aharonov-Bohm effect.
In: *Nuclear Physics B*.  SEP 30 1991 v 363 n 1 Page 185

● AUTHOR(s):  Bezerra, V.B.
   TITLE(s):        Gravitational Aharonov-Bohm effect in a locally flat spacetime.
   In: *Classical and Quantum Gravity*.  OCT 01 1991 v 8 n 10 Page 1939


● AUTHOR(s):  Sitenko, Y.A.
   TITLE(s):        The Aharonov-Bohm effect and the inducing of vacuum charge by a singular
                        magnetic string.
   In: *Nuclear Physics B*.  MAR 23 1992 v 372 n 3 Page 622


● AUTHOR(s):  March-Russell, John; Preskill, John; Wilczek, Frank
   TITLE(s):        Internal frame dragging and a global analog of the Aharonov-Bohm effect.
   In: *Physical Review Letters*.  APR 27 1992 v 68 n 17 Page 2567


● AUTHOR(s):  Krive, I.V.; Rozhavsky, A.S.
   TITLE(s):        Non-Traditional Aharonov-Bohm Effects in Condensed Matter.
   In: *International Journal of Modern Physics B*.  MAY 10 1992 v 6 n 9 Page 1255


● AUTHOR(s):  Krive, I.V.; Zvyagin, A.A.
   TITLE(s):        Aharonov-Casher effect in half-integer spin antiferromagnets.
   In: *Modern Physics Letters B*, Condensed matter ph   JUN 20 1992 v 6 n 14 Page 871


● AUTHOR(s):  Zubkov, M.A.; Polikarpov, M.I.
   TITLE(s):        Aharonov-Bohm effect in lattice field theory.
   In: JETP Letters.  APR 25 1993 v 57 n 8 Page 461


● AUTHOR(s):  Duru, I.H.
   TITLE(s):        Casimir Force Between Two Aharonov-Bohm Solenoids.
   In: *Foundations of Physics*.  MAY 01 1993 v 23 n 5 Page 809


● AUTHOR(s):  Takai, Daisuke; Ohta, Kuniichi
   TITLE(s):        Aharonov-Bohm effect in the presence of magnetic flux and electrostatic
                        potential.
   In: *Physical Review B*, condensed matter.  JUL 15 1993 v 48 n 3 Page 1537


● AUTHOR(s):  Allman, B.E.; Cimmino, A.; Klein, A.G.
        TITLE(s): Observation of the scalar Aharonov-Bohm effect by neutron interferometry.
        In: *Physical Review A*.  SEP 01 1993 v 48 n 3 Page 1799


● AUTHOR(s):  Jensen, Bjorn; Kucera, Jaromir
   TITLE(s):        On a gravitational Aharonov-Bohm effect.
   In: *Journal of Mathematical Physics*.  NOV 01 1993 v 34 n 11 Page 4975


● AUTHOR(s):  Maeda, J.; Shizuya, K.
   TITLE(s):         Aharonov-Bohm and Aharonov-Casher effects and electromagnetic angular
                        momentum.
   In: *Zeitschrift fur Physik C*; particles and fields.  1993 v 60 n 2 Page 265


● AUTHOR(s):  Afanasiev, G.N.
   TITLE(s):        Toroidal solenoids in an electromagnetic field and toroidal Aharonov-Casher
                        effect.
   In: *Physica Scripta*.  OCT 01 1993 v 48 n 4 Page 385

- AUTHOR(s): Moreau, William; Ross, Dennis K.
  TITLE(s):      Complementary electric Aharonov-Bohm effect.
  In: *Physical Review A*, Atomic, molecular, and opt  JUN 01 1994 v 49 n 6 Page 4348

- AUTHOR(s): Ho, Vu B.; Morgan, Michael J.
  TITLE(s):      An Experiment to Test the Gravitational Aharonov-Bohm Effect.
  In: *Australian Journal of Physics*.  1994 v 47 n 3 Page: 245

- AUTHOR(s): Zeiske, K. Zinner, G. Helmcke, J.
  TITLE(s):      Atom interferometry in a static electric field: Measurement of the Aharonov-Casher phase.
  In: *Applied Physics B*, lasers and optics.  FEB 01 1995 v 60 n 2/3 Page: 205

- AUTHOR(s): Sazonov, S.N.
  TITLE(s):      On Aharonov-Bohm Effect in Multiconnected Superconductor.
  In: *Acta Physica Polonica, A*.  DEC 01 1994 v 86 n 6 Page 987

- AUTHOR(s): Reznik, B.
  TITLE(s):      Gravitational analogue of the Aharonov-Casher effect.
  In: *Physical Review D*: particles, fields, gravitat  MAR 15 1995 v 51 n 6 Page 3108

- AUTHOR(s): Oh, Sangchul; Ryu, Chang-Mo
  TITLE(s):      Persistent spin currents induced by the Aharonov-Casher effect in mesoscopic rings.
  In: *Physical Review B*: Condensed matter.  MAY 15 1995 v 51 n 19 Page 13441

- AUTHOR(s): Leadbeater, M.; Lambert, C.J.
  TITLE(s):      Mesoscopic Superconducting Analogs of the Aharonov-Bohm-Casher Effect.
  In: *Physical Review Letters*.  MAY 29 1995 v 74 n 22 Page 4519

- AUTHOR(s): Cook, Richard J.; Fearn, Heidi; Milonni, Peter W.
  TITLE(s):      Fizeau's experiment and the Aharonov-Bohm effect.
  In: *American Journal of Physics*.  AUG 01 1995 v 63 n 8 Page 705

- AUTHOR(s): Yi, J.; Jeon, G.S.; Choi, M.Y.
  TITLE(s):      Dual Aharonov-Casher effect and persistent dipole current.
  In: *Physical Review B*: Condensed matter.  SEP 15 1995 v 52 n 11 Page 7838

- AUTHOR(s): Audretsch, Jurgen; Jasper, Ulf; Skarzhinsky, Vladimir D.
  TITLE(s):      Bremsstrahlung of relativistic electrons in the Aharonov-Bohm potential.
  In: *Physical Review D*: particles, fields, gravitat  FEB 15 1996 v 53 n 4 Page 2178

- AUTHOR(s): Skarzhinsky, Vladimir D.; Audretsch, Jurgen; Jasper, Ulf
  TITLE(s):      Electron-positron pair production in the Aharonov-Bohm potential.
  In: *Physical Review D*: particles, fields, gravitat  FEB 15 1996 v 53 n 4 Page 2190

28. Time out for a summary …

- Hooper (as well as Carr, Rognerud, Jefimenko et al) find that a electromagnetic effect which is not shieldable -- and hence **difficult to distinguish from gravitation** -- results from equal and

opposite electric currents (dipole-current). And that a similar effect can also be generated by a moving magnet or a moving electric current.

- Recent experiments in Tampere Finland discover a gravitational shielding effect from a levitated rotating superconductor disk. This is similar in some respects to Hooper's invention,with the equal-and-opposite electric current being generated in a superconductor disk via the Meissner effect.

- Sansbury, Volkov, Brown, Teller, Blackett, Zollner et al provide theoretical arguments as well as some experimental indications that equal-and-opposite electric charge (dipole-charge) is similar -- or equivalent -- to a static gravitational field. And that alignment of electric dipoles in matter and in vacuum polarization can result in a force which is not shieldable and not easily distinguishable from gravity. Conversely, it is well know that a gravitational field, an acceleration, or a mechanical force causes a dipole moment (polarization) to occur within a dielectric material.

- Wallace, Laithwaite, Barnett et al, discover that gravitational and electromagnetic field effects occur due to alignment of the microscopic spin of quantum particles with the angular momentum spin axis of a larger Macroscopic body.

- Aharonov and Bohm discover that an effect can occur on an electrically-charged particle due to the magnetic vector potential in regions of space where the classic Maxwell fields vanish. Originally on the outside of infinitely long solenoid coil (with the magnetic field cancelled by equal-and-opposite currents). Others have conducted this experiment using a toroidal coil coated with superconductor material (generating an equal-and-opposite current) to cause the Maxwell magnetic field to vanish. A similar effect (Aharonov-Casher) is discovered to occur due to the electric scalar potential in regions of space where the Maxwell electric field vanishes.

- Whittaker and Eherenberg&Siday have written theories which are precursors to Aharonov-Bohm, suggesting that the electromagnetic potential is a far richer and more fundamental thing than the Maxwell fields. T he classical Maxwell fields are regarded as artificial abstractions. We can also note that Maxwell's theory itself was originally much richer in variables (20 equations and 20 unknowns) before it was simplified by Gibbs and Heaviside to the vector formulation which we know as "Maxwell's equations".

- Vu Ho authors a recent paper suggesting experiments relating the electromagnetic potential and the Aharonov-Bohm effect to gravitation. And in a more recent paper using the mathematics of differential geometry and General Relativity, Dr Ho demonstrates that **Gravity can be expressed mathematically as a coupling of 2 equal-and-opposite ElectroMagnetic fields**.

- Jun Liu authors recent papers suggesting that the electromagnetic potential is of paramount importance. Liu's theory predicts that "local"effects can result from the potential in regions where the Maxwell fields vanish -- a violation of the theory of invariance under electric gauge transformations. Liu theory predicts that time dilation will occur in an electric potential. Saxl, Barker, and Keller have conducted earlier experiments which demonstrate time dilation in an electric potential.

- Ning Li -- a consulting scientist to NASA's Marshall Space Center who we might presume to know something -- authors papers about the relationship of gravito-electric and gravito-magnetic forces to the electromagnetic potential and methods for generation of gravitational

effects with superconductor material.  According to Dr Li: "…a detectable gravitomagnetic field.  And in the presence of a time-dependent applied magnetic vector potential field, a detectable gravitoelectric field could be produced."

How many clues do we need?  Equal-and-opposite electric sources (dipole-charges and/or dipole-currents) appear to effect the electromagnetic potential in ways which are indistinguishable from gravitation.  And you know what they say about things that "look like a duck".

The net sum of equal and opposite electromagnetic vectors is a zero vector.  But it is NOT the same situation as no vector.  For skeptics and diehards who are still having a hard time accepting the idea of electrogravitics, here's a simple experiment.  Stand on a train track between 2 locomotives which are pushing on you with equal force in opposite directions.  You will exhibit no net motion.  Nonethe less, you may soon begin to notice that something important is happening.  -- *Robert Stirniman*

**[StealthSkater note: former Air Force cadet Stan Deyo also talks about electrogravitics in his Australian-based books => doc  pdf  URL-doc  URL-pdf ]**


29. Jorge Pullin
    Wed, 1 Feb 1995 22:55:17 -0500 (EST)
    Matters of Gravity, a newsletter for the gravity community
    Author: Jorge Pullin (PSU), editor.
    Loops, Knots, Gauge Theories, and Quantum Gravity.
    Rodolfo Gambini and Jorge Pullin.  Foreword by Abhay Ashtekar.
    New York: Cambridge University Press, 1996.  Cambridge monographs on mathematical physics
    ISBN 0-521-47332-2 (hc)


30. A number of reports which have been prepared for the USAF are publicly available.  These reports can be obtained from the "Defense Technical Information Center" (DTIC). Cameron Station, Alexandria VA 22304, 800-225-3842:
    - Mead F.B. Jr et al, Advanced Propulsion Concepts - Project Outgrowth, AFRPL-TR-72-31, (JUN 1972).
    - Mead F.B. Jr, "Exotic Concepts for Future Propulsion and Space Travel" in Advanced Propulsion Concepts, 1989 JPM Specialist Session, (JANNAF) Chemical Propulsion Information Agency, CPIA Publication 528, p.93-99, (May 24, 1989).
    - Talley R.L, "21$^{st}$ Century Propulsion Concept", Veritay Technology Inc, East Amherst NY. prepared for the Phillips Laboratory, Air Force Systems Command, Propulsion Directorate, Edwards AFB.  May 1991. PL-TR-91-3009
    - Talley R.L., 21st Century Propulsion Concept, AFAL-TR-88-031, Apr 88.
    - Talley R.L., Final report on NYS contract no. (88)-166 of NYS Science and Technology Foundation with Veritay Technology, Inc., P.O. Box 305, East Amherst NY 14051.
    - Forward R.L., 21st Century Space Propulsion Study, AL-TR-90-030, Final Report on Contract FO4611-87-C-0029, Air Force Astronautics Lab (AFSC), (Oct 1990).
      --AND-- Forward,R.L., 21st Century Space Propulsion Study (Addendum), PL-TR-91-3022, Final (Addendum), OLAC Phillips Lab, formally known as Air Force Astronautics Lab (AFSC), (June 1991).

    - Cravens D.L., "Electric Propulsion Study", prepared for the Astronautics Laboratory, Air Force Space Technology Center at Edwards AFB. August 1990.  AL-TR-89-040
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31. AUTHOR(s):     Woyk, E.
    TITLE(s):  Gravitomagnetics in Stationary Media.
    In: *The Astrophysical Journal*.  SEP 20 1994 v 433 n 1 p 1 Page 357


    AUTHOR(s):     Shahid-Saless, Bahman
    TITLE(s):  Local gravitomagnetic perturbations of the lunar orbit.
    In: Physical review. D, Particles and fields.  DEC 15 1992 v 46 n 12 Page 5404


    AUTHOR(s):     Blockley, C.A. Stedman, G.E.
    TITLE(s): Gravitomagnetic effects along polar geodesics about a slowly rotating spherical mass in
              the PPN formalism.
    In: *Physics Letters: [part A]*  JUL 09 1990 v 147 n 4 Page 161


    AUTHOR(s):     Zhang, Xiao-He
    TITLE(s): Interactions of magnetohydrodynamic waves with gravitomagnetic fields, and their
              possible roles in black-hole magnetospheres.
    In: *Physical Review D*, Particles and fields.   DEC 15 1989 v 40 n 12  Page: 3858


    AUTHOR(s):     Khanna, Ramon; Camenzind, Max
    TITLE(s):  The Gravitomagnetic Dynamo Effect in Accretion Disks of Rotating Black Holes.
    In: *The Astrophysical Journal*.  NOV 10 1994 v 435 n 2 p 2


    AUTHOR(s):     Casotto, S.; Ciufolini, I.; Vespe, F.
    TITLE(s):  Earth satellites and gravitomagnetic field.
    In: *Il nuovo cimento delle societa Italiana di fisic*  MAY 01 1990 v 105 n 5 Page 589


    AUTHOR(s):     Mashhoon, Bahram; Paik, Jung Ho; Will, Clifford M.
    TITLE(s):  Detection of the gravitomagnetic field using an orbiting superconducting gravity
              gradiometer.  Theoretical principles.
    In: *Physical Review D*, Particles and fields.  MAY 15 1989 v 39 n 10 Page 2825


    AUTHOR(s):     Nordtvedt, K.
    TITLE(s):  Gravitomagnetic interaction and laser ranging to Earth satellites.
    In: *Physical Review Letters*. DEC 05 1988 v 61 n 23 Page 2647


32. There is a reprint of an article that appeared in *Interavia*, Volume XI - No. 5, 1956" -- a March 23,
    1956 article titled "Towards Flight without Stress or Strain... or Weight".  This article has a
    photograph of T.T.Brown holding one of his flying disks and another photograph of the flying disk
    by itself.  There is some info on the operation of the electrokinetic apparatus.

The 1956 paper "The Gravitics Situation" prepared by Gravity Rand Ltd. - a division of Aviation Studies Ltd. This includes 6 appendices with papers by various authors including the text from T. Townsend Brown's 1929 gravitor patent. **[StealthSkater note: "The Gravitics Situation" as collected by Stan Deyo is archived at doc pdf URL-doc URL-pdf. More on Gravity Rand at doc pdf URL-doc URL-pdf .]**

33. Many documents on Gravitoelectrics/Electrogravitation refer back to the 1952 Project Winterhaven. That project is Projects with Mr. T.T. Brown been produced. I have seen his Lab notes 1-3, - 4. I was looking for 2-5 & 6. Also, the Bahnson et al Brown lab notes during his research days at Bahnson Labs in North Carolina 1957-60 period or about. I have a poor chopped-up Lab Video on the subject. I'm looking for the full video the 45-minute one. Mine is a mere 23 minutes.

I have yet to track down an original document entitled "The Flying Saucer: The Application of the Biefeld-Brown Effect to the Solution of Space Navigation" by Mason Rose. This 50s' document details how a flying said to contain information on a Mach 3 Combat Disc. Also, have any records related to other saucer operates. I have a copy of a re-write and it is outstanding.

And I'm also looking for a document as seen on SIGHTINGS TV entitled: "PROJECT SILVER BUG" - the 1955 USAF Flying Saucer Tests. Also seeking a copy of PROJECT WINTERHAVEN by Thomas Townsend Brown on a MACH-3 Combat Disc. The British had a stake in as well as the USAF. It too is from the 1950s. *-- James Hartman, CaluNET - Future Science Admin.*

34. The Biefeld-Brown effect is described generally as the anomalous tendency of high-voltage flat capacitors to display movement towards (usually) the positive pole. Effects are most often seen at potentials above 50kv. Thomas Townsend Brown held a few patents on devices using it.

It's very controversial and is part of the subject of "electrogravitics" as some say that the B-B effect is actually polar gravity peeking out from behind a high electrical gradient within a dielectric. Claims are that the mass of the dielectric is a factor in the magnitude of the effect as well as the capacitance and the gradient intensity. Should be fairly easy for the home-workshop experimenter to get a look at. But the difficulty seems to be in isolating the effect from ionic wind and simple electrostatic propulsive effects. Skeptics claim that those forces are all it ever was. But a few reports indicate that they may be wrong. *-- Rick Monteverde, Honolulu HI*

35. The experiments involved freely suspended electrically charged capacitors which were determined to possess angular momentum yet did not rotate. Source: <u>Albert Einstein: Philosopher- Scientist</u>, P. Schilpp, editor, 3rd ed., 1988, pp 522-523.

Schilpp, Paul Arthur, 1897- ed. <u>Albert Einstein: philosopher-scientist</u>. [3d ed.] La Salle, Ill., Open Court [1970] xviii, 781 p. illus., facsim., ports. 25 cm. LC CALL NUMBER: QC16.E5 S3 1970

36. From Richard Feynman's Lectures on Physics, we learn that there is intrinsic field energy and momentum density associated with a static electromagnetic field configuration. When there is a change in the magnetic field, this field energy and momentum can be directly converted into kinetic energy and mechanical momentum. Feynman illustrates this with an electromagnetic carousel paradox.

In this paradox, a dielectric disk (which is embedded with small charged spheres along its circumference) rotates without any apparent "counter" torque in the system.  Before this rotation occurs, the dielectric disk is immersed in a static magnetic field.  The subsequent rotation occurs as a consequence to reducing the previously static magnetic field to zero.  The angular momentum and rotational kinetic energy comes directly from the initial static magnetic field.  -- "The Feynman Lectures on Physics" by Richard Feynman, R.B. Leighton, and M. Sands.  Volume II  p 17-6

37. A Report on the T. Townsend Brown Conference: "Focus on Unconventional Energies: A Symposium on Electrical Propulsion & the Technology of Electro-Gravity"  April 15-16, 1994 Philadelphia Community College, Philadelphia, PA

This conference was held in tribute to Thomas Townsend Brown and I feel that it was a great success.  About 15 speakers and 80 attendees provided a brief overview of Zero-Point Energy theories, Free Energy devices, electrostatics theory, and anti-gravity experiments and documentation. Attendees came from as far away as California and Washington.  The conference program advertised the following topics:  -- *Patrick Bailey*
- "A Review of Advanced Energy Devices: Evidence, Promises, and Dangers" by Patrick Bailey (VP INE)
- "Thomas Townsend Brown's Electro-Gravities Research in the 1950's" by Tom Valone (Integrity Institute)
- "The Role of ElectroStatics" by Charles Yost (Electric Spacecraft Journal)
- "Thomas Townsend Brown's Research: A Challenge to Modern Science" by Elizabeth Rauscher (Tecnic Research Laboratories)
- "Electro-Gravitic Theory: Explaining the Operating Principle of Brown's Electric Disks" by Paul LaViolette (The Starburst Foundation)
- "A Panel Discussion on Biefeld-Brown and Beyond
- "Vortices in the Zero Point Energy" by Moray King
- "Design of a Compact Marx Generator Triggered by a Blumlein Capacitor" by George Hathaway
- "Thomas Townsend Brown's Final Gravito-Electric Research" by Josh Reynolds (New Wave Partners)
- "Townsend Brown Effects Reviewed" by Ron Kovac
- "Pushing the Boundaries: Electro-Hydro Dynamic Potentials ..." by Henry Monteith
- "Gravity Drop Tests" by Don Kelly (SEA).

[I have the audio tapes from the T.T. Brown conference (11 tapes in all) and got a lot of good information from it. -- *Bob Reim (reim@advantor.com)*]

38. There is a connection between Townsend Brown and UFOs.  Brown was the founder of **NICAP** (National Investigations Committee on Aerial Phenomena) Project Skylight and served as Vice-Chairman pro tempore during NICAP's organizational period in 1956.

a partial biography of Thomas Townsend Brown:
- 1922-23, private research laboratory, Pasadena, California
- 1924-25, special electronics research, Denison University, Department of Physics
- 1926-30, private research laboratory (astrophysics), Zanesville, Ohio in collaboration with Dr. Paul Biefeld, Swazey Observatory, Granville, Ohio
- 1930-33, Naval Research Laboratory (radiation and spectroscopy), Washington, DC

- ... 1938, Assistant Engineering Officer (Lt. jg USNR) shakedown cruise USS Nashville to Europe
- 1939-40, Materials and Processes Engineer (aircraft), Glenn L. Martin Company, Baltimore
- 1940-41, Officer-in-charge (Lt. USNR), Magnetic and Acoustic Minesweeping, Research&Development, Bureau of Ships, Navy Department, Washington, DC.
- 1942-43, Officer-in-Charge (Lt. Comdr. USNR), Atlantic Fleet Radar Materiel School and Gyro-compass School, Naval Operating Base, Norfolk, Virginia
- 1944-45, Radar Consultant, Advanced Design Section, Lockheed Aircraft Corporation, Burbank, California; ...

Also, there was a T.T. Brown on the Condon committee for UFO studies. And some of Brown's above described Navy duties are coincident with some of the times and places in stories about the **Montauk Project/Philadelphia Experiment**. **[StealthSkater note: UFO phenomena are frequently connected with the M-P and P-X, leading one to wonder if weird high-powered RF electronics creates anomalies that are perceived as "UFOs" or opens up "portals" (or acts as beacons) or actual nuts&bolts extraterrestrial craft. It is interesting to note that electronics guru Bob Beckwith -- who patented many things for the U.S. Navy along the same lines as Brown (above) -- also attended UFO conferences etc. => doc pdf URL ]**

Quotation from a letter to William Moore from T. Townsend Brown dated 12/17/76:

> "I am still working on petro-electricity. The project is housed largely at Stanford Research Institute with additional assistance being provided by the University of California/Berkeley and the Ames Research center of NASA. Unfortunately, under the circumstances, while this project is being evaluated for funding by ERDA, we should not and cannot publish details..."

> "Your next question concerns the airfoils. As far as I am aware, no RF is radiated. There is, of course, a static DC field which accompanies the airfoils in flight."

It is very interesting to note that Townsend Brown was the pioneer in this field and was not able to obtain very much support for his work until the 1950s. During that time, there was much discussion of gravity and antigravity within the aerospace industry and in the magazine *Aviation Week*.

Then the Gravity Research Group (GRG) published a detailed summary report of their review of research into "Electrostatic Motion, Dynamic Counterbary, and Barycentric Control" (i.e. "Antigravity"). This report is the last public report that any researchers have been able to find for us that deals with the physical effects of electrostatics, electrodynamics, and gravity control. (It is also worth noting that this report was found in the Wright Patterson Air Force Base Library "TL 565 A9" and was not listed in the library catalog).

So after the mid-1950's to the present, no other information regarding the technology of electrodynamics and its effect on gravity has been able to be found in any of the unclassified U.S. literature. *-- Patrick Bailey*

39. I have the 5 lab books of TT Brown's R&D at the Bahnson Co. in Salem, N. Carolina during 1958-9. I also have some other letters and drawings of the lab plus the only surviving 16mm color film of the various stages of his work at Bahnson Labs.

I was in contact with Dr Brown in 1983 by phone and by mail.  He died of lung cancer not long after in Oct of 1985.  He told me that a lot of people (including Bill Morre) had attributed more to his work than he had really done.  In particular, he was only marginally connected with the Philadelphia Experiment as such.  His main theme of R&D was dielectrics and the Biefeld-Brown effect.  He was not an electro-magnetics man -- only electro-statics.

From 1983 to 1991-or-so, I was in frequent communication with J. Frank King who was TT Brown's boss at the Bahnson Co.  J. Frank was a good man and a good friend of mine.  He, too, died in Dec 1989.  Before he died, I was given rights to reproduce and share letters, files, drawings, patent submissions, films etc. from his personal files on TT Brown, George Adamski, Dr Ilka, T Henry Moray, and others.

J Frank warned me a long time ago to take what TT Brown said with a "grain of salt" because Townsend had a habit of "stretching the truth" a bit to get funding which he was always in need of.... So I warn you now in good faith.

If you seek lost or hidden technology in Brown's lab notes, I don't think you will find it there.  However, I am prepared to make photocopies available to you.

There are about 750 pages in all.  I would need to charge you AUS$50 per notebook which would include the air mail charges as well.  In US$, that would be about $38 per notebook.  The film is available as are the notebooks (I think) from The Electric Spacecraft Journal in the US (Charles Yost on 704-252-8083, FAX 202-683-3511.  -- *Stan Deyo*

40. As far as I know, the last thing Brown published before his death was, "On The Possibilities of Optical-Frequency Gravitational Radiation", 2/14/1976 and 8/30/1976.  I don't know where it was originally published.  But you can get copy from:

Rex Research, P.O. Box 19250, Jean NV 89019  (http://www.rexresearch.com)

It is part of NR 046-BT2/B17-BRV "T. Brown: Petro-Voltaics" (Gravito-Electric Conversion).  Most people think Brown was just into flying capacitors.  But he was into much, much more!  -- *Bob Paddock*

41. Here are some titles by Townsend Brown:
   ● "The Wizard of Electro-Gravity: The Man Who Discovered how UFOs are powered" by William L. Moore in UFO Report magazine.  Unfortunately, the issue date is not on this copy and the magazine is at work.  A lot of the same information can be found in the book The Philadelphia Experiment: Project Invisibility by William L. Moore with Charles Berlitz.  Chapter 10 "The Force Fields of Townsend Brown".  These two items are the same; I just don't know which one came first.  Also there is more than one book with the title The Philadelphia Experiment. You want the one with ISBN 0-449-20526-6.
   ● "The Townsend Brown Electro-Gravity Device: A Comprehensive Evaluation by the Office of NAVAL Research" 15 September 1952.
   ● Such as "How I Control Gravity by T. Townsend Brown" from *Science and Invention Magazine* Aug. 1929.
   ● "Townsend Brown and his Anti-Gravity Discs" by Gaston Burridge in *Fate Magazine*. No issue date is visible.
   ● "Electrical Self-Potential in Rocks" by T.Townsend Brown, some time after 1/1976,but again no source is visible.

- "Another Step Toward Anti-Gravity" by Gaston Burridge in *The American Mercury*, June 1958, p77.
- "Towards Flight without Stress or Strain... or Weight" by *Intel*, Washington, D.C. [Doesn't make sense but that is what it says.]
- Someone just on the list here just reinvented "The Fluid Pump" by T.Townsend Brown for the Whitehall-Rand Group, Washington DC

42. Paper: gr-qc/9207002
From: [RCAPOVI%CINVESMX.BITNET@ricevm1.rice.edu](mailto:RCAPOVI%CINVESMX.BITNET@ricevm1.rice.edu)
Date: Tue, 21 Jul 1992 17:52 CST
Title: Remarks on Pure Spin Connection Formulations of Gravity
Authors: Riccardo Capovilla and Ted Jacobson
Abstract: In the derivation of a pure spin connection action functional for Gravity, 2 methods have been proposed. The first starts from a first-order Lagrangian formulation; the second from a Hamiltonian formulation. In this note, we show that they lead to identical results for the specific cases of pure gravity with-or-without a cosmological constant.

43. Paper: hep-th/9210110 (Phys. Rev. D47, R5214 (1993).)
From: pullin@mail.physics.utah.edu (Jorge Pullin)
Date: Tue, 20 Oct 92 11:18:14 MDT
"Quantum Einstein-Maxwell Fields: a Unified viewpoint from the Loop Representation" by R. Gambini, J. Pullin. 13pp. no figures.

We propose a naive unification of Electromagnetism and General Relativity based on enlarging the gauge group of Ashtekar's new variables. We construct the connection and loop representations and analyze the space of states. In the loop representation, the wavefunctions depend on 2 loops, each of them carrying information about both Gravitation and ElectroMagnetism. We find that the Chern-Simons form and the Jones Polynomial play a role in the model.

44. Paper: gr-qc/9301012
From: porrati@MAFALDA.PHYSICS.NYU.EDU (Massimo Porrati)
Date: Wed, 13 Jan 93  20:17:21 -0500
"Massive Spin-5/2 Fields Coupled to Gravity: Tree-Level Unitarity vs. the Equivalence Principle" by Massimo Porrati, 6 pages.

I show that the gravitational scattering amplitudes of a spin-5/2 field with mass $m\ll M_{Pl}$ violate tree-level unitarity at energies $\sqrt{s}\approx\sqrt{mM_{Pl}}$ if the coupling to gravity is minimal. Unitarity up to energies $\sqrt{s}\approx M_{Pl}$ is restored by adding a suitable non-minimal term which gives rise to interactions violating the (strong) Equivalence Principle. These interactions are only relevant at distances $d\lequiv 1/m$.

45. Paper: gr-qc/9303014
From: ISTVAN@RMK520.RMKI.KFKI.HU
Date: Wed, 10 Mar 1993 16:24:01 +0100
"(Wet) Maxwell Fiels in Space-Times admitting Non-Null Killing Vectors" by Istvan Racz. 7 pages, PACS numbers: 04.20.Cv, 04.20.Me, 04.40.+c

We consider source-free electromagnetic fields in spacetimes possessing a non-null Killing vector field, $\xi^a$. We assume further that the electromagnetic field tensor $F_{ab}$ is invariant under the action of the isometry group induced by $\xi^a$.

It is proved that whenever the two potentials associated with the electromagnetic field are functionally independent, the entire content of Maxwell's equations is equivalent to the relation $\n^aT_{ab}=0$. Since this relation is implied by Einstein's equation, we argue that it is enough to solve merely Einstein's equation for these electrovac spacetimes because the relevant equations of motion will be satisfied automatically.

It is also shown that for the exceptional case of functionally related potentials $\n^aT_{ab}=0$ implies along with one of the relevant equations of motion that the complementary equation concerning the electromagnetic field is satisfied.

46. Paper: gr-qc/9310007 (*Physica Scripta* 48, 649 (1993))
From: harald@nordita.dk
(Harald H. Soleng) Date: Mon, 4 Oct 93 13:18:04 +0100
"Inverse Square Law of Gravitation In (2+1)-Dimensional Space-Time as a consequence of Casimir Energy" by H. H. Soleng. 10 pages, LaTeX, Report: UPR-0540-T, To appear in Physica Scripta.

The gravitational effect of vacuum polarization in space exterior to a particle in (2+1)-dimensional Einstein theory is investigated. In the weak field limit, this gravitational field corresponds to an inverse square law of gravitational attraction even though the gravitational mass of the quantum vacuum is negative. The paradox is resolved by considering a particle of finite extension and taking into account the vacuum polarization in its interior.

47. Paper: gr-qc/9310019
From: rri!bri@rri.ernet.in (B.R.Iyer)
Date: Tue, 12 Oct 93 12:44:52 IST
"The Frenet-Serret Description of Gyroscopic Precession" by B.R.Iyer and C.V.Vishveshwara, 37 pages, Paper in Latex.

The phenomenon of gyroscopic precession is studied within the framework of Frenet-Serret formalism adapted to quasi-Killing trajectories. Its relation to the congruence vorticity is highlighted with particular reference to the irrotational congruence admitted by the stationary, axisymmetric spacetime.

General precession formulae are obtained for circular orbits with arbitrary constant angular speeds. By successive reduction, different types of precessions are derived for the Kerr-Schwarzschild-Minkowski spacetime family. The phenomenon is studied in the case of other interesting spacetimes such as the De Sitter and Godel universes as well as the general stationary, cylindrical, vacuum spacetimes.

48. Paper: gr-qc/9310030
From: khatsymovsky Date: Thu, 21 Oct 93 16:39:25 +0100
"Can Wormholes Exist?" by V.Khatsymovsky, 10 pages, Plain LaTeX, preprint UUITP-20/1993

Renormalized vacuum expectation values of electromagnetic stress-energy tensor are calculated in the background spherically-symmetrical metric of the wormhole's topology. Covariant geodesic point separation method of regularization is used. Violation of the Weak Energy Condition at the

throat of wormhole takes place for geometry sufficiently close to that of infinitely long wormhole of constant radius irrespectively of the detailed form of metric.

This is an argument in favor of possibility of existence of self-consistent wormhole in empty space maintained by vacuum field fluctuations in the wormhole's background.

49. Paper: hep-th/9402046
From: LANDI@SUHEP.PHY.SYR.EDU
Date: Tue, 08 Feb 1994 15:09:39 -0500 (EST)
"Gravity and ElectroMagnetixm in NonCommutative Geometry" by Giovanni Landi, Nguyen Ai
    Viet, Kameshwar C.Wali, 1 + 11 pages, Report # SU-4240-566

We present a unified description of Gravity and ElectroMagnetism in the framework of a Z2 noncommutative differential calculus. It can be considered as a "discrete version" of Kaluza-Klein theory where the $5^{th}$ continuous dimension is replaced by two discrete points. We derive an action which coincides with the dimensionally-reduced one of the ordinary Kaluza-Klein theory.

50. Paper: gr-qc/9404016
From: David Garfinkle
Date: Sun, 10 Apr 1994  17:44:50 -0400
"Generating New Magnetic Universe Solutions From Old" by By David Garfinkle and M.A. Melvin.
    17 pages

In this paper, we apply the techniques which have been developed over the last few decades for generating nontrivially new solutions of the Einstein-Maxwell equations from seed solutions for simple spacetimes. The simple seed spacetime which we choose is the "magnetic universe" to which we apply the Ehlers transformation. 3 interesting non-singular metrics are generated. Two of these may be described as "rotating magnetic universes" and the third as an "evolving magnetic universe." Each is causally complete in that all time-like and light-like geodesics do not end in a finite time or affine parameter.

We also give the electromagnetic field in each case. For the 2 rotating stationary cases, we give the projection with respect to a stationary observer of the electromagnetic field into electric and magnetic components.

51. Paper: gr-qc/9404065 (*Phys. Rev. D50* (1994) 6190)
From: carroll@marie.mit.edu (Sean Carroll)
Date: Sun, 1 May 1994 16:35:00 -0400
"Energy-Momentum Restrictions on the Creation of Gott Time Machines"  by Sean M. Carroll,
    Edward Farhi, Alan H. Guth, and Ken D. Olum.  Plain TeX, 41 pages incl. 9 figures. MIT-CTP
    #2252.

The discovery by Gott of a remarkably simple spacetime with closed time-like curves (CTCs) provides a tool for investigating how the creation of time machines is prevented in classical general relativity. The Gott spacetime contains 2 infinitely long, parallel cosmic strings which can equivalently be viewed as point masses in (2+1)-dimensional gravity.

We examine the possibility of building such a time machine in an open universe. Specifically, we consider initial data specified on an edgeless, noncompact, space-like hypersurface for which the total momentum is time-like (i.e., not the momentum of a Gott spacetime).

In contrast to the case of a closed universe (in which Gott pairs, although not CTCs, can be produced from the decay of stationary particles), we find that there is never enough energy for a Gott-like time machine to evolve from the specified data. It is impossible to accelerate 2 particles to sufficiently high velocity.

Thus, the no-CTC theorems of Tipler and Hawking are enforced in an open (2+1)-dimensional universe by a mechanism different from that which operates in a closed universe. In proving our result, we develop a simple method to understand the inequalities that restrict the result of combining momenta in (2+1)-dimensional gravity.

52. Paper: gr-qc/9405050
    From: MATSAS@IFT.UESP.ANSP.BR
    Date: Mon, 23 May 1994 15:01 BSC (-0300 C)
    "Do Inertial Electric Charges Radiate with respect to Uniformly-Accelerated Observers?" by George E.A. Matsas. 6 pages (REVTEX 3.0), IFT-P017/94.

We revisit the long standing problem of analyzing an inertial electric charge from the point of view of uniformly accelerated observers in the context of semi-classical Gravity. We choose a suitable set of accelerated observers with respect to which there is no photon emission coming from the inertial charge. We discuss this result against previous claims [F. Rohrlich, *Ann. Phys.* (N.Y.) vol: 22, 169 (1963)]. (This Essay was awarded a 'Honorable Mention' for 1994 by the Gravity Research Foundation.)

53. Paper: gr-qc/9406032
    From: wam@tdo-serv.lanl.gov (Warner A. Miller)
    Date: Mon, 20 Jun 94 14:44:42 MDT
    "Spin Dynamics of the LAGEOS Satellite in Support of a Measurement of the Earth's Gravitomagnetism" by Salman Habib, Daniel E. Holz, Arkady Kheyfets, Richard A. Matzner, Warner A. Miller, and Brian W. Tolman. 16 pages, RevTeX, LA-UR-94-1289. (Part I of II, postscript figures in Part II).

LAGEOS is an accurately-tracked, dense spherical satellite covered with 426 retroreflectors. The tracking accuracy is such as to yield a medium term (years to decades) inertial reference frame determined via relatively inexpensive observations. This frame is used as an adjunct to the more difficult and data intensive VLBI absolute frame measurements. There is a substantial secular precession of the satellite's line of nodes consistent with the classical, Newtonian precession due to the non-sphericity of the Earth. Ciufolini has suggested the launch of an identical satellite (LAGEOS-3) into an orbit supplementary to that of LAGEOS-1. LAGEOS-3 would then experience an equal and opposite classical precession to that of LAGEOS-1.

Besides providing a more accurate real-time measurement of the Earth's length of day and polar wobble, this paired-satellite experiment would provide the first direct measurement of the general relativistic frame-dragging effect. Of the 5 dominant error sources in this experiment, the largest one involves surface forces on the satellite and their consequent impact on the orbital nodal precession. The surface forces are a function of the spin dynamics of the satellite. Consequently, we

undertake here a theoretical effort to model the spin dynamics of LAGEOS. In this paper, we present our preliminary results.

54. Paper: gr-qc/9407003
    From: William Bruckman
    Date: Tue, 5 Jul 94 09:06:49 EDT
    "Generation of Electro and Magneto Static Solutions of the Scalar-Tensor Theories of Gravity" by William Bruckman. 28 pages, LaTeX.

    The field equations of the scalar-tensor theories of gravitation are presented in different representations, related to each other by conformal transformations of the metric. One of the representations resembles the Jordan-Brans-Dicke theory and is the starting point for the generation of exact electrostatic and magnetostatic exterior solutions. The corresponding solutions for each specific theory can be obtained by transforming back to the original canonical representation, and the conversions are given for the theories of Jordan-Brans-Dicke, Barker, Schwinger, and conformally invariant coupling.

    The electrostatic solutions represent the exterior metrics and fields of configurations where the gravitational and electric equipotential surfaces have the same symmetry. A particular family of electrostatic solutions is developed which includes as special case the spherically symmetric solutions of the scalar-tensor theories. As expected, they reduce to the well-known Reissner-Nordstrom metric when the scalar field is set equal to a constant. The analysis of the Jordan-Brans-Dicke metric yields an upper bound for the mass-radius ratio of static stars for a class of interior structures.

55. Paper: gr-qc/9407030
    From: Marco SISSA +39(40)3787522
    Date: Thu, 21 Jul 1994 15:10:04 +0200
    "Quantum ElectroMagnetic Wormholes and Geometrical Description of the Electric Charge" by Marco Cavaglia. 13 pages, PLAIN TEX, Report No: SISSA 92/94/A (to appear in *Phys. Rev. D15*).

    I present and discuss a class of solutions of the Wheeler-de Witt equation describing wormholes generated by coupling of Gravity to the electromagnetic field for Kantowski-Sachs and Bianchi I spacetimes. Since the electric charge can be viewed as electric lines of force trapped in a finite region of spacetime, these solutions can be interpreted as the quantum corresponding of the Einstein-Rosen-Misner-Wheeler electromagnetic geon.

56. Paper: gr-qc/9409060 (*Annals of Physics* vol. 240 432--458 (1995))
    From: soleng@surya11.cern.ch (Harald SOLENG)
    Date: Thu, 29 Sep 94 14:01:03 +0100
    "Modification of the Coulomb potential from a Kaluza-Klein model with a Gauss-Bonnet term in the action" by H. H. Soleng and O. Gron. 27 pages, compressed and uuencoded postscript file with unpacking instructions; major revision to section IV.D.2 on pages 15-16 ("Corrections to the Coulomb potential at short distances") and to the figure on page 27, to be published in The Annals of Physics (NY), NORDITA 94/50

In 4 dimensions, a Gauss-Bonnet term in the action corresponds to a total derivative. It does not contribute to the classical equations of motion. For higher-dimensional geometries, this term has the interesting property (shared with other dimensionally continued Euler densities) that when the action is varied with respect to the metric, it gives rise to a symmetric, covariantly conserved tensor of rank two which is a function of the metric and its first and second order derivatives.

Here we review the unification of General Relativity and electromagnetism in the classical 5-dimensional, restricted (with g55 = 1) Kaluza-Klein model. Then we discuss the modifications of the Einstein-Maxwell theory that results from adding the Gauss-Bonnet term in the action.

The resulting 4-dimensional theory describes a non-linear U(1) gauge theory non-minimally coupled to gravity. For a point charge at rest, we find a perturbative solution for large distances which gives a mass-dependent correction to the Coulomb potential. Near the source, we find a power-law solution which seems to cure the short-distance divergency of the Coulomb potential. Possible ways to obtain an experimental upper limit to the coupling of the hypothetical Gauss-Bonnet term are also considered.


57. Paper: hep-th/9410046
    From: M.J. Duff
    Date: Fri, 7 Oct 94 13:04:15 BST
    "Kaluza-Klein Theory in Perspective" by M. J. Duff, 38 pages latex, NI-94-015

    The Kaluza-Klein idea of extra spacetime dimensions continues to pervade current attempts to unify the fundamental forces. But in ways somewhat different from that originally envisaged. We present a modern perspective on the role of internal dimensions in Physics, focusing in particular on superstring theory. A novel result is the interpretation of Kaluza-Klein string states as extreme black holes. (Talk delivered at the Oskar Klein Centenary Nobel Symposium, Stockholm, September 19-21, 1994.)


58. Paper: gr-qc/9509018
    From: nunez@venus.fisica.unlp.edu.ar (NUNEZ Carlos)
    Date: Fri, 8 Sep 95  15:05:13 EST
    Title: On Pseudospherically Symmetric Repulsive Gravitational Field
    Authors: Luis A. Anchordoqui, Graciela S. Birman, Jose D. Edelstein, and Carlos Nunez
    Report-no: La Plata-Th 95/23

The solution of Einstein vacuum equation for a static pseudo-spherically symmetric system is presented. It describes a singular solution that produces a repulsive gravitational field with an event horizon. We analyze particle motion in such a gravitational field and comment on some interesting features of the solution.


59. "The Origin of the Electromagnetic Interaction in Einstein's Unified Field Theory" by Antoci,S.
    *General Relativity and Gravitation*, Vol 23 No 1, 1991

    Recently it has been shown that if sources are appended in a certain way to the field equations of Einstein's Unified Theory, the contracted Bianchi identities and the field operations appear endowed with definite physical meaning. The theory looks like a Gravo-ElectroDynamics in a

polarizable Riemmannian continuum.  **The wealth of the implied possibilities is far richer** than in the so-called Einstein-Maxwell theory.

60. Paper: HEP-TH/9411092
From: hssong@phyy.snu.ac.kr
Date: Mon, 14 Nov 94 15:19:29 KST
Title: Factorization and polarization in linearized gravity
Authors: S.Y. Choi; J.S. Shim; H.S. Song
Comments: 45 pages, figures are included (uses pictex), RevTex Report-no: KEK-TH-415, HYUPT-94/10, SNUTP 94-03

We investigate all the 4-body graviton interaction processes: gX→gamma X, gX→gX, and gg→gg with X as an elementary particle of spin less than 2 in the context of linearized gravity except the spin-3/2 case.  We show explicitly that gravitational gauge invariance and Lorentz invariance cause every 4-body graviton scattering amplitude to be factorized.  We explore the implications of this factorization property by investigating polarization effects through the covariant density matrix formalism in each 4-body graviton scattering process.

61. Causality, electromagnetic induction, and gravitation : a different approach to the theory of electromagnetic and gravitational fields
Oleg D. Jefimenko.
Star City [West Virginia] : Electret Scientific Co., c1992. xii, 180 p.
LC CALL NUMBER: QC665.E4 J44 1992
SUBJECTS: Electromagnetic fields.  Gravitational fields.  Causality.  Maxwell Equations.

62. COUNTER-GRAVITATION -- the sustaining of an object in space by means of a counter-gravitational effect produced through the action of an electric field upon the object . Associated with the effects of levitation in this manner is a simultaneous appearance of a strange luminous halo that appears at about 500,000 volts.
Sources:
- *American Philosophical Society Proceedings*. Philadelphia, PA, years 1914-1929.  Articles on Charles F. Brush's experiments.
- *Electrical Experimenter*. "Can Electricity Destroy Gravitation?", New York, March 1918.
- *Electrical Experimenter*. "Piggott's Electro-gravitation Experiment", Vol. 8, 1920.
- Hooper, William J.  New Horizons in Electric, Magnetic, and Gravitational Field Theory, Principia College, Elsah, IL, 1974.
- The Scientific Papers of James Clerk Maxwell. Vol. II, W.D. Niven (ed.), Constable & Co., London, 1965. "Le Sage Theory of Gravitation".
- *Transactions of the Academy of Science*. "Nipher's Gravitation Experiments", Vol. 23, pp. 163-192+, St. Louis, 1916.
- US patent No. 1,006,786, Piggott.
- US patent No. 3,518,462, Brown.
- US patent No. 3,610,971, Hooper.

63. "Journal of Propulsion and Power" of the AIAA, R.H. Woodward Waesche, Science Applications International Corporation, Editor-in-Chief.

This Journal is devoted to the advancement of the science and technology of aerospace propulsion and power through the dissemination of original archival papers contributing to advancements in airbreathing, electric, and advanced propulsion; solid and liquid rockets; fuels and propellants; power generation and conversion for aerospace vehicles; and the application of aerospace science and technology to terrestrial energy devices and systems.

It is intended to provide readers of the Journal (who have primary interests in propulsion and power) access to papers spanning the range from research through development to applications. Papers in these disciplines and the sciences of combustion, fluid mechanics, and solid mechanics as directly related to propulsion and power are solicited.

64. I have recently come into possession of a paper on magneto-gravitics and field resonance systems presented by A.C. Holt from NASA Johnson Space Center to the American Institute of Aeronautics and Astronautics' 16th Joint Propulsion Conference, June 30-July 2, 1980. Holt presents a project using an already existing system known as the Coherent Field and Energy Resonance System (CoFERS) [probably located at Los Alamos Labs' High Magnetic Field Research Laboratory].

CoFERS utilizes a toroidal-shaped energy guide with mega-gauss magnetic field sources located along radius vectors equally spaced around the toroid. CoFERS is shaped like a thick flying disc. Holt goes on to say:

"By conveying an object's normal space-time energy pattern to an energy pattern which differs substantially from the normal pattern, the gravitational forces acting on the object are changed. The object's new pattern interacts with the surrounding space-time and virtual energy patterns such that the interactive forces are substantially altered. The alteration of the characteristics of the continuous field of force results in the apparent motion of the object *through space-time*." [...]

"Since the gravitational forces acting on the propulsion system can be quickly altered to achieve the desired motion, the *spacecraft* can make right-angle turns at very-high velocities without adversely affecting the crew or system elements. The effective gravitational field the *spacecraft/aircraft* experiences can be nearly simultaneously reoriented at a 90- degree angle, resulting in a smooth continuous motion as far as the occupants are concerned." [ ... ]

"The gravimagnetic system is perhaps best suited for use in and around ... a large mass such as the Earth."

"While the gravimagnetic system is likely to be the first field-dependent propulsion system developed, the field resonance system will **bring stellar and galactic travel out of the realm of science-fiction**. The field resonance system artificially generates an energy pattern which precisely matches or resonates with a virtual pattern associated with a distant space-time point. According to the model, if a fundamental or precise resonance is established, (using hydromagnetic wave fine-tuning techniques), the spacecraft will be very strongly and equally repelled by surrounding virtual patterns. At the same time, through the virtual many-dimensional structure of space-time, a very strong attraction

with the virtual pattern of a distant space-time point will exist. ...this combination of very strong forces will result in the translocation of the spacecraft from its initial position through the many-dimensional virtual structure to the distant space-time point. [ ... ]

"A space-time 'jump' already appears to be supported by astrophysical research."

Should you wish the entirety of this report, "Prospects for a Breakthrough in Field Dependent Propulsion" by A.C. Holt, you can order it from AeroPlus Dispatch, 1722 Gilbreth Road, Burlingame, CA 94010; phone: (800)-662-AERO. The paper/conference number is AIAA-80-1233 (American Institute of Aeronautics andAstronautics, June 30-July 2, 1980 - 16th Annual Conference. *-- Richard Boylan*

There is also a great article discussing the work of A.C. Holt in the *Electric Spacecraft Journal*, Issue No. 5, June 30, 1992.

65. GENERAL RELATIVITY & QUANTUM COSMOLOGY, ABSTRACT GR-QC/9601024
   From: MONTANARI@axpfe1.fe.infn.it
   Date: Wed, 17 Jan 1996 13:01:16 +0100 (CET)
   Coherent Interaction of a
   Monochromatic Gravitational Wave with both Matter and Electromagnetic Circuits
   Author(s): Enrico Montanari (1) , Pierluigi Fortini (1) ((1) University of Ferrara,INFN sezione di
      Ferrara, Italy)

   The interaction of a gravitational wave with a system made of an RLC circuit forming one end of a mechanical harmonic oscillator is investigated. We show that in some configurations, the coherent interaction of the wave with both the mechanical oscillator and the RLC circuit gives rise to a mechanical quality factor increase of the electromagnetic signal. When this system is used as an amplifier of gravitational periodic signals, a sensitivity of $10^{-30}$ on the amplitude of the metric could be achieved.

66. GENERAL RELATIVITY & QUANTUM COSMOLOGY, ABSTRACT GR-QC/9602004
   From: wells@cfaitamp2.harvard.edu (Jack Wells)
   Date: Thu, 1 Feb 1996 16:50:06 -0500
   Gravitational Interaction of Spinning Bodies, Center-of-Mass Coordinate and Radiation of Compact
      Binary Systems
   Author(s): I.B. Khriplovich, A.A. Pomeransky

   Spin-orbit and spin-spin effects in the gravitational interaction are treated in a close analogy with the fine and hyperfine interactions in atoms. The proper definition of the center-of-mass coordinate is discussed. The technique developed is applied then to the gravitational radiation of compact binary stars.

   Our result for the spin-orbit correction differs from that obtained by other authors. New effects possible for the motion of a spinning particle in a gravitational field are pointed out. The corresponding corrections -- nonlinear in spin -- are in principle of the same order of magnitude as the ordinary spin-spin interaction.

67. HIGH ENERGY PHYSICS - THEORY, ABSTRACT HEP-TH/9601119

From: gonzalez@fyma.ucl.ac.be
Date: Tue, 23 Jan 1996 10:03:41 +0100 (MET)
Spinning Relativistic Particle in an External Electromagnetic Field
Author(s): M. Chaichian , R. Gonzalez Felipe, D. Louis Martinez

The Hamiltonian formulation of the motion of a spinning relativistic particle in an external electromagnetic field is considered. The approach is based on the introduction of new coordinates and their conjugated momenta to describe the spin degrees of freedom together with an appropriate set of constraints in the Dirac formulation. For particles with gyromagnetic ratio $g=2$, the equations of motion do not predict any deviation from the standard Lorentz force while for $g \neq 2$ an additional force (which corresponds to the magnetic dipole force) is obtained.

68. HIGH ENERGY PHYSICS - PHENOMENOLOGY, ABSTRACT HEP-PH/9601280

From: MAREK@taunivm.tau.ac.il
Date: 16 Jan 96 19:19 IST
The Strange Spin of the Nucleon
Authors: John Ellis (CERN), Marek Karliner (Tel-Aviv Univ.)
Comments: Invited Lectures at the International School of Nucleon Spin Structure, Erice, August 1995.

The recent series of experiments on polarized lepton-nucleon scattering have provided a strange new twist in the story of the nucleon -- some of whose aspects are reviewed in these lectures.

In the first lecture, we review some issues arising in the analysis of the data on polarized structure functions, focusing in particular on the importance and treatment of high-order QCD perturbation theory.

In the second lecture, some possible interpretations of the "EMC spin effect" are reviewed -- principally in the chiral soliton (Skyrmion) approach but also interpretations related to the axial $U(1)$ anomaly. This lecture also discusses other indications from recent LEAR data for an $\bar{s} s$ component in the nucleon wave function and discusses test of a model for this component.

Finally, the third lecture reviews the implications of polarized structure functions measurements for experiments to search for cold dark matter particles, such as the lightest supersymmetric particle and the axion after reviewing briefly the astrophysical and cosmological evidence for cold dark matter.

69. "Mechanical Propulsion From Unsymmetrical Magnetic Induction Fields"
R.L. Schlicher; A.W. Biggs; W.J. Tedeschi
31$^{st}$ AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, July 10-12 1995

A method is presented for generating mechanical spacecraft propulsion from unsymmetrical magnetic induction fields. It is based on an unsymmetrical 3-dimensional loop antenna structure driven by a repetitively-pulsed high-current power supply. Antenna geometry is optimized for generating propulsive thrust rather than radiating electromagnetic energy. A magnetic field density gradient imbalances the magneto-mechanical forces that result from the interactions of the internal magnetic induction field with the current in the conductors of the antenna structure.

From Richard Feynman's "Lectures on Physics", we learn that there is intrinsic field energy and momentum density associated with a static electro-magnetic field configuration. When there is a change in the magnetic field, this field energy and momentum can be directly converted into kinetic energy and mechanical momentum. Feynman illustrates this with an electromagnetic carousel paradox.

In this paradox, a dielectric disk (which is embedded with small charged spheres along its circumference) rotates without any apparent "counter" torque in the system. Before this rotation occurs, the dielectric disk is immersed in a static magnetic field. The subsequent rotation occurs as a consequence to reducing the previously static magnetic field to zero. The angular momentum and rotational kinetic energy comes directly from the initial static magnetic field.

"The Feynman Lectures on Physics" by Richard Feynman, R.B. Leighton, and M. Sands, Volume II p 17-6

"Nonlinear Electromagnetic Propulsion System and Method", R.L. Schlicher, 19$^{th}$ Power Modulation Symposium of the IEEE, 1990 Page 139

"Classical Electrodynamics" by C.D. Jackson, 2nd Edition, John Wiley and Sons, New York, 1975

"The Feynman Lectures on Physics" Richard Feynman, R.B. Leighton, and M. Sands, Volume II p 27-9

US Patent #5142861, "Nonlinear Electromagnetic Propulsion System", R.L. Schlicher et al. 1992

70. Dr Peter Graneau has conducted experiments which he claims provide a demonstration of departure from classical electrodynamics at high currents levels. A force is found to exist in a direction longitudinal to current flow.

Graneau ran a variety of types of experiments with a metal rod conductor immersed in a conductive fluid (mercury, or saline solution). With high amperage passing through the solution, the metal rod is found to move in a longitudinal direction. There is no known explanation in conventional EM theory.

This force may be similar to the force (v X B) that William Hooper finds in a non-inductive coil. Or Graneau's longitudinal force may be a coupling between the electromagnetic and inertial/gravitational fields which is predicted by some 5-D unified EM/gravitational theories (predicted to result from a divergence of the electric current vector field).

Graneau's experiments should be relatively easy to duplicate. But I can find no record that anyone has ever done so. Graneau has also discovered apparently anomalous forces and effects in high-energy electromechanical devices such as rail guns and induction motors.

AUTHOR: Graneau, Peter.
TITLE: Ampere-Neumann Electrodynamics of Metals.
PUBL.: Nonantuma, MA. : Hadronic Press,
FORMAT: ix, 311 p. : ill. ; 23 cm.
DATE: 1985
SUBJECT Metals--Electric properties--History.
Free electron theory of metals--History. Electrodynamics--History.
Electric conductors--History.
ISBN: 0911767371

AUTHOR: Graneau, Peter
TITLE:    Electromagnetic Jet Propulsion in the Direction of Current Flow
In: *Nature*  June 18, 1982 No 295 Page 311


AUTHOR(s):       Graneau, P.
TITLE(s):  Ampere force calculation for filament fusion experiments.
In: *Physics Letters A*  MAR 22 1993 v 174 n 5/6 Page 421


AUTHOR(s):       Graneau, P.
TITLE(s):  Comment on "The motionally induced back-EMF in railguns".
In: *Physics Letters: [part A]*  DEC 02 1991 v 160 n 5 Page 490


AUTHOR(s):       Graneau, Peter
TITLE(s):  The Difference between Newtonian and Relativistic Forces.
In: Foundations of Physics Letters.  OCT 01 1993 v 6 n 5 Page 491


AUTHOR(s):       Graneau, P.
TITLE(s):  Electrodynamic momentum measurements.
In: *Journal of Physics D: applied physics*.  DEC 01 1988 v 21 n 12 Page 1826


AUTHOR(s):       Graneau, P.
TITLE(s):  Far-action versus contact action.
In: *Speculations in Science and Technology*.  1990 v 13 n 3 Page 191


AUTHOR(s):       Graneau, Peter
TITLE(s):  Inertia's Riddle.
Summary: Inertia has been misunderstood ever since the time of Galileo, says Dr. Graneau.
In: *Electronics World + Wireless World*.  JAN 01 1990 v 96 n 1647 Page 60


AUTHOR(s):       Graneau, P.
TITLE(s):  Longitudinal forces in Ampere's wire-arc experiment.
In: Physics Letters: [part A]  MAY 08 1989 v 137 n 3 Page 87


AUTHOR(s):       Graneau, P. Thompson, D.S. Morrill, S.L.
TITLE(s):  The motionally induced back-emf in railguns.
In: *Physics Letters: [part A]*  APR 30 1990 v 145 n 8/9 Page 396


AUTHOR(s):       Graneau, Peter
TITLE(s):  Nonlocal Action in the Induction Motor.
In: *Foundations of Physics Letters*.  OCT 01 1991 v 4 n 5 Page 499


AUTHOR(s):       Graneau, P. Graneau, N.
TITLE(s):  The role of Ampere forces in nuclear fusion.
In: *Physics Letters: [part A]*  MAY 04 1992 v 165 n 1 Page 1


AUTHOR: Graneau, Peter.
TITLE:    Underground Power Transmission : the science, technology, and economics of high
          voltage cables
PUBL.:    New York : Wiley
FORMAT: x, 515 p. : ill. ; 24 cm.

DATE:      1979
SUBJECT: Electric cables.  Electric power transmission.  Electric lines--Underground
ISBN:      0471057576

I see that Graneau has devoted himself to the electric rail gun.  I looked a bit into this phenomena in 1994.  I will now be able look a bit further.  It seems that Graneau believes in free energy in vacuum.  The rail gun and the theories about it are very controversial.  There is a conflict between PhD Witalis (who works for the Swedish Defense) and the established plasma physiscists here in Uppsala.  Witalis has condemned controlled hot fusion.  *-- David Jonsson*

71. <u>MAGNETO-RESISTANCE IN METALS</u> by Pippard, A.B.
Cambridge Studies in Low Temperature Physics 2 1989  6x9  272 pp.  3 halftones  113 line diagrams
Hardback 0-521-32660-5 $84.95 (£50.00)

Pippard provides the first systematic account of magneto-resistance in metals -- the study of which has provided solid-state physicists with valuable information about electron motion in metals. The electrical resistance of a metal is usually changed when a magnetic field is applied to it.  And at low temperatures, the change may be very large indeed.  Every metal behaves differently, and the effect has been widely used to elucidate details of electron motion in individual metals.

Because there has been no systematic account of the phenomena (apart from review articles addressing special points), this book fills an obvious gap.  Making no great demand on mathematical ability, it should be a valuable reference work for readers with a basic knowledge of undergraduate solid-state physics.  The text is copiously illustrated with real experimental results.

72. Albert C. Crehore published <u>New Electrodynamics</u> in 1950.  In this book, he described how the <u>motion</u> <u>of</u> <u>protons</u> in the nucleus would produce gravitational field effects.  Gravitational field effects such as counter-bary are used in the mainstream effort to develop non-areodynamic non-rocket flight systems that usually referred to as "anti-gravitational".

By making use of the "Crehore Paradigm", it is possible to derive a method of producing counter-bary.  It's most likely Crehore had no knowledge of Brown's 1928 British patent for a gravitator device that would have been a Macroscopic analog of a Crehore atom.

Crehore, Albert C. (Albert Cushing), b. 1868.  <u>The mystery of matter and energy; recent progress as</u>
    <u>to the structure of matter</u> by Albert C. Crehore ... New York, D. van Nostrand company, 1917
    LC CALL NUMBER: QC173 .C8
    SUBJECTS: Matter--Constitution.

Crehore, Albert C. (Albert Cushing), b. 1868.  <u>The Atom</u> by Albert C. Crehore  ... New York, D.
    Van Nostrand company, 1920. xvi, 161 p. diagrs. 19 cm.
    LC CALL NUMBER: QC173 .C75

73. A man named Gerry Vassilator is an electrogravity experimenter.  Last I know (in 1991), he runs an information service called MUUDO Experimental Videos, Delmar Ave, Staten Island, NY 10312. (718)-356-9373.

74. There are many books available about anti-gravity and other weird science subjects from:
    International Tesla Society
    330-A West Uintah Street - Suite 215
    Colorado Springs CO 80905-1095


75. The Anti-Gravity Handbook (revised ed.)
    Compiled by D. Hatcher Childress
    Published by Adventures Unlimited Press 303 Main St., Kempton, Illnois 60949
    USA ISBN: 0-932813-20-8
    Pub date: 1993 (First edition was in 1985)

    Anti-gravity and the World Grid (1st ed)
    edited by David Hatcher Childress, Stelle, IL
    Adventures Unlimited Press, c1987. 267 p. : ill. ; 26 cm. LC CALL NUMBER: BF1999 .A6386
        1987
    SUBJECTS: Antigravity. Grids (Cartography). Occultism.
    ISBN: 0932813038 (pbk.) : $12.95

    The Anti-gravity handbook / compiled by D. Hatcher Childress. 1st ed. Stelle, IL.
    Adventures Unlimited Press, c1985 (1986 printing) 195 p. LC CALL NUMBER: QC178 .A58 1985
    SUBJECTS: Antigravity.
    ISBN: 0932813011 (pbk.) : $12.95


76. Pages, Marcel J. J.
    Le defi de l'antigravitation: techniques antiponderales, utilisation de l'energie de l'espace [par]
    Paris, Chiron [1974] 306 p. LC CALL NUMBER: QC178 .P23
    SUBJECTS: Antigravity. Force and energy. ISBN: 2702703097


77. Nipher, Francis Eugene, 1847-
    Electricity and Magnetism.  A mathematical treatise for advanced undergraduate students by Francis
    E. Nipher ... 2d ed., rev. with additions.
    St. Louis, Mo., J. L. Boland book and stationery co., 1895 i.e. 1898 xi, 430 p. diagrs. 20 cm.

    My library research shows that as early as 1917, a Professor Nipher had found that the weight of substances could be reduced (become negative) by the application of electrostatic charges (*Science*, Sept. 21, 1917, page 173).

    In a series of reports in the Proceedings of the American Philosophical Society, Dr. Charles Bush around 1922 found in some well-thought-out-experiments that weight was not only proportional to mass but was also affected by the atomic structure of the substances.  For example, he found that for a given unit of mass and shape, Bismuth falls faster than Zinc or Aluminum in complete contradiction to Newton's Law of Gravity which they are still teaching in colleges today!  So far, the literature hasn't given me an answer.

    Incidentally, Otis Carr's work involved counter-rotating charged discs that supposedly produced thrust when they reached a certain speed in relation to the Earth's rotational speed and became activated by free energy from space.  Maybe he did have something." -- *James E. Cox*

78. When individual molecules are not permanently magnetized, it is possible in some cases to have a relative magnetic permeability u which is less than one. Such a material (like Hydrogen or Bismuth) is called diamagnetic. It tends to expel magnetic field and is repelled from regions of stronger magnetic field. The names "paramagnetic" and "diamagnetic" are sometimes confused. Pramagnetic is analogous to a dielectric in an electric field while diamagnetic is quite the opposite.

It is not possible to give a simple argument of why diamagnetism can occur. It is, strictly speaking, a quantum effect. However, one can see that there might be diamagnetic tendencies if electric currents can flow within molecules. An increasing magnetic field always tends to induce currents to flow in such a way as to tend to prevent the increase in the field. This is (at least temporarily) a diamagnetic kind of effect.

Thus the case where the relative magnetic permeability u<1 is connected with the flow of electric charges in a magnetic field. There is no analogous case with electric fields since isolated magnetic poles do not (so far as is known) exist. -- The New Physics edited by Paul Davies

79. GE engineer Henry Wallace found unusual gravitational effects in spinning odd atomic nucleid metals. Odd atomic nucleid metals are those in which the sum of the protons are not equal to the number of neutrons (i.e., more neutrons). See US patents 3626605 and 3626606. -- *Ron Kita*

80. "Also indicated in the embodiment is the orientation of the flux within the mass circuit, the latter being constructed preferably of Bismuth."
Henry Wallace
US patent # 3626605 - Method and Apparatus for Generating a Secondary Gravitational Force Field

81. AUTHOR(s):     Uyeda, C.;Yamanaka, T.; Miyako, Y.
TITLE(s): Magnetic rotation of diamagnetic oxide crystals and the origin of diamagnetic anistropies.
In: *Physica B.* Condensed matter. MAY 01 1995 v 211 n 1/4 Page: 342

82. A while back, I had the need to take a peek at a copy of the Periodic Table of elements. So I grabbed my old, dusty college chemistry book that I could never quite bring myself to toss. It's called Chemical Principles, published WAY back in 1970. While looking through the book, I was stunned when I came across a discussion of the possibilities of new elements.

"What lies ahead for the synthesis of trans-Uranium elements? Will there be more radioactive and extremely short-lived species such as 97 through 104? It now appears as if there is a chance of reaching a new zone of stability that might even include some none radioactive elements. Calculations with nuclear shell models have led to the expectation that Element-114 with 114 protons and 184 neutrons (both magic numbers in the new shell theory) would be an island of stability in a sea of instability."

I noted that some information was taken from an article in the April 1969 (pages 57-67) issue of *Scientific American* by Dr. Glenn Seaborg. In this article, there are excellent graphics showing the expected half-lives of all the heavyweights. They predict a fission half-life for the most stable isotope of 114 of 10 to the 16th years and an alpha-decay half-life of 1,000 years. They didn't go into the same level of detail for 115. But it looks like the stuff would clock out considerably sooner by way of beta decay.

BTW, according to the article, the proper terminology to denote an undiscovered element in a Periodic column is the prefix "eka". Therefore Element-115 should be eka-BISMUTH. Lose this Un-un-pentium crap! -- *Tom Mahood*

[StealthSkater note: Tom was featured prominently in David Darlington's Area-51: The Dreamland Chronicles (ISBN 0-8-50-4777-8) as he uncovered many flaws in Bob Lazar's stated background. Refer to doc pdf URL-doc URL-pdf .]

Lazar is not the only one to theorize that the 114/115 area is stable. Check out the August 31, 1991 issue of *New Scientist* (that respected peer-reviewed periodical). Find Glenn Seaborg's article called "The Search for the Missing Elements." Seaborg is a renowned scientist who won the Nobel Prize for Chemistry in 1951. He and his research group at the Lawrence Berkeley Laboratory have discovered 10 of the trans-Uranium elements. His article is very technical and interesting. In it, he has two separate graphs that show islands of stability at the 114/115 area. There is a sea of instability around these "islands."

83. AUTHOR(s):     Bhattacharyya, S.; Ghoshal, A.; Ghatak, K.P.
    TITLE(s): On the field emission from bismuth in the presence of a quantizing magnetic field.
    In: *Fizika*; a journal of experimental and theoretic APR 01 1991 v 23 n 2 Page 159

    AUTHOR(s):     Byrne, A.P.; Birkental, U.; Hubel, H.
    TITLE:     High-Spin States in 205Bi.
    In: *Zeitschrift fur Physik. A*, Atomic nuclei 1989 v 334 n 3 Page: 247

    AUTHOR(s):     Vezzoli, G.C.; Chen, M.F.; Craver, F.
    TITLE(s): Magnetically-related properties of Bismuth containing high-$T_c$ superconductors.
    In: *Journal of Magnetism and Magnetic Materials*. AUG 01 1990 v 88 n 3 Page 351

    AUTHOR(s):     Bannerjee, D.; Bhattacharya, R.
    TITLE(s): Magnetic Properties of Single Crystals of Bismuth doped with Lead and Tin.
    In: *Physica status solidi. b:* basic research. JAN 01 1990 v 157 n 1 Page 443

    AUTHOR(s):     Zhilyaev, I.N.
    TITLE(s): Observation of kinetic paramagnetic effect in Bismuth in a transverse magnetic field.
    In: *Soviet Journal of Low Temperature Physics*. SEP 01 1988 v 14 n 9 Page 502

    AUTHOR(s):     Mondal, M. ;Banik, S.N.; Ghatak, K.P.
    TITLE(s): Effect of a quantizing magnetic field on the Einstein relation in Bismuth.
    In: *Canadian Journal of Physics*. JAN 01 1989 v 67 n 1 Page 72

    AUTHOR(s):     Zheng, Q.; Zeng, Z.; Lai, W.
    TITLE(s): The influence of Al on the electronic structure and magnetic properties of doped MnBi
        with huge enhancement of Kerr rotation.
    In: *Journal of Magnetism and Magnetic Materials*. FEB 01 1992 v 104/107 p 2 Page 1019

84. CONDENSED MATTER, ABSTRACT COND-MAT/9601068
    From: arghya@mri.ernet.in ("Arghya Taraphder")
    Date: Wed, 17 Jan 1996 14:30:54 +0500

The Exotic Barium Bismuthates

Authors: A. Taraphder, Rahul Pandit, H.R. Krishnamurthy, T.V. Ramakrishnan

We review the remarkable properties including superconductivity, charge-density-wave ordering, and metal-insulator transitions of Lead- and Potassium-doped Barium Bismuthate. We discuss some of the early theoretical studies of these systems. Our recent theoretical work on the negative-$U\backslash/$, extended-Hubbard model for these systems is also described. Both the large- and intermediate-$U\backslash/$ regimes of this model are examined using mean-field and random-phase approximations -- particularly with a view to fitting various experimental properties of these bismuthates.

On the basis of our studies, we point out possibilities for exotic physics in these systems. We also emphasize the **different consequences of electronic and phonon-mediated mechanisms** for the negative $U.\backslash/$ We show that, for an electronic mechanism, the \secin \,\,phases of these bismuthates must be unique with their transport properties {\it dominated by charge $\pm 2e$ Cooperon bound states}. This can explain the observed difference between the optical and transport gaps. We propose other experimental tests for this novel mechanism of charge transport and comment on the effects of disorder.

85. Huston, David L.
"The nature and possible significance of the Batamote Copper-Bismuth-Silver anomaly", Pima County, Arizona by David L. Huston and Paul K. Theobald.
Washington : U.S. G.P.O. ; Denver, CO :
For sale by the Books and Open-File Reports Section, U.S. Geological Survey, 1990. v, 19 p. : ill., maps LC CALL NUMBER: QE75 .B9 no. 1907 (ALTERNATE CLASS QE390.2.C6)
SUBJECTS: Copper ores--Arizona--Batamote Mountains Region. U.S. Geological Survey bulletin ; 1907
**[StealthSkater note: David Hutson is most noted for his professed discovery of the Type III solid-state ORMEs/Ormus substances => doc pdf URL ]**

86. Beck, Sherwin M.
"Measured electron conversion ratios for the 1064-keV gamma ray of Bismuth-207"
by Sherwin M. Beck. Washington, National Aeronautics and Space Administration;
[for sale by the Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.] 1970. 39 p. illus. 27 cm. LC CALL NUMBER: TL521 .A3525 no. 6057
SUBJECTS: Bismuth--Isotopes. Nuclear counters. NASA technical note, NASA TN D-6057

87. The following is an excerpt from a telephone interview between Stanton Friedman (**F**) and Dr. Robert Sarabacher (**S**). Sarabacher was a prominent U.S. government scientist who had a secret briefing with Canadian scientist Wilbert Smith in 1950. He told Smith that that facts in a recent popular book about a UFO crash at Aztec, New Mexico were "essentially true" and that UFOs were classified by the U.S. Government 2 points higher than the H bomb. **[SS: details are archived at doc pdf URL ]**

Sarabacher died in July 1986. Before Sarabacher died, Stanton Friedman did a phone interview with him. In between Friedmann's attempts to dig more UFO info out of Sarabacher, there was a lot of small talk. And since Sarabacher was fairly old, he tended to ramble a bit. However, a most interesting statement was made by Sarabacher:

F: Were you guys talking about nuclear-powered flight at that time?

S: Oh, we were possibly, yes.  But I held had certain ideas, see.  One of the problems today [is that] we really don't know <u>what</u> Gravity is.  We don't know and I had an idea.  I'm willing to work on it in one of my theses, but then my professor didn't believe me.  But I had determined that **Bismuth** did <u>not</u> obey the laws of gravity.  So I thought that "Gee, there's a leak".  I might be able to get Nature to tell me something.

So where exactly is Bismuth on the Periodic Table of Elements?  Why, directly above where [Lazar's] E-115 would fall if it exists!  And the way the Table works, (generally speaking) elements in the same column have similar properties.

So just what-the-hell was Sarabacher referring to?  I don't know, but it's sure intriguing!  It appears it was back when he was a grad student in maybe the 30s or 40s.  Whatever it was, it was at the very edge of the ability of equipment at the time.  Does Bismuth possess any very subtle anomalous physical properties? -- *Tom Mahood*

**[StealthSkater note: Lazar claims that his major contribution to "Project Galileo" was in determining that the mystery substance was Element-115.  It had resisted all conventional tests normally used to determine the number of protons in an atom's nucleus.  He didn't say what his "backdoor method" was that led him to conclude it was E-115.  But I wonder if some strange exotic arrangement of lower-weight elements (like Bismuth) could somehow appear as a much heavier element.  The fact that it resisted standard tests makes me suspicious right off-the-bat.]**

88. In the Wallace patent #3626606, Figs. 7A and 7B are side views of a gravity-NEUTRALIZING FLYING SAUCER (or if anchored to the ground, a ZERO-GRAVITY CHAMBER).

    Each oval diagram shows a motor spinning a central disc at a very high speed (about 28,000 RPM) and also rotating 2 other discs sandwiched around the first disc (via gears) at a much slower speed (perhaps 2,800 RPM) in the opposite direction.  The 2 outer discs have extensions [counter-balanced via off-center axis] that as they rotate, alternately make contact with 2 wide extensions from opposite walls of the spacecraft.

    The central disc should have shallow spiral-shaped grooves on both sides for air-bearings to allow the needed very close contact with the 2 outer discs.  Each of the 2 outer discs has ONLY ONE [counter-balanced] extension -- each one pointed opposite (180 degrees) the extension of the other disc.

    The most important factor making it work is that the discs, extensions, and outer walls of the spacecraft MUST be made of any material(s) in which a very large majority of the atoms are of isotopes having "HALF-INTEGRAL ATOMIC SPINS" such as Copper (3/2).   -- *Robert E. McElwaine*

89. AUTHOR(s):       Sun, W.; Stephen, J.T.; Wu, Y.
    TITLE(s): Rotation-Induced Resonance and Second-Order Quadrupolar Effects on Spin Locking of Half-Integer Quadrupolar Nuclei.
    In: *Journal of Magnetic Resonance. Series A.*  OCT 01 1995 v 116 n 2 Page: 181

AUTHOR(s):        Seliger, J.; Blinc, R.
TITLE(s): Orientation dependences of quadrupolar spin-lattice relaxation rates of spin-3/2 nuclei subject to a random two-site exchange in a high magnetic field: a theoretical study.
In: *Journal of Physics*. Condensed matter : an Inst  DEC 13 1993 v 5 n 50 Page: 9401


90. Thanks for the patent info about Wallace.  I got them a few days ago and found it quite enjoyable. Actually, many people have had this notion at one time or another.  I think that Oleg Jefimenko wrote a book relating to this subject.  -- *Keith Nagel*


AUTHOR: Jefimenko, Oleg D.
TITLE:    Electricity and Magnetism: an introduction to the theory of electric and magnetic fields.
EDITION: 2nd ed.
PUBL.:    Star City, W. Va. : Electret Scientific Co.
DATE:     1989
SUBJECT: Electromagnetism
ISBN:     0917406081


AUTHOR: Jefimenko, Oleg D.
TITLE:    Electrostatic Motors: their history, types, and principles of operation (with many illus. of which 57 are by David K. Walker.
PUBL.:    Star City (W. Va.) Electret Scientific Co.
DATE     1973
SUBJECT: Electrostatic apparatus and appliances


AUTHOR: Jefimenko, Oleg D.
TITLE:    Causality, Electromagnetic Induction, and Gravitation:  a different approach to the theory of electromagnetic and gravitational fields"
PUBL:     Star City [West Virginia] : Electret Scientific Co.,
DATE:     1992.
SUBJECTS: Electromagnetic fields. Gravitational fields. Causality. Maxwell Equations.


AUTHOR(s):        Jefimenko, Oleg D.
TITLE(s): Direct calculation of electric and magnetic forces from
In: *American Journal of Physics*.  JUL 01 1990 v 58 n 7 Page 625


AUTHOR(s):        Jefimenko, Oleg D.
TITLE(s): Direct calculation of the electric magnetic fields of an electric point charge moving with constant velocity.
In: *American Journal of Physics*.  JAN 01 1994 v 62 n 1 Page 79


AUTHOR(s):        Jefimenko, Oleg D.
TITLE(s): Force exerted on a stationary charge by a moving electric current or by a moving magnet.
In: *American Journal of Physics*.  MAR 01 1993 v 61 n 3 Page 218


AUTHOR(s):        Jefimenko, Oleg D.
TITLE(s): Retardation and Relativity: The case of a moving line charge.
In: *American Journal of Physics*.  MAY 01 1995 v 63 n 5 Page 454


AUTHOR(s):        Jefimenko, Oleg D.

TITLE(s): Retardation and Relativity: derivation of Lorentz-Einstein transformation from retarded
integrals for electric and magnetic fields.
In: *American Journal of Physics*.  MAR 01 1995 v 63 n 3 Page 267

AUTHOR(s):     Jefimenko, Oleg D.
TITLE(s): Solutions of Maxwell's equations for electric and magnetic fields in arbitrary media.
In: *American Journal of Physics*.  OCT 01 1992 v 60 n 10 Page 899


91. "Anti-Gravity Electronics", H. Aspden, *Electronics&Wireless World*, Jan 1 1989, Vol 95 No 1635
     Reinterpretation of Netwon's Third Law of Motion suggests that it depends upon an electronic
action.  Electronic interaction therefore explains the paradoxical anti-gravity properties of the force
precessed gyroscope.

"The Anti-Gravity Puzzle", Mark Ander, *Professional Pilot*, Aug 1 1989
     Exploring the possibility of exceptions to Newton's inverse-square law of gravity, scientists
pursue evidence in strange locations.

"The Latest Anti-Gravity Gossip", *Rock&Ice*, Nov 1 1994 No 64

"Propulsion by Gyro", Eric Laithwaite, *Space*, Sep 1989 Vol 5 No 5
     In an attempt to reveal the strange, hidden properties of gyroscopes, Professor Eric Laithwaite
explains the physics behind the idea that a propulsion system could be built using gyros.


92. "Negative Mass in General Relativity", H. Bondi, *Reviews of Modern Physics*, Vol 29, July 1957, pp
423-428

"Looking for New Gravitational Forces with Antiprotons", M.M. Nieto and B.E. Bonner,
Proceedings RAND Workshop on Anti Proton Science and Technology, World Scientific,
Singapore, 1988 pp 328-341

"Negative and Imaginary Proper Masses", Y.P Terletskii, Paradoxes in the Theory of Relativity,
Plenum, New York 1968, Chapter VI pp 83-115

"Gravitational Coupling of Negative Matter", A. Inomata and D. Peak, *Nuovo Cimento*, Vol B63 Sep
1969 pp 132-142

"Negative-Mass Lagging Cores of the Big Bang", B.D. Miller, Astrophysical Journal, Vol 208, Sep
1976 pp 275-285

"The Cosmological Term, the Shielding of Gravitation, and the Negative Mass Hypothesis", A.A.
Baranov, *Izvestiya VUZ Fizika*, Vol 14 Nov 1971 pp 118-120

"Negative Masses and the Energy-Sources of the Universe", Y.P. Terletskii, *Experimentelle Technik
der Physik*, Vol 29 April 1981 pp 331-332


93. ElectroMagnetic-Gravitational Conversion Cross-Sections in External ElectroMagnetic Fields
International Centre for Theoretical Physics, Trieste (Italy).
Long, Hoang Ngoc Soa, Dan Van Tran, Tuan A.

The classical processes -- the conversion of photons into gravitons in the static electromagnetic fields -- are considered by using Feynman perturbation techniques. The differential cross sections are presented for the conversion in the electric field of the flat condenser and the magnetic field of the solenoid. A numerical evaluation shows that the cross sections may have the observable value in the present technical scenario. CASI Accession Number: N95-30637

94. I have an excerpt from a paper presented under the auspices of Northrop Corp in 1968 that gives an idea of why you would want to bother with high-voltage fields. To achieve the effects described involved relatively small high voltage. The true electrogravitational effects are significant at higher E-field strength. In any case, this was only the state of the art in 1968. Their involvement in the B-2 stealth bomber began much later after considerably more research.

"Electroaerodynamics In Supersonic Flow" by M. S. Cahn and G. M. Andrew, Northrop Corporation, Hawthorne, California. Presented at AIAA 6th Aerospace Sciences Meeting, January 22-24, 1968 -- *Tom Capizzi (tcapizzi@world.std.com)*

95. ELECTRO-AERODYNAMICS: Electric charges are applied to high-speed vehicles for the purpose of reducing air drag or eliminating sonic booms. High-speed ions are projected forward from the leading edges of the craft. The corona glow propagates forward and repels air molecules away from the oncoming surfaces. Thus a shock wave cannot be mechanically produced.

Sources: Dudley, Horace C., *Analog Science Fact & Fiction*. "The Electric Field Rocket", November 1960.

*Product Engineering*. "Sonic Boom Experiments", Vol. 39, New York, pp. 35-6, March 11, 1968.

US Patent No. 3,095,167, Dudley.

96. The paper entitled the "U.S. Antigravity Squadron" paper appears with others in the book ELECTROGRAVITICS SYSTEMS: Reports on a New Propulsion Methodology edited by Thomas Valone (Washington, D.C.: Integrity Research Institute, 1994); ISBN 0-9641070-0-7.

In addition to this paper, this book also includes the following:

1) The 1956 paper "Electrogravitics Systems" (prepared by the Special Weapons Study Unit of Aviation Studies Ltd. -- a UK-based aviation industry intelligence firm). It was declassified from a 'Confidential' status some time prior to 1985 and entered the public domain as a result of a request that I placed through the Wright-Patterson Air Force Base Technical Library.

2) The 1956 paper "The Gravitics Situation" (prepared by Gravity Rand Ltd. -- a division of Aviation Studies Ltd. This includes 6 appendices with papers by various authors including the text from T. Townsend Brown's 1929 gravitor patent.

3) A paper by Banesh Hoffman entitled "Negative Mass as a Gravitational Source of Energy in the Quasistellar Radio Sources.

4) A collection of diagrams copied from various patents by T. Townsend Brown. You may order a copy from Starburst Publications, 1176 Hedgewood Lane, Schenectady NY 12309, USA

Also available from Starburst Publications is the book Subquantum Kinetics: The Alchemy of Creation (ISBN 0-9642025-0-6). Subquantum kinetics is a new approach to microphysical theory that utilizes concepts from the fields of nonlinear chemical kinetics, irreversible thermodynamics, and general system theory, replacing the current mechanistic foundation of Physics with a reaction-kinetic model. This new approach resolves a number of problems that plague classical and modern physics also may provide some insights into the electrogravitic connection that Brown was researching. In particular, Chapter 9 gives some background information on Townsend Brown's electrogravitics.

Scott, W.B. "Black World engineers, scientists encourage using highly-classified technology for civil applications." *Aviation Week & Space Technology*, March 9, 1992, pp. 66,67.

Brown, T.T. "How I Control Gravity." *Science and Invention Magazine*, August 1929. Reprinted in Psychic Observer 37(1) pp.14 - 18.

Burridge, G. "Another Step Towards Antigravity." *The American Mercury* 86(6) (1958):77 - 82.

Sigma, Rho. "Ether Technology: A Rational Approach to Gravity Control." Lakemont, GA: CSA Printing & Bindery, 1977, p. 44-49, quoting a letter from T. Townsend Brown dated February 14, 1973.

Intel. "Towards Flight Without Stress or Strain...Or Weight." *Intervia Magazine* 11(5) (1956):373-374

Rose, M. "The Flying Saucer: The Application of the Biefeld-Brown Effect to the Solution of the Problems of Space Navigation." University for Social Reesearch, April 8, 1952.

LaViolette, P.A. "An Introduction to Subquantum Kinetics: Part Journal of General Systems, Special Issue on Systems Thinking in Physics" 11(1985):295-328.

LaViolette, P.A. Subquantum Kinetics: The Alchemy of Creation. Schenectady, NY, 1994.

LaViolette, P.A. Beyond the Big Bang: Ancient Myth and the Science of Continuous Creation. Rochester, VT:Inner Traditions Intl., 1994.

LaViolette, P.A. "A Theory of Electrogravtics." *Electric Spacecraft Journal*, Issue 8, 1993, pp. 33 - 36.

LaViolette, P.A. "A Tesla Wave Physics for a Free Energy Universe."
Proceedings of the 1990 International Tesla Symposium, Colorado Springs, CO
International Tesla Society, 1991, pp. 5.1 - 5.19.

Aviation Studies (International) Ltd. "Electrogravitic Systems: An Examination of Electrostatic Motion, Dynaimc Counterbary and Barycentric Control." Report GRG 013/56 by Aviation Studies, Special Weapons Study Unit, London, February 1956. (Library of Congress No. 3,1401,00034,5879; Call No. TL565.A9).

LaViolette, P. "Electrogravitics: Back to the Future." *Electric Spacecraft Journal*, Issue 4, 1992, pp. 23 - 28.

LaViolette, P. "Electrogravtics: An Energy-Efficient Means of Spacecraft Propulsion." Explore 3 (1991): 76-79; idea No. 100159 submitted to NASA's 1990 Space Exploration Outreach Program.

Aviation Studies (International) Ltd. "The Gravitics Situation" prepared by Gravity Rand Ltd. - a divison of Aviation Studies, London, December 1956.

"Northrup Studying Sonic Boom Remedy." *Aviation Week & Space Technology*, Jan. 22, 1968, p.21.

Rhodes, L. "Ex-NASA Expert Says Stealth Uses Parts from UFO." *Arkansas Democrat*, Little Rock, AR., April 9, 1990.

Scott, W.B. Inside the Stealth Bomber. Tab/Aero Books: New York, 1991.

97. One of the most famous researchers in this area is **John Searl** who noticed that spinning metal would accumulate electrons on the rim -- possibly through some kind of centrifugal thrust. The initial test was a metal disk attached to a breakaway coupling driven by a gasoline engine. It was carried out in the country and as the disk reached higher and higher speeds, tremendous electrostatic forces were generated which were estimated at $10^6$ volts! That's when the disk began to glow blue … broke the coupling … rose to about 30 feet … continued to accelerate … turned pink and shot off into space.

   Searl claims that this happened with many of his early tests and as a result, he lost the device each time. Later, he learned how to control the device. The neat thing about it is that the Searl disk is self-propelling using a magnetic drive. *-- Jerry Decker (www.keelynet.com)*

   THE SEARL EFFECT (The Introduction)
   [To contact WCVE, write to:
   23 Sesame Street, Richmond VA, 23235
   or phone: 804-320-1301
   or fax: 804-320-8729]

   ANTIGRAVITY: The Dream made Reality [The Story of John R. R. Searl] by John A. Thomas Jr.
   Published by Direct International Science Consortium 13 Blackburn, Low Strand, Grahame Park Estate, London NW95NG England
   Available in the USA through John A. Thomas, Jr., 373 Rock Beach Rd., Rochester, NY 14617-1316 Phone: (716) 467-2694

98. Aspden, Harold A. (1989). "The Theory of the Gravitation Constant," *Physical Essays*, Vol. 2, No. 2, pages 173-179.

   Aspden, Harold A. (1991). "The Theory of Antigravity," *Physical Essays*, Vol. 4, no. 1, pages 13-19.

99. Sigma, Rho. Forschung in Fesseln: das Ratsel d. Elektro-Gravitation.
   Wiesbaden-Schierstein : Ventla-Verl., 1972. 272 p. : ill. ; 21 cm.

100. There is also a good book written by an Aerospace Engineer who worked for General Electric named John Ackerman. The book is called To Catch a Flying Star. It is available from Univelt, Inc., P.O. Box 28130, San Diego, CA. 92128  1989  ISBN 0-912183-03-9.


101. ELECTRIC SPACECRAFT JOURNAL
    $24/yr. (U.S)  $29/yr (Canada/Mexico)  $39/yr other countries
    P.O. BOX 18387
    Asheville, North Carolina 28814
    I highly recommend this semi-pro publication.  Buy all the back issues, too!  It's not just 'counterbary' but has articles on energy anomalies, Tesla, unconventional hobby projects, unconventional physics, etc.

    SPACE ENERGY NEWS
      PO Box 11422
      Clearwater FL 34616
      Suscription info: $35, 4 issu/yr =
      Editors: Donald A. Kelly, Michael Marino

    The Space Energy Association is dedicated to the pioneering work of several scientists and inventors, including Nikola Telsa, Viktor Schauberger, T. Henry Moray, T.T. Brown, Alfred Hubbard, T.J.J. See, Erwin Saxl, Hans Coler and others

    Antigravity by R.M. Santilli
    The Institute for Basic Research,
    PO Box 1577
    Palm Harbor FL 34682


102. Recently I had read a book from Hans A. Nieper with the title Konversion von Schwerkraft-Feld-Energie (transformation of gravity field energy).  This book tells from transformers of the types Fluxtransformer (electrodynamic system) and Capacitor Discharge (solid-state method).  My problem is that I find nowhere any information about these machines.  So I hope that YOU can give me hints where I can find information (books, files, articles) about these machines and theories.  I am also grateful for your opinions about these theory and these machines. -- *Michael Bell / Berlin, Germany*

    Revolution in Technik, Medizin, Gesellschaft. (Revolution in technology, medicine and society: conversion of gravity field energy).  Hans A. Nieper. Extended ed. in English, 1. ed. Oldenburg : MIT Verlag, 1985. 384 p. : ill. ; 22 cm.  LC CALL NUMBER: TJ163.7 .R4813 1985
    SUBJECTS: Power (Mechanics)--Congresses. Translation of: Revolution in Technik, Medizin, Gesellschaft.
    Cover title: Dr. Nieper's Revolution in technology, medicine, and society.  Includes proceedings of the Symposium on Energy Technology, Hannover, Nov. 27-28, 1980 and the First International Symposium on Non-Conventional Energy Technology, Oct. 23-24, Toronto, Oct. 23-24, 1981. ISBN: 392518807X

103. Nieper, Hans A.  Zur Theorie der Schwerkraftwirkungen.  In "Revolution in Technik Medizin Gesellschaft"

Bearden, T.E.  "Maxwell's Lost Unified Field Theory of Electromagnetics and Gravitation" in *New Energy Technology*, pg. 25.  Published by The Planetary Association for Clean Energy, nc. Ottawa/Hull, Canada.

Bearden, Thomas E. (1988). "Maxwell's Original Quaternion Theory Was a Unified Field Theory of Electromagnetics and Gravitation," <u>Proceedings of the International Tesla Society</u>, 1988, ITS Books.

Moretti, Angelo.  "Possibility of Non-Zero Mass in Synchrotron Radiation" in <u>What Physics for the Next Century?</u>,  pg. 397 - Inediti No. 59, Societ_Editrice Andromeda, Bologna

Gunnufson, Craig.  "Neuere Neutrinomessungen aus der Sonne unterstuetzen eine neue Theorie".  Lecture held at a congress on Gravity Field Energy in Toronto, Oct. 1981.  In Nieper, "Revolution in Technik Medizin Gesellschaft", Illmer Verlag, Hannover

Seike, Shinichi. " Lecture held at Energy Symposium" in Hannover, November 1980.  In Nieper, "Revolution in Technik Medizin Gesellschaft".


104. Anyone ever see Stan Deyo's book <u>Cosmic Conspiracy</u>?  He talked about an ElectroGravitics society (I think it was).

These things must have some sort of high-voltage resonating circuitry in a round shape obviously.  They can recharge over high-power lines.  They can apparently become invisible.  They also must be able to change their mass so they can accelerate at very high rates.

For anyone interested, he wrote a second book called <u>The Vindicator Scrolls</u> which contains more information.

**[StealthSkater note: excerpts from Deyo's first book are archived at (a) doc pdf URL-doc URL-pdf and (b) doc pdf URL-doc URL-pdf .  In an email to me, Tom Mahood was not impressed at all with Deyo's science (to say the least).  But who knows …]**


105. "Space Warps: A Review of One Form of Propulsionless Transport," *Journal of the British Interplanetary Society*, 42 (Nov. 1989): 533-542.
   ● "Negative Matter Propulsion," *Journal of Propulsion and Power*, 1 (Jan.-Feb. 1990): 28-37.
   ● Vonsovskii, S, <u>Ferromagnetic Resonance</u>, 1966.
   ● Feynman, R, <u>Feynman Lectures on Physics</u>, v2, 1964
   ● Chikazumi, S, <u>Physics of Magnetism</u>, 1964
   ● Soohoo, R, <u>Microwave Magnetics</u>, 1988
   ● Herlach, F, Strong and Ultrastrong Magnetic Fields, 1985

<u>Feynman's Lectures</u> Vol II Chapter 10, Page 10-8 describes an electrostatic effect that may be related to the Biefeld-Brown effect.  Feynman shows that a force results on a dielectric due to the gradient of the square of the electrical field.

106. There have been quite a few people who have also looked at "gravitationless" universes such as:
Ralph Juergens, <u>Reconciling Celestial Mechanics</u>, Pensee Fall, 1992.
C E R Bruce, <u>A New Approach to Astrophysics and Cosmogony</u>, London 1944
<u>Problems of Atmospheric and Space Electricity</u>, Elsevier, 1965
Eric Crew, "Electricity in Astronomy", *SIS Review*, Vol 1 No 1-4.
Earl Milton," Electric Stars in a Gravity-less Electrified Cosmos", *SIS Review*, Vol V, No 1.
*-- Ian Tresman / London, UK*


107. AUTHOR:      Driscoll, R.B.
TITLE:  Comments on the paper "Gravitational lift via the Coriolis force" by Leon R. Dragone.
In: *Hadronic journal*.  JUL 01 1988 v 11 n 4 Page: 177


108. Paper: gr-qc/9503060
From: linet@ccr.jussieu.fr (Bernard LINET)
Date: Thu, 30 Mar 1995 14:55:07 +0200
Title: Vacuum polarization induced by a uniformly accelerated charge
Author: B. Linet
Report-no: GCR-941003

We consider a point charge fixed in the Rindler coordinates which describe a uniformly accelerated frame.  We determine an integral expression of the induced charge density due to the vacuum polarization at the first order in the fine structure constant.  In the case where the acceleration is weak, we give explicitly the induced electrostatic potential.


Paper: gr-qc/9504023
From: Mathias PILLIN
Date: Mon, 17 Apr 1995 10:43:50 +0900
Title: Pure spin-connection formulation of gravity and classification of energy-momentum tensors
Author: Mathias PILLIN
Report-no: YITP/U-95-12

It is shown how the different irreducibility classes of the energy-momentum tensor allow for a pure spin-connection formulation.  Ambiguities in this formulation especially concerning the need for constraints are clarified.


Paper: gr-qc/9504041
From: SHORE@crnvma.cern.ch
Date: Tue, 25 Apr 95 17:22:56 SET
Title: ``Faster than Light" Photons in Gravitational Fields -- Causality, Anomalies, and Horizons
Authors: G.M. Shore
Report-no: SWAT-95/70

A number of general issues relating to superluminal photon propagation in gravitational fields are explored.  The possibility of superluminal -- yet causal -- photon propagation arises because of Equivalence Principle violating interactions induced by vacuum polarization in QED in curved spacetime.

2 general theorems are presented.  First, a polarization sum rule which relates the polarization averaged velocity shift to the matter energy-momentum tensor.  Second, a "horizon theorem"

which ensures that the geometric event horizon for black hole spacetimes remains a true horizon for real photon propagation in QED.

A comparison is made with the equivalent results for electromagnetic birefringence and possible connections between superluminal photon propagation, causality, and the conformal anomaly are exposed.

Paper: hep-th/9506035
From: Gary Gibbons  Date (revised)
Sun, 27 Aug 95 11:31:39 BST
Title: Electric-Magnetic Duality Rotations in Non-Linear Electrodynamics
Authors: G W Gibbons, D A Rasheed
To appear in *Nucl Phys B* Report-no: DAMTP preprint # R95/46.
We show that there is a function of one variable's worth of Lagrangians for a single Maxwell field coupled to gravity whose equations of motion admit electric-magnetic duality.

Paper: gr-qc/9506053
From: ESPOSITO@napoli.infn.it
Date: Mon, 26 Jun 1995 10:24:36 +0200 (CET-DST)
Title: Euclidean Maxwell Theory in the Presence of Boundaries
Author: Giampiero Esposito
Comments: 18 pages, plain-tex, to appear in: Heat-Kernel Techniques and Quantum Gravity, Discourses in Mathematics and Its Applications, No. 4, edited by S.A. Fulling (Texas A&M University, College Station, Texas, 1995)
Report-no: DSF preprint 95/31
This paper describes recent progress in the analysis of relativistic gauge conditions for Euclidean Maxwell theory in the presence of boundaries. The corresponding quantum amplitudes are studied by using Faddeev-Popov formalism and zeta-function regularization after expanding the electromagnetic potential in harmonics on the boundary 3-geometry. This leads to a semi-classical analysis of quantum amplitudes involving transverse modes, ghost modes, coupled normal and longitudinal modes, and the decoupled normal mode of Maxwell theory.

Paper: gr-qc/9507050
From: Luis Octavio Pimentel
Date: Tue, 25 Jul 1995
11:19:44 -0500 (CDT)
Title: Electromagnetic Field in Some Anisotropic Stiff Fluid Universes
Authors: Pimentel L O
Report-no: UAMI-AG-95-29
The electromagnetic field is studied in a family of exact solutions of the Einstein equations whose material content is a perfect fluid with stiff equation of state (p = $\epsilon$ ). The field equations are solved exactly for several members of the family.

109. El Escorial Summer School on Gravitation and General Relativity 1992:
"Rotating Objects and Relativistic Physics": <u>Proceedings of the El Escorial Summer School on Gravitation and General Relativity</u> (1992) held at El Escorial, Spain, 24-28 August 1992 / F.J. Chinea, L.M. Gonzalez-Romero, eds. Berlin ; New York : Springer-Verlag, c1993. 302p. LC CALL NUMBER: QC178 .E36 1992
SUBJECTS: Gravitational fields. General Relativity. Astrophysics
Chinea, F. J. (Francisco Javier), 1949-

Gonzalez-Romero, L. M. (Luis Manuel), 1962- ISBN: 354057364X (Berlin : acid-free paper) : DM90.00
038757364X (New York : acid-free paper) : $62.00


110. <u>Propulsion Techniques: Action and Reaction</u> by Peter J. Turchi, editor, Ohio State University.
Spring 1995, 350 pp, illus, Paperback
ISBN 1-56347-115-9
(Available from the AIAA)

This is the first of 3 volumes devoted to space propulsion part of a new series of titles with articles taken from the pages of <u>Aerospace America</u>.  The 3-volume collection of over 150 articles rescues the insights, concerns, and dreams of dozens of space propulsion experts for the next generation of aerospace scientists and engineers.  Written by well-known figures in space propulsion, including Werner von Braun, Martin Summerfield, Ernst Stuhlinger, and Jerry Grey, these books provide readily accessible source material for design courses in astronautical engineering.

This first volume surveys the technologies of rocketry in the traditional categories of liquid, solid, hybrid, nuclear and electric propulsion.  Historical trends and cycles are displayed in each category as articles describe concepts and progress from the early visions of Goddard, Oberth, and Tsiolkovsky to proposed (and re-proposed) ideas for advanced space thrusters.  In addition to descriptions of rocket engines of various types (including photon and laser propulsion), associated technologies for propellants and space-electrical power systems are discussed.


111. I have a book from Russia that may interest you.  It's in Russian and called <u>Experimental Gravity</u>. It is jointly authored by a father and son -- S.M. Poliakov and O.M. Poliakov.  It describes "gyro-gravity" and "ferromagnetic-gravity" and also how to produce gravity.  It's 130 pages and contains a lot of pictures and diagrams and equations (that's about all I understand from it).  To judge from the pictures, the Russians must have conducted a lot of research in this topic.  (Many different devices are on the pictures).  The question is now how do I get a translator?  *-- David Jonsson*


112. <u>INTRODUCTION TO EXPERIMENTAL GRAVITONICS</u>
Abstract of book by S.M.Poliakov and O.S.Poliakov.  The experiments part covers the following subjects:

1. Light-beam curvature and optical-radiation frequency shift is created and investigated in an artificial nonhomogeneous gravitational field.  A new gravitational effect named "quadrature" frequency shift in the curved light beam is predicted and calculated.
2. Magnetostriction is at last explained as a secondary gravitational effect. A n equation derived for magnetostriction permits to calculate the magnetostriction curve.
3. The propagation velocity of gravitational radiation (generated by a laboratory source) was measured for "quadrupole" - $9 \times 10^{20}$ cm/s or squared light velocity.
4. It was demonstrated that gravitation is only one of NONLINEAR-MECHANICS EFFECT that can be created in mechanical system or in ferromagnetic.

The book was published at the author's expense in 1991.  Most powerful experimental result described in this book is more than 1,200 grams of pulsed G-force.  Several mechanical systems and systems using ferrites are detailed here.

Second edition in English is ready for copy process (disket's text). Editors and investors are interested in joint project for publication can get direct contact with Dr. Poliakov by address: Moscow area, 141120, FRIAZINO, 60-let str., 1-167. Phone 7-095-4658822.

*-- Alexander V. Frolov , P.O.Box 37, St.-Petersburg, 193024, Russia. e-mail: alex@frolov.spb.ru*

I wrote already about Poliakov's book <u>Experimental Gravitonics</u>. He wrote it in 1991 and published in Russian. Now he has an English version as MSDOS text on diskette. If you wish help for Dr.Poliakov, write for him and buy book in Russian or copy of text in English. Here is more information.

*-- Alex Frolov*

<u>Experimental Gravitonics</u> , Spartak M. Poliakov and Oleg S. Poliakov
Russia 141120 Moscow area, Friazino, 60-let SSSR str., 1 - 167.

TABLE OF CONTENTS

Super-weapon designer Edward Teller has written an article entitled "Electromagnetism and Gravitation", *Proc. Nat. Acad. Sci*. USA Vol 74, No 4. pp. 2664-2666.   Teller's article is referenced in the book by the Poliakov brothers [above] about Russian experiments in gravitation control.

113.  H.E. Puthoff, "The energetic vacuum: implications for energy research", *Speculations in Science and Technology*, vol.13, No.3, p.247.
    ● Thomas Valone, "Inertial propulsion...",  *Newsletter of Planetary Association for Clean Energy*, vol.7 No.1, p.6-12.  Published by PACE, Inc. 100 Bronson Av., Suite 1001, Ottawa, Ontario K1R 6G8, Canada.
    ● re NASA electrostatic levitation experiments and Thomas Townsend Brown's research look the *Newsletter of Planetary Association for Clean Energy*, vol.7 No.4.p.7. July, 1994. "Electrogravitics Developments" reprinted from *NEXUS Special*.
    ● "The Swiss Methernitha-Linden Converter", p.3-6. *Space Energy Newsletter*, June 1993, vol.4 No.2. Published by Space Energy Association, P.O.Box 11422, Clearwater, FL 34616, USA.
          My understanding of this electrostatic machine allows development of a simple scheme: self-rotating thanks to electrostatic forces disk and ordinary electrical generator connected with axis of disk.
    ● Conception of Edmund Whittaker (papers of 1903-1904) is developed by T.E.Bearden in his book Gravitobiology published by Tesla Book Co., P.O.Box 121873, Chula Vista, CA 91912, USA.
    ● P.D. Ouspensky, A New Model of the Universe, New York, 1971.p.433 in Russian edition of 1993.
    ● Example of joint demonstration of "gravity/chronal/over-unit power" effect is invention of Ivan Stepanovitch Filimonenko of 1960.  His version of cold fusion system produced:
          (1) Heat power
          (2) Motive force without fling back of mass
          (3) Influence on time-period of half-decay.

Article of N.E.Zaev published in "Izobretatel i Razionalizator", Russia, No.1 1995, p.8-9.
● Alexander V. Frolov, The Application of Potential Energy for Creation of Power, *New Energy News,* vol.2, No.1, May 1994. Published by Institute for New Energy, P.O.Box 58639, Salt Like City, UT 84158-8639, USA.
● V.V.Lensky, General for Many-Polarity, Irkutsk, Russia, 1986. Published in Russian by Irkutsk University.
● N.A.Kozyrev, Selected works, 1991, published by University of St. Petersburg, in Russian.


114. Bearden, Thomas E. and Walter Rosenthal (1991). "On a testable unification of ElectroMagnetics, General Relativity, and Quantum Mechanics", 26th IECEC, VOL. 4, pp 487-492 and Association of Distinguished American Scientists.

● Bearden, Thomas (1992). "A redefinition of the energy Ansatz, leading to a fundamentally new class of Nuclear Interactions", 27th IECEC, pp 4.303-4.310 and Association of Distinguished American Scientists.

● Grotz, Toby (1992). "The Use of Mirror Image Symmetry in Coil Winding Applications and Advantages in Magnetic Field Generation", 27th IECEC, pp 4.311-4.313.

● Hathaway, George D. (1991). "From Anti-Gravity to Zero-Point Energy: a Technical Review of Advanced Propulsion Concepts", AIDAA/AIAA/DGLR/JSASS 22nd International Electric Propulsion Conference, Viareggio, Italy

● LaViolette, Paul A. (1991). "SubQuantum Kinetics: Exploring the Crack in the First Law", 26th IECEC, VOL. 4, pp 352-357.

● Surgalla, Lynn A. (1991). "Nonlinear Dynamics: Mathematical Physics for 21st Century Technology (A Tutorial for Engineers)", 26th IECEC, VOL. 4, pp 394-399.

● Valone, Thomas (1991). "Non-Conventional Energy and Propulsion Methods", 26th IECEC, VOL. 4, pp 439-444.

● DePalma, Bruce (1991). "Magnetism as a Distortion of a Pre-Existent Primordial Energy Field and the Possibility of Extraction of Electrical Energy Directly from Space", 26th IECEC, VOL. 4, pp 429-432.

● Valone, Thomas (1991). "The One-Piece Faraday Generator: Research Results", 26th IECEC, VOL. 4, pp 473-478.

● AUTHOR :Znidarsic, Frank
TITLE :Elementary Antigravity
PUBLISHED :New York : Vantage Press ; 1989 PHYSICAL DESC :53 p. ; 21 cm.
SUBJECT :Gravitation, Antigravity

● Title: The Source of Inertial and Gravitational Mass
Author: Frank Znidarsic, P.E. FZNIDARS@GPU.COM, electrical engineer with the Penn Electric Co., Johnstown, PA
Comments: 8 PAGES ASCII TXT
File. NEW ENERGY PROJECT

Submitted to the *Canadian Journal of Physics*, July 94 resubmitted Jan 95 Texted in the DOS editor.
(Available at Elektromagnum website)

● Title: Genesis of and Zero-Point Energy
Frank Znidarsic, P.E.   FZNIDARS@GPU.COM, electrical engineer with the Penn Electric Co., Johnstown, PA Comments: ASCII *.TXT, 5 PAGES, Texted on DOS editor
submitted to the *Canadian Journal of Physics* July 94, Resubmitted Jan 95
Report_no: Special Energy Prog. (Available at Elektromagnum website)

115. The Jackson text is entirely wrong if it does discuss magnetic fields without a potential - the electromagnetic 4-potential A always applies to the conservation of 4-momentum (energy and momentum) by electromagnetic interactions.  See <u>GRAVITATION</u> by Misner, Thorne, and Wheeler.

116. The causative agent of gravitational gradients (Potential) was first enumerated G.L. LeSage in 1784.  H.A. Lorentz and G.H. Darwin evaluated LeSage's postulate mathematically and rejected it when -- as a result of <u>their</u> evaluation -- it was found that although the postulated process could describe all observed gravitational phenomena (and inherently results is GR), the mechanism REQUIRED a continuous overall LOSS of energy (apparently disappearing into matter in a clear violation of the Conservation of Energy).  I could go on to suggest that mining this concept and process could lead one to significant "pay dirt" in terms of understanding how GR relates to QM.

The kinetic model of LeSage does lead to a valid model for physical processes.  The key is Super-Fluid theory.  Both GR and QM are fully described as well as why each dominates at the scales they do.  Hemholtz proved that a superfluid vortex ring is infinitely stable and without a boundary discontinuty can not be created or destroyed.  Kelvin mathematically proved that the equations that describe small linear disturbances in a a superfluid vortex sponge are IDENTICAL to the equations that describe the propogation of light through space.

An EXCELLENT book on this topic is <u>A History of the Theories of Aether and Electricity</u> by Sir Edmund Whitaker, Dover Reprint 1989.  I cannot give any reference a higher recommendation.  Why is this information not known, that, Sir, is a very long and interesting story.  -- *Paul Stowe*

117.  For a much more current model than LeSage of a sink-source interpretation of gravity, see O.C. Hilgenberg's <u>Gravitation, Tromben, und Wellen in bewegten Medien</u> (1931), GieSmann & Bartsch.  It's in German.  It's in the National Union Catalogue.  If you don't read German, then Carl Frederick Krafft's <u>Ether and Matter</u> (1945), Dietz Printing Co. contains some portions translated from Hilgenberg's work.

Hilgenberg developed a quantum numbering system of the atoms based upon Krafft's ether-vortex atom model entitled "Quantenzahlen, Wirbelring-Atommodelle und Heliumsechserring-Aufbauprinzip des Periodensystems der chemischen Elemente".  Which means roughly a Quantum Number, Vortex Atom model and Hexagonal-ring construction principle of the Periodic system of the chemical elements.  Krafft saw the quantization of energy as a logical consequence of a system of particles consisting of basically pumps, which could take in and give out energy and ether/space at limited rates based on rotations of the various rings.

In his model (as opposed to LeSage's), the flux terminates in what he called equipotential zones -- much as one would see if 2 jets of water were to collide coaxially.  So the intake of 2 bodies "squirting" out ether will be on the back sides of both bodies and -- hence -- they are pushed together.  LeSage saw each body acting as shields to the ultra-mundane particles racing in all directions in space (cosmic rays foreseen in the 18$^{th}$ Century!).  Thus the 2 bodies move into each other's "shadow".

Louis Kevran's work on low-energy transmutations of the elements was predicted by Krafft's model.  And there was a man named Nemos who claimed to have developed a television type microscope not limited by the optical paths of standard microscopes.  I have a photo he took which shows (it is claimed) the nucleous of an Iron atom as a collection of vortices arranged peripherally (non-coaxially).  It's like looking down on pearl-like smoke rings connected by vibrating jets.  It's an amazing photo(?)

Krafft's prediction was that the proton and electron would be double-vortex structures and the neutron a triple-vortex structure.  The picture seems to confirm that.  So much for my 2-bits.  The work of Krafft is not heavily laden with math.  The beauty of it to me is it can be <u>visualized</u>. (Note: Nemo's "microscope" may be based on the technology very recently developed which is known as magnetic microscopy.)

I have a neat little book written by Carl Krafft back in the 1930s.  He was an avid developer of an ether-vortex theory of atomic and gravitational forces.  His theory was underpinned by the writings of O.C. Hilgenberg and Hermanne Fricke of Germany, pre-Nazi.  Hilgenberg's views included a vertical ether sink as the cause of Gravity and the consequent development of mass in the interior of the Earth.  Hence the Earth expanded over time with periodic explosive expansions and contractions.

Meanwhile, Krafft developed the idea of combining vortices in face-to-face rolling contact which provides 4 basic forms: single vortice=neutrino; double vortice, with rolling contact drawing ether into the periphery-proton; with rolling contact into the poles-electron; then the neutron which is three vortices combining forming a neutral, polarizeable particle drawing ether into one end, out the sides, in the sides out the other end.  Krafft's books were all self-published.

*-- Roger Cathey*

118. Is there anyone out there who is familiar with modern Kaluza-Klein theory?  Or even with the kind that Kaluza got Einstein to buy into in 1921 (or whenever it was)?  This is supposed to unify Gravity and ElectroMagnetics in a 5-dimensional model.  Would it not, if true, predict the kind of effects that Brown was experimenting with?  *-- John Sangster*

Kaluza and Klein had the idea of extending GR to 5 dimensions.  When they did, Maxwell's equations just sort of "pop out".  Unfortunately, the weak and strong nuclear forces don't.  So people try expanding GR into 10, 11, or even 26.

It's interesting to do the reverse.  Expand Maxwell's equations into 5 dimensions.  I did it and soon I'll (hopefully) give some details.  But essentially, you get 2 out of 3 of Newton's gravitational equations.  You get something similar to the 3$^{rd}$ eqn.  But I haven't convinced myself that mine is a generalization of Newton's.  *-- Ray Cote, KSC*

Kaluza-Klein theories are an attempt to give a General Relativistic explanation for <u>all</u> the forces of Nature and not just gravity. T he original Kaluza-Klein idea was hatched in 1920 by

Kaluza and in 1926 by Klein.  The basic idea is that there are 4 space dimensions and 1 time dimension (i.e., a 5-dimensional manifold) rather than the 3 space dimensions and 1 time dimensions that there appear to be.  Then generalizing Einstein's field equations to this 5-dimensional space (and making the assumption that one of the dimensions gets "curled" up or "compactified"), you find that you get Einsteins 4D field equations plus Maxwell's equations.  The way that this happens is one of the most beautiful aspects of this theory.  And it really makes you (or at least it makes me) think that there should be at least some aspect of this theory that has some correspondence in reality.

Kaluza-Klein theories were revived in the mid-1970s by A. Chodos (I think) who showed how you can incorporate all the interactions that we know about now (i.e., the strong and the weak forces which weren't unified with gravity in Kaluza's original theory which only unified EM and gravity) by taking spacetime to be 11-dimensional (10 space dimensions and 1 time).

I can't really think of a good layman's intro to Kaluza-Klein.  But there is a Physics Report in 1985 and 1986 that gives a review of Kaluza-Klein theories by Bailin and Love (?).  And there is a Frontiers of Physics book edited by T. Appelquist which reprints most of the important articles on the subject. -- *Doug Singleton*


119. The Possibly Unifying Effect of the Dynamic Theory, May 1983, by P.E. Williams
This is part of a series of works by Williams.  The novel aspect of the work it that Williams starts from Thermodynamics instead of the usual General Relativistic and Newtonian approach.  Williams develops the 5-D field equations and the neo-Coulombic potential.  The equations allow for inductive coupling between the electric and gravitational fields.  -- *Dennis Cravens*


120. Kaku, Michio.
Hyperspace: a scientific odyssey through parallel universes, time warps, and the $10^{th}$ dimension
New York : Oxford University Press, LC CALL NUMBER: QC793.3.F5 K35 1994 *CIP
SUBJECTS: Kaluza-Klein theories. Superstring theories. Hyperspace. ISBN: 0195085140 (alk. paper).
[StealthSkater note: sample excerpt is archived at => doc pdf URL-doc URL-pdf ]


121. "The Interaction of Magnetizations with an External ElectroMagnetic Field and a Time-Dependent Magnetic Aharonov-Bohm Effect"
Joint Inst. for Nuclear Research, Dubna (USSR). Afanasev, G.N.; Nelhiebel, M.; Stepanovskij, Yu. P. AB(Technische Univ., Vienna, Austria.) AC(Academy of Sciences of the Ukraine, Kharkov, Ukraine.)
1994 20 PAGES DE95-613463 JINR-E-2-94-297
Avail: CASI HC A03/MF A01 (US Sales Only)
 CASI Accession Number: N95-30368

We investigate how the choice of the magnetization distribution inside the sample affects its interaction with the external electromagnetic field.  The strong selectivity to the time dependence of the external electromagnetic field arises for the particular magnetizations.  This can be used for the storage and ciphering of information.  We propose a time-dependent Aharonov-Bohm-like experiment in which the phase of the wave function is changed by the time-dependent vector magnetic potential.  The arising time-dependent interference picture may be viewed as a new channel for the information transfer.

122. AUTHOR :Doughty, Noel A. (Noel Arthur)
TITLE: <u>Lagrangian Interaction : an introduction to relativistic symmetry in electrodynamics and gravitation</u>
PUBLISHED :Sydney ; Readwood City, Calif. : Addison-Wesley, c1990.
DESC :xix, 569 p. : ill. ; 23 cm.
SUBJECT :Electrodynamics, Gravitation, Relativity, Symmetry

"Generalized Hall Acceleration for Space Propulsion by Akihiro Sasoh"
by AATohoku University, Sendai, Japan
In: *International Symposium on Space Technology and Science*, 18th, Kagoshima, Japan, May 17-22, 1992. Vols. 1 & 2 . A95-82299 Tokyo, Japan ISTS Editorial Board 1992 6 PAGES 1992 p. 403-408

The operation characteristics of electric propulsion devices which utilize the Hall effect have been generalized. The electrostatic acceleration is enhanced by thermoelectric effect. An ion kinetic energy can be higher than that associated with the electrostatic potential. Depending on the extent of this effect, there exist 2 acceleration modes -- an electrostatic and an electrostatic/electrothermal hybrid one (the latter characterized by low voltage).

ABSTRACTS OF THE AMERICAN MATHEMATICAL SOCIETY:

vol. 12 (1991) p.572  Abstract *91T-81-200 by Alexander Abian:
"The inertia of Time and the energy spent on moving Time forward"

vol. 13 (1992) p.344  Abstract *92T-81-79 by Alexander Abian:
"The universal Time"

vol. 15 (1994) p.437  Abstract *94T-81-92 by Alexander Abian
"Time has inertia.  Equivalence of Time and mass"

vol. 15 (1994) p.585  Abstract *94T-81-164 by Alexander Abian
"Time has inertia. Equivalence of Time and mass.  How to measure the mass of Time"

123. Look up a paper published by Miguel Alcubierre in *Classical and Quantum Gravity* 11 (1994) pp. L73-L77.  It's titled "The Warp-Drive: Hyper-Fast Travel within General Relativity".  If you can follow a lot of math (or at least the gist of it), it is fascinating. *-- Ian McBride*

"The Warp drive: hyper-fast travel within general relativity" by: Miguel Alcubierre / Department of Physics and Astronomy, University of Wales, College of Cardiff, PO Box 913, Cardiff CFI 3YB, UK

Article taken from the May 1994 issue of *Classical and Quantum Gravity* -- a scientific magazine wich you are not likely to find at your local newsagent.

ABSTRACT. It is shown how -- within the framework of General Relativity and without the introduction of wormholes -- it is possible to modify a spacetime in a way that allows a

spaceship to travel with an arbitrarily large speed. By a purely local expansion of spacetime behind the spaceship and an opposite contraction in front of it, motion faster than the speed-of-light as seen by observers outside the disturbed region is possible. The resulting distortion is reminiscent of the "warp drive" of science -fiction. However, just as happens with wormholes, "exotic matter" will be needed in order to generate a distortion of spacetime like the one discussed here.

124. Anomalous Info Nexus
    S P A C E  D R I V E S
    PO Box 228
    Kingston Springs, TN   USA    37O82-O228
    Introductory Reading List

    ● Anomalous Info Nexus, 615.952.5638, 3/12/24/96/14.4 Kbps v.32bis,
    for Space Drive Info, Files, and graphics.
    ● Correy, Lee, Star Driver, Del Ray Books, New York, 1976, # 28994  (Fiction)
    ● Clarke, Arthur C., Profiles of the Future, Bantam Books, New York 1964, # H2734, pp. 46-6O, 235
    ● Clarke, Arthur C., Rendevous with Rama, Ballantine Books New York 1974, # 24175, pp. 113-4, 2O7-8, 265-6 (Fiction)
    ● Davis, William O., Jr., "The Fourth Law Of Motion," *ANALOG*, May 1962, pp. 83-1O4
    ● Dean, Norman L., "System For Converting Rotary Motion Into Unidirectional Motion (i.e., the 'Dean Drive')"  U.S. Patent # 2,886,976
    ● Electric Spacecraft Journal, 73 Sunlight Dr, Leicester, NC 28748,
    704.683.0313 Voice / 704.683.3511 FAX / 615.952.5638 BBS Published since 1991
    Quarterly, Subscription Rate: $24/Yr (Only U.S. publication dedicated to Space Drives R&D)
    ● Forward, Robert L., "Spin Drive To The Stars," ANALOG, Apr 1981, pp. 64-7O
    ● Harrison, Harry, The Daleth Effect, Berkley SF Books, New York, 1977, # S188O, (Fiction)
    ● Kidd, Alexander D. (Aka Sandy), "Gyroscopic Apparatus", U.S. Patent # 5,O24,112
    ● Pournelle, Jerry, A Step Farther Out, Ace Books, New York, 1983, #78586, pp. 17O-187, 229-238
    ● Sellings, Arthur, The Quy Effect, Berkley SF Books, New York, 1967, # X135O, (Fiction)
    ● Stine, G. Harry, "Detesters, Phasers, and Dean Drives," *ANALOG*, Jun 1976, pp. 68-8O
    ●  Thornson, Brandson R., "Apparatus For Developing A Propulsive Force," U.S. Patent # 4,631,971
    ● David JonssonVoice&Fax +46-18-24 51 52
        P.O Box 353Postal giro 499 40 54-7
        S-751 06 UPPSALA Internet E-mail t89djo@tdb.uu.se SWEDEN
        Cold EMISSION before the end of the Century


125. AUTHOR:          Terletskii, IAkov Petrovich
    Paradoksy teorii otnositelnosti. Russian/English
    TITLE:  Paradoxes in the theory of Relativity by Yakov P. Terletskii with a foreword by Banesh Hoffmann.
    PUBL.:  New York, Plenum Press, 1968
    NOTES: Translation of Paradoksy teorii otnositelnosti.


126. "Quantum Fluctuations and Semi-Classical Gravity Theory"

Semi-Classical gravity theory should serve as a working model before the final theory of quantized gravity is known or as an approximation for manageable calculations even when the final theory is known.

We deal with the important issue of the applicability of the semi-Classical theory of Gravity -- specifically considering the effects of quantum fluctuations of the matter fields and the induced metric perturbations.  The quantum fields with negative energy densities are proposed to be the cases where the semi-Classical theory is no longer valid.

We start with a discussion of the basic notions and developments of semi-Classical gravity theory and continue with a discussion of the establishment of a meaningful measurement of the deviation from semi-Classical theory.  The measure is a normalized dispersion of the energy density.

The non-positive-definiteness of the energy density of quantum fields is derived and discussed. Important cases -- like squeezed states and the Casimir effect which exhibit negative energy densities -- are discussed and the deviations from semi-Classical theory are checked.  A test particle method using a generalized Langevin equation is formulated for the physical description of systems for which the semi-Classical theory can not be used.

Quantum fields around straight infinite cosmic string is another example of where the negative energy densities may arise. We examine the validity of semi-Classical theory for this case.  The Casimir force due to the Zero-Point fluctuations of the electromagnetic fields in the presence of a conducting plate is another case where the quantum fluctuations are large and naive classical consideration should be modified.  Using the test particle method, we are able to show that it is a relaxation phenomenon and that a notion of effective temperature can be associated with it.


127. "The Physics of Tachyons.
   3.Tachyon ElectroMagnetism"
Dawe, Ross L., Hines, Kenneth C.

A new formulation of the theory of tachyons using the same 2 postulates as in Special Relativity is applied to ElectroMagnetism.  Tachyonic transformations of the electromagnetic fields E and B are rigorously derived from Maxwell's equations and are shown to be the same as for bradyonic transformations.

Tachyonic tranformations of current density, charge density, scalar and vector potentials are also derived and discussed. Tachyonic optics and the 4-potential of a moving tachyonic charge are also discussed along with generalized 4-vector transformations and electromagnetic 4-tensors in extended Relativity.  Use is made of a switching principle to show how tachyons automatically obey the law of Conservation of Electric Charge in any inertial reference frame even though the observed tachyon electric charge is not an invariant between observers.

The electromagnetic field produced by a charged tachyon takes the form of a Mach cone, inside which the electromagnetic field is real and detectable while outside the cone the field generated by the tachyon is imaginary and undetectable.

128. Franklin, Allan.  The rise and fall of the "Fifth Force": discovery, pursuit, and justification in modern physics
New York : American Institute of Physics, c1993. 141 p. : ill. ; 25 cm.
LC CALL NUMBER: QC6 F673 1993
SUBJECTS: Physics--Methodology. Gravitation.

Michlo, George.  The push of Gravity.  illustrated by Warwick Humphries. 1st ed.
New York : Vantage Press, c1993. xv, 101 p. : ill. ; 24 cm.
LC CALL NUMBER: QC178 .M49 1993
SUBJECTS: Gravitation.
ISBN: 0533091330

Doughty, Noel A.   Lagrangian interaction: an introduction to relativistic symmetry in electrodynamics and gravitation
 Sydney ; Redwood City, Calif. : Addison-Wesley, c1990. xix, 569 p. : ill. ; 23 cm.
LC CALL NUMBER: QC631 .D68 1990
SUBJECTS: Electrodynamics. Gravitation. Relativity. Symmetry.  ISBN: 0201416255
(U.S.) : $33.95

Alexander, S.  Gravity and Inertia : the mechanism
 Santa Barbara, Calif.  G.E.C. Research, c1985. 64 p. : ill. ; 23 cm.
LC CALL NUMBER: QC178 .A44 1985
SUBJECTS: Gravitation. Inertia (Mechanics) ISBN: 0939525054

Harrigan, Gregory Leo.  The Great Gravity Myth.  2nd ed., rev. and enl.
Minneapolis : Shanty Press, 1991. p. cm.
LC CALL NUMBER: QC178 .H28 1991 *CIP
- NOT YET IN LC*
SUBJECTS: Gravitation--Miscellanea. Serendipity in science.
ISBN: 0916403033 (lib. bdg.) : $8.95

Soldano, B. A.  A new look at Maxwell's equations and the permittivity of free space
Greenville, S.C., U.S.A. : Grenridge Pub., 1982. 50 p.
LC CALL NUMBER: QB341 .S65 1982
SUBJECTS: Gravitation. Maxwell equations.

Gallimore, J. G.  Transverse paraphysics: the new science of space, time, and gravity control
Millbrae, Calif. : Tesla Book Co., 1982. ix, 359 p. LC CALL
NUMBER: QC173.59.S65 G35 1982
SUBJECTS: Space and time. Gravitation.

Mancini Ridolfini, Niccolo.
Elettricita e magnetismo; rotazione elettro-magnetica gravitazionale.
Bologna, L. Cappelli, 1931. vii, 506 p. illus. 25 cm.
LC CALL NUMBER: QC518 .M36

SUBJECTS: Electromagnetic theory. Space and time. Gravitation.

King, Moray B.  Tapping the Zero-Point Energy
Provo, UT : Paraclete Pub., c1989. iii, 169 p. : ill. ; 22 cm.
LC CALL NUMBER: QC178 .K5575 1989
SUBJECTS: Antigravity. Radiation. Electromagnetics. Force and energy. ISBN:
0962335606 : $9.95

The Large N expansion in quantum field theory and statistical physics from spin systems to 2-
    dimensional gravity
editors - Edouard Brezin, Spenta R. Wadia.
Singapore ; River Edge, NJ : World Scientific, c1993. xiv, 1130 p.
LC CALL NUMBER: QC174.45 .L37 1993
SUBJECTS: Quantum field theory. String models. Gauge fields (Physics)
ISBN: 9810204558

Magnetic susceptibility of superconductors and other spin systems
edited by Robert A. Hein, Thomas L. Francavilla, and Donald H. Liebenberg.
New York : Plenum Press, c1991. xx, 606 p. : ill. ; 26 cm.
LC CALL NUMBER: QC611.97.M34
M34 1991
SUBJECTS: Superconductors--Magnetic properties--Magnetic susceptibility United States.  Office
    of Naval Research.  Office of Naval Research Workshop on Magnetic Susceptibility of
    Superconductors and Other Spin Systems (1991: Coolfont, W. Va.) "Proceedings of the
    Office of Naval Research Workshop on Magnetic Susceptibility of Superconductors and
    Other Spin System, held May 20-23, 1991 in Coolfont, Berkeley Springs, West Virginia"--
    T.p. verso. ISBN: 0306441977

Spin waves and magnetic excitations
volume editors: A.S. Borovik-Romanov, S.K. Sinha.
Amsterdam ; New York : North-Holland ; New York, N.Y.
Sole distributors for the U.S.A. and Canada, Elsevier Science Pub. Co., 1988.
LC CALL NUMBER: QC762 .S66 1988
SUBJECTS: Spin waves. Magnons. Dielectrics--Magnetic properties. Metals--Magnetic
    properties.
Modern problems in condensed matter sciences ; v. 22 ISBN: 0444870687 (v. 1)

Aono, Osamu.  Rotation of a magnetic field
Osamu Aono and Ryo Sugihara. Nagoya, Japan : Institute of Plasma Physics, Nagoya University,
    1986. 6 p. ; 30 cm.
LC CALL NUMBER: QC717.6 .N35 no. 792 (ALTERNATE CLASS QC754.2.M3)
SUBJECTS: Magnetic fields. Electrodynamics. Research report (Nagoya Daigaku. Purazumu
Kenkyujo) ; IPPJ-792.

Handbook of electron spin resonance : data sources, computer technology, relaxation, and ENDOR
edited by Charles P. Poole, Jr. and Horacio A. Farach.
New York : American Institute of Physics, c1994. x, 660 p. : ill. ; 25 cm.
LC CALL NUMBER: QC762 .H32 1994
SUBJECTS: Electron paramagnetic resonance. Electron nuclear double resonance spectroscopy.
    Relaxation phenomena.
ISBN: 1563960443 (acid-free)

Mims, W. B.  The linear electric field effect in paramagnetic resonance
Oxford : Clarendon Press, 1976. 339 p. : ill. ; 24 cm.
LC CALL NUMBER: QC762 .M55
SUBJECTS: Electron paramagnetic resonance. Electric fields.
ISBN: 0198519443 : L9.75


Morrison, Clyde A.  Angular momentum theory applied to interactions in solids
Berlin ; New York : Springer-Verlag, c1988. 159 p. ; 25 cm.
LC CALL NUMBER: QD475 .M68 1988
SUBJECTS: Crystal field theory. Angular momentum.
ISBN: 0387189904 (U.S. : pbk.)


129. Mirman,  R.  Massless  representations  of  the  Poincare  Group : electromagnetism, gravitation,
        quantum mechanics, geometry
Commack, N.Y. : Nova Science Publishers, 1995. p. cm.
LC CALL NUMBER: QC20.7.G76 M57 1995 *CIP - NOT YET IN LC* SUBJECTS:
Representations  of  groups.  Poincare  series.  Electromagnetism.  Gravitation.  Quantum  theory.
Geometry. Mathematical physics.
ISBN: 1560722592


Antunez de Mayolo, Santiago, 1887-1967.
The neutral element base of matter and probable cause of gravitation
Santiago Antunez de Mayolo. Lima, Peru : Universidad Nacional Mayor de San Marcos, 1948. 36
        p. : ill. ; 22 cm.
LC CALL NUMBER: MLCS 94/12050 (Q)
SUBJECTS: Nuclear physics. Matter--Constitution. Translation of "Work presented in Spanish to
        the IV South American Chemistry Congress, Santiago, Chile, March 1948."


Ciufolini, Ignazio.  Gravitation and Inertia
Ignazio Ciufolini and John Archibald Wheeler.
Princeton, N.J. : Princeton University Press, c1995. xi, 498 p.
LC CALL NUMBER: QC173.59.G44 C58 1995
SUBJECTS: Geometrodynamics. General Relativity. Gravitation. Inertia.
ISBN: 0691033234 (acid-free paper)


130. TITLE: Excalibur Briefing
     AUTHOR: Thomas E. Bearden; foreword by John White; special drawings by Hal Crawford
     COPYRIGHT DATE: 1980, 1988
     PUBLISHER: Strawberry Hill Press/A Walnut Hill Book
     LC CALL NUMBER: BF1999 .B387 1980
     ISBN# 0-89407-060-6
     ISBN: 0894070150 (pbk.) : $8.95
     PURCHASED FROM: Tesla Book Co. or Fry's INC. INQ.
     COMMENTS ....


     According to the front and rear covers, this book explains *paranormal* phenomena and the
**interaction** of mind and matter.  There are 4 chapters plus a glossary and bibliography. 3 32
pages, 42 photographs, and 40 illustrations.

Chapter one is called "A Sampling of Specific Paranormal Phenomena".  Some of the subjects in this chapter are Remote-Viewing, the Moray Radiant Energy Device, Thought Photography, Pavlita's Psychotronic Generators, UFOs, Kirlian Photograpy, Psychic Surgery.

Chapter Two is called "A Theoretical Background for Understanding PT, UFOs, and PSI Phenomena".  Some of the subjects are Unexplained Mysteries of Physics, 2-Slit Experiment, Radionics, Biofields, and Maverick Worlds.

Chapter Three is called "New Military Applications of PSI Research".  Some of the subjects covered are Background to Psychotronic Research in the U.S and the U.S.S.R., Radiation of the U.S. Embassy, Hyperspace Howitzer operation, Virtual States and Hyperspaces, Feynman diagrams The Neurophone, Soviet "Woodpecker" signals.

The last chapter covers Soviet Phase Conjugate Directed Energy Weapons (i.e., weapons that use time reversed Electromagnetic Waves).  The Glossary is about 30 pages long and is very useful.


131. TITLE: Magnetism:  An Introductory Survey
    AUTHOR: E.W. Lee
    COPYRIGHT DATE: 1963,1970
    PUBLISHER: Dover Publications Inc. New York
    ISBN# 0-486-24689-2
    PURCHASED FROM: Lindsay Publications
    COMMENTS ....
    Paperback, 280 pages, Some photographs and Illustrations.  Some of subjects covered are Atomic Theory of Matter, Earth's Magnetism History of Magnetism, Magnetism in Scientific Research, Paramagnetism and Diamagnetism


132. TITLE: Tesla: The Lost Inventions
    AUTHOR: George Trinkhaus
    COPYRIGHT DATE: 1988
    PUBLISHER: High Voltage Press
    ISBN# N/A
    PURCHASED FROM: Lindsay Publications
    COMMENTS ....  Paper, 33 Pages, 42 Illustrations. Describes Tesla's lost inventions in plain, easy to understand English. According to the author, patents are hard to understand.  In the illustrations he shows the patent number. Some of the inventions include Disk Turbine Rotary Engine. Magnifying Transmitter, Transport, Free Energy Receiver.

    TITLE: Tesla: Man out of Time
    AUTHOR: Margaret Cheney
    COPYRIGHT DATE: 1981
    PUBLISHER: Laurel Book by Dell Publishing Co.
    ISBN# 0-440-39077-X
    PURCHASED FROM: Tesla Book Co. or Lindsay Publications
    COMMENTS .... Paperback 320 Pages, 8 Pages of Rare Photographs Good biography of Tesla. 30 Chapters plus Reference Notes.  Chapter 29 deals with Tesla's papers and what may have happened to them after he died.

133. TITLE: The Philadelphia Experiment: Project Invisibilty
     AUTHOR: William L. Moore, Charles Berlitz
     COPYRIGHT DATE: 1979
     PUBLISHER: Fawcett Crest New York
     ISBN# 0-449-24280-3
     PURCHASED FROM: Waldenbooks
     COMMENTS .... Paperback 288 pages.

    Book on the alleged Navy experiment to make a ship invisible to radar or optically or both. Supposedly the ship not only became invisible but dematerialized and rematerialized at a distant location, then re-materialized at the original location (Philadelphia Navy Yard). Plus there were severe side-effects to the crew members. Some of the crew were said to have disappeared into another dimension. Some never to return.

    Chapter 9 (The Unexpected Key) is very interesting because it describes an interview with a scientist who was involved with the Philadelphia Experiment when it was being planned.

134. The best introduction to dyads and dyadic analysis in electromagnetism in my opinion is Theory of Electromagnetic Waves: A Coordinate-Free Approach by Hollis C. Chen (1983, McGraw-Hill; 1992, TechBooks).

135. It's already a proven fact that angular momentum will generate an opposing force to gravity in the way you describe. This is a purely General Relativistic effect. There's an article in the 1988 Foundations of Physics "An Exact Solution to Einstein's Field Equations: Gravitational Force Can Also Be Repulsive!" It requires an immensely huge angular momentum to get any decent repulsion such that you're not going to get it by any mechanical means

136. For those of you who are not familiar with the obscure aspects of General Relativity, this will hopefully steer you in the right direction for further research and knowledge. Non-Newtonian gravitational fields -- which may be either attractive or repulsive -- can be generated from 3 effects.

    These are that of rotating masses, moving masses, or fluctuating masses relative to a stationary, non-rotating body. These effects are similar to centrifugal, Coriolis, and other inertial forces and were first described by W. de Sitter in 1916 and Hans Thirring in 1918. Dr. Robert L. Forward published his "Guidelines to Antigravity" in March 1963 in the *American Journal of Physics*.

Dr. Forward is an expert in General Relativity and Gravity Research and studied under Weber at the University of Maryland. In his guidelines article, he discusses the dipole effect of gravity as predicted by General Relativity. Unfortunately, the forces generated are extremely weak without very dense mass or extremely high angular velocities. I suggest that everyone with an interest in such aspects obtain a copy of this article and read it through before passing any judgments as to these forces existing or being generated! *-- Phillip Carpenter*

137. Might a mass (gravitational charge) in motion also produce another type of field much like a magnetic one? Something like this "gravitomagnetic effect" is theoretically predicted. If you were in such a field, it would simply give the impression that you were in a locally rotating frame of reference. So moving objects would experience coriolis forces even when you were not rotating relative to distant reference points. As the effect is of the order of $v_1 v_2/c^2$ where $v_1$ is the speed-of-the gravitational source and $v_2$ is the speed of the test object, it is extremely small and has not yet been measured.

Note also that a rotating massive object is expected to give rise to a similar field in the same way as a current loop gives rise to a magnetic field. This is known as the Lense-Thirring effect. A first-order Special Relativity approximation (which only applies for a locally inertial frame of reference where space isn't significantly curved) is simply that the rotation field is $(v_1 g)/c^2$ where $g$ is the Newtonian acceleration vector $v_1$ is the velocity of the source object. The acceleration that field generates for a body moving with velocity $v_2$ is $v_2(v_1 g)/c^2$.

Note for comparison that the magnetic field is $B = (v_1 \times E)/c^2$ so the magnetic force is $qv_2 \times (v1 \times E)/c^2$. The gravitational rotation field calculated in this way is equal to $2w$ where $w$ is the apparent angular velocity of rotation. It is hoped that "conscience-guided" satellite experiments may confirm this effect within a few years. But at present, there are too many other disturbances which make it too difficult to measure such a small effect. The rotation field -- whether caused by a linearly moving mass or a rotating object -- only affects moving masses.

However, there is of course a much stronger associated acceleration field which affects all masses. From the subjective point of view, the acceleration field may appear to be partly linear acceleration and partly "centrifugal" force associated with rotary motion. But this is a higher-order effect. *-- Jonathan Scott*

138. Some scientists in Boulder, CO (USA) have succeeded in cooling down matter into the elusive Bose-Einstein condensate. The kinetic energy of the atoms in this state have been removed. If you could maintain this state in stable form and spin it, the angular momentum would repel the Earth and lift many times its own mass. Outside of the atmosphere, this could produce the desired gravitational dipole effect.

139. Bonaldi, M., et al., "Inertial and Gravitational Experiments With Superfluids: A Progress Report," Proceedings of the Fourth Marcel Grossmann Meeting on General Relativity, Elsevler Science Publishers B.V., 1985, pp. 1309-1317.

140. Title: Angular Momentum Paradoxes with Solenoids and Monopoles
In: *Phys.Lett.118B*:385,1982
Date/Source: August 1982

Title: Long-Range Effects in Asymptotic Fields and Angular Momentum of Classical Field
        Electrodynamics
Date/Source: February 1995

Title: Angular Momentum
Authors: D.M. Brink and G.R. Satchler
Date/Source: Oxford : Clarendon Press ; New York : Oxford University Press, 1993.

141. AUTHOR(s):    Hayasaka, Hideo Takeuchi, Sakae
     TITLE:  Gravitation and Astrophysics.
     Summary:       Anomalous weight reduction on a gyroscope's right rotations around the vertical
                    axis on the Earth.
     In: *Physical Review Letters*.  DEC 18 1989 v 63 n 25 Page 2701

     AUTHOR(s):    Starzhinskii, V.M.
     TITLE:  An exceptional case of motion of the Kovalevskaia gyroscope.
     In: *PMM, Journal of applied mathematics and mechanic* 1983 v 47 n 1 Page 134


 From: sphinx@world.std.com (John Sangster, SPHINX Technologies)
 Subject: Weight Reduction in Spinning Masses
 Date: Fri, 3 Nov 1995 06:04:35 GMT


     Recently Hideo Hayasaka and Sakae Takeuchi of the Engineering Faculty at Tohoku University in Japan have published an experimental result of this sort.  They found that gyroscopes spinning clockwise as seen from above at their location exhibited a decrease in relative mass of $5.07 \times 10^{-5}$ and $4.22 \times 10^{-5}$ respectively for the 2 gyroscope configurations studied.  (Weight was multiplied by 1-e where e is the relative factors given above if I haven't botched up in my arithmetic.)

     The effect as plotted in the paper that I saw appears to be perfectly linear to within reasonable experimental error, thus giving a rotational velocity at which the weight would go to zero which I made out to be 3.27 MHz (million rotations per second) in the first case and 3.95 MHz in the second.

     That was with CLOCKWISE rotation as seen from above.  With COUNTERclockwise rotation, the same experimental setup showed ZERO EFFECT. Zip! Nada! Nichts! Nyechevo! You get the idea.

     For one thing, this result makes it almost certain that they are NOT dealing with bad lab technique.  Not to mention the fact that they spent nearly a year-and-a-half going over-and-over their setup and trying to answer all objections by the reviewers of their Physical Review Letters paper (it eventually appeared in PRL (63 2701)).

     As far as I know, nobody has published a theoretical model that accounts for these observations.  The idea of a physical phenomenon that appears only in one direction of rotation is

rather unprecedented.  I know of only one other mathematical/physical phenomenon that does this.  I'm trying to understand how the two might be related but without success as yet.  -- *John Sangster*

142. Physicist Alex Harvey wrote an article about the Hayakawa-Taguechi experiment.  The article was published in *Nature*, Aug 23 1990, Vol 346 Page 705

You'll also find other references there.  Harvey shows mathematically that an angular momentum vector aligned anti-parallel to the local gravitational field <u>violates</u> the Equivalence Principle.  He also shows that the path of a spinning body under Gravity need <u>not</u> be geodesic.  Here are 2 "holes" in GR that seem to account for the behavior of H-T's gyros.  New experiments should be designed to force the asymmetry to appear as predicted by theory, rather than passively leave the results to chance.

There is a dimensional error of Hayasaka and Takeuchi which CAN be corrected by supplying a quantity that restores proper dimensionality.  In simplest terms, H-T's result looks like: { deltaN = - (proportionality constant) m w r } where deltaN is the weight change in Newtons, m is the mass of the rotor in kg, w is the rotation frequency in angular units, and r is the radius of the rotor in meters.  The units of the missing quantity are radians per second.  The rotation w has already been counted.  The missing quantity is the precession Wp.  With clockwise rotation, the vector J points down the spin axis while the precession vector Wp points up the spin axis.

Writing about H and T's results, physicist Alex Harvey confirmed that there is no (symmetrical) weight gain, no effect at all, with counter-clockwise rotation, J (up).  In this case says Harvey: "[J] is parallel to the gravitational field."  -- *laradex3@sj.znet.com*

AUTHOR(s):     Harvey, Alex
TITLE(s):          Complex Transformation of the Kasner Metric.
In: *General Relativity and Gravitation*, OCT 01 1989 v 21 n 10 Page 1021

AUTHOR(s):     Harvey, Alex
TITLE(s):          Cosmological models.
In: *American Journal of Physics*. OCT 01 1993 v 61 n 10 Page 901

AUTHOR(s):     Harvey, Alex
TITLE(s):          Identities of the scalars of the 4-dimensional Riemannian manifold.
In: *Journal of Mathematical Physics*. JAN 01 1995 v 36 n 1 Page 356

AUTHOR(s):     Harvey, Alex
TITLE(s):          Will the Real Kasner Metric Please Stand Up.
In: *General Relativity and Gravitation*. DEC 01 1990 v 22 n 12 Page 1433

143. >"Maybe I've missed it.  But I've looked seriously and there seems to be no information in undergraduate- or graduate-level Physics reference books which mentions the relationship between Macroscopic and microscopic angular momentum.  Much less provides any analysis or explanation linking quantum angular momentum to Macroscopic angular momentum."

You're catching on.  The subject of compound angular momentum -- or internal and external angular momentum, or intrinsic and extrinsic angular momentum -- has been a <u>repressed</u> <u>subject</u> for about 2-and-half decades.  Add to that list: spherical pendulums, Coriolis effect (except as

applied to balilstics and meteorology as used by the US military), and Shafer's pendulum (that neat little device used as the artificial horizon of aircraft).

>"How does quantum angular momentum become organized from a microscopic to a Macroscopic level? Has anyone ever published any work about this? I can't find any."

There isn't any that I know of although back in the late-1950s, there was a fellow named Edward Condon at the University of Colorado who was fairly proficient on the subject. So much so that he wrote the rotational dynamics section called "noninertial dynamics" at the time, of the reference The Handbook of Physics which he also co-edited (Chapter 5). I don't recall offhand who the publisher was (Harcourt/Brace?), though it was endorsed by the American Institute of Physics. Later, when Mr Condon was the head of the USAF project "Blue Book", he labored to suppress his own work when the directive was handed down from the Navy's Turtle Island project. -- *James Youlton*

144. In the "Barnett effect", a long iron cylinder -- when rotated at high speed about its longitudinal axis -- is found to develop a measurable component of magnetization, the value of which is proportional to the angular speed. The effect is attributed to the influence of the impressed rotation upon the revolving electronics systems due to the mass property of the unpaired electrons within the atoms. -- *Henry Wallace*

Barnett, S.J., "Magnetization By Rotation", The American Physical Society, Second Series, vol. VI, No. 2, Jun., 1915, pp. 171-172.

Barnett, S.J., "Magnetization By Rotation," The Physical Review, Second Series, vol. VI., No. 4, Oct., 1915, pp. 239-270.

The Barnett Effect is known to me as the effect of a change in volume of a magnetic material in response to a change in its magnetization strength. If a ferrite material is exposed to a higher magnetization field (i.e., more current through the coil), the ferritd will change in volume. I was not aware that this has anything to do with alignment to a spinning axis. For further information about this aspect of the Barnett effect, see: Ref. Handbook of Magnetic Phenomena by Harry S Burk, Van Nostrand Reinhold 1986 Page 262. -- *William Clymer*

145. Magnetic systems with competing interactions : frustrated spin systems / edited by H.T. Diep. Singapore ; River Edge, N.J. : World Scientific, c1994. xiv, 335 p. : ill. ; 24 cm.
LC CALL NUMBER: QC754.2.S75 M34 1994
ISBN: 9810210051
SUBJECTS: Magnetization. Rotational motion. Spin waves. Ferromagnetism.
CONTENTS: ● Nonlinear phenomena and chaos in magnetic materials / P.E. Wigen
    ● Some nonlinear effects in magnetically-ordered materials / H. Suhl
    ● Spin-wave instability processes in ferrites / M. Chen & C.E. Patton
    ● Spin-wave dynamics in a ferrimagnetic sphere: experiments and models / P.H. Bryant, D.C. Jeffries, & K. Nakamura
    ● Spin-wave auto-oscillations in YIG spheres driven by parallel pumping and subsidiary resonance / S.M. Rezende & A. Azevedo
    ● Strong chaos in magnetic resonance / M. Warden
    ● Magnetostatic modes in thin films / R.D. McMichael & P.E. Wigen
    ● Fractal properties in magnetic crystal / H. Yamazaki

● Spin-wave envelope solitons in magnetic films / A.N. Slavin, B.A. Kalinikos, &
N.G. Korshikov.

146. Hence the Wilson-Blackett proportionality between the angular momentum of planets, stars etc and
their magnetic moment.  For more information, see *Science News* Aug 6 '94 p82.

147. AUTHOR(s):    Bloxham, Jeremy Gubbins, David
TITLE(s):        The Evolution of the Earth's Magnetic Field.
Summary:         The origin of the field has fascinated more than a dozen generations of
physicists.  Molten iron in the outer core -- driven by convection and influenced
by the Earth's rotation -- acts as a dynamo that generates the field.  Now
historical records of magnetic-field changes yield new insights into the process
and into how the field may behave in the future.
In: *Scientific American*. DEC 01 1989 v 261 n 6 Page 68

AUTHOR(s):    Malov, I.F.
TITLE(s):        Angle between the magnetic field and the rotation axis in pulsars.
In: *Soviet Astronomy*. MAR 01 1990 v 34 n 2 Page 189

AUTHOR(s):    Marsheva, N.M.
TITLE(s):        Permanent rotation of a heavy rigid body in a magnetic field.
In: *Moscow University Mechanics Bulletin*. 1989 v 44 n 1

AUTHOR(s):    Vitale, S., Bonaldi, M. Falferi, P.
TITLE:   Magnetization by rotation and gyromagnetic gyroscopes.
Summary:         We discuss how the general phenomenon of magnetization by rotation may be
used probe the angular velocity of the laboratory with respect to a local frame of
inertia.  We show that gyroscope with no moving parts based on this pheno-
In: *Physical Review B*: Condensed matter.  JUN 01 1989 v 39 n 16 p B Page 11993

148. CONDENSED MATTER THEORY, ABSTRACT COND-MAT/9509141
From: Erwin Frey
Date: Fri, 22 Sep 1995 09:43:52 +0200
"Critical Dynamics of Magnets"
Authors: Erwin Frey , Franz Schwabl (TU Muenchen)
Comments: Review article (154 pages, figures included)

We review our current understanding of the critical dynamics of magnets above and below the
transition temperature with focus on the effects due to the dipole-dipole interaction present in all
real magnets. Significant progress in our understanding of real ferromagnets in the vicinity of the
critical point has been made in the last decade through improved experimental techniques and
theoretical advances in taking into account realistic spin-spin interactions.

We start our review with a discussion of the theoretical results for the critical dynamics based
on recent renormalization group, mode coupling, and spin wave theories.  A detailed comparison is
made of the theory with experimental results obtained by different measuring techniques such as
neutron scattering, hyperfine interaction, muon-spin resonance, electron-spin resonance, and
magnetic relaxation in various materials.

Furthermore, we discuss the effects of dipolar interaction on the critical dynamics of 3-dimensional isotropic antiferromagnets and uniaxial ferromagnets. Special attention is also paid to a discussion of the consequences of dipolar anisotropies on the existence of magnetic order and the spin-wave spectrum in 2-dimensional ferromagnets and antiferromagnets.

We close our review with a formulation of critical dynamics in terms of nonlinear Langevin equations.


149. Paper: cond-mat/9501029
From: Kazuhiro Kuboki
Date: Mon, 09 Jan 1995 10:40:11 EST
Title: Proximity-induced time-reversal symmetry breaking at Josephson junctions between unconventional superconductors
Author: Kazuhiro Kuboki and Manfred Sigrist

We argue that a locally time-reversal symmetry breaking state can occur at Josephson junctions between unconventional superconductors. Order parameters induced by the proximity effect can combine with the bulk order parameter to form such a state. This property is specifically due to the intrinsic phase structure of the pairing wave function in unconventional superconductors. Experimental consequences of this effect in high-temperature superconductors are examined.


Paper: cond-mat/9501088
From: David Benedict Bailey
Date: Thu, 19 Jan 1995 11:34:10 -0800 (PST)
Title: Gapless Time-Reversal Symmetry Breaking Superconductivity
Authors: A. M. Tikofsky and D. B. Bailey

We consider a layered superconductor with a complex order parameter whose phase switches sign from one layer to the next. This system is shown to exhibit gapless superconductivity for sufficiently large interlayer pairing or interlayer hopping. In addition, this description is consistent with experiments finding signals of time-reversal symmetry breaking in high-temperature superconductors only at the surface and not in the sample bulk.


Paper: cond-mat/9501133
From: ioffe@physics.rutgers.edu (Lev Ioffe)
Date: Mon, 30 Jan 95 08:59:22 EST
Title: On the spin density wave transition in a two dimensional spin liquid.
Authors: B.L. Altshuler, L.B. Ioffe, A.I. Larkin, A.J. Millis.

Strongly correlated 2-dimensional electrons are believed to form a spin liquid in some regimes of density and temperature. As the density is varied, one expects a transition from this spin liquid state to a spin density wave antiferromagnetic state.

In this paper, we show that it is self-consistent to assume that this transition is second-order and -- on this assumption -- determine the critical behavior of the $2p_F$ susceptibility, the NMR rates $T_1$ and $T_2$ and the uniform susceptibility. We compare our results to data on high $T_c$ materials.


Paper: gr-qc/9502041
From: Barry Haddow
Date: Fri, 24 Feb 1995 18:59:15 (GMT)
Title: Purely Magnetic Spacetimes
Author: Barry Haddow (Trinity College, Dublin, Ireland)

Purely magnetic spacetimes, in which the Riemann tensor satisfies R_{abcd}u^bu^d=0 for some unit timelike vector u^a, are studied. The algebraic consequences for the Weyl and Ricci tensors are examined in detail and consideration given to the uniqueness of u^a. Some remarks concerning the nature of the congruence associated with u^a are made.

We show that charged scalar fields are always diamagnetic -- even in the presence of interactions and at finite temperatures. This generalizes earlier work on the diamagnetism of charged spinless bosons to the case of infinite degrees of freedom.


150. "CP Violation and Antigravity Revisited", G. Chardin, Nuclear Physics, Jun 7 1993, Vol 558

"Equivalence Principal Violation, Antigravity and Anyons Induced by Gravitational Chern-Simons Couplings", S. Deser, *Classical and Quantum Gravity*, 1992, Vol 9 Supp

"The Arguments Against Antigravity and the Gravitational Acceleration of Anti-Matter", Michael Martin, *Physics Reports*, Jul 1 1991, Vol 205

"Empirical Limits to Antigravity", Ericson & Richter, Europhysics Letters, Feb 15 1990, Vol 11 no 4

"Chern-Simons Quantizations of (2+1) Anti-de Sitter Gravity on a Torus", K. Ezawa, *Classical and Quantum Gravity*, Feb 1 1995 Vol 12 No 2

"Green's Function for Anti-de Sitter Space Gravity", Gary Kleppe, *Physical Review D*: Particles, Fields, Gravity; Dec 15 1994 Vol 50 No 12

"Lowest Eigenvalues of the Energy Operator for Totally Anti Symmetric Massless Fields of the N-Dimensional Anti-de Sitter Group", R.R. Metsaev, *Classical and Quantum Gravity*, Nov 1 1994, Vol 11 No 11

"The Positivity of Energy for Asymptotically Anti-de Sitter Spacetimes", E. Woolgar, *Classical and Quantum Gravity*, Jul 1 1994, Vol 11 No 7

"Vacuum Polarization Near Asymptotically Anti-de Sitter Black Holes in Odd Dimensions", Shiraishi & Maki, *Classical and Quantum Gravity*, Jul 1 1994, Vol 11 No 7

"Strong Anti Gravity: Life in the Shock Wave", Fabbrichesi & Roland, *Nuclear Physics B*, Dec 21 1992, Vol 388 No 2

"Global Solutions of Yang-Mills Equations on Anti-de Sitter Spacetime", Choquet-Bruhat, *Classical and Quantum Gravity*, Dec 1 1989, Vol 6 No 12

"The Scalar Wave Equation on Static de Sitter and Anti-de Sitter Spacetimes", D. Polarski, *Classical and Quantum Gravity*, Jun 1 1989

"Lehman Representation of the Spinor Two-Point Function in Anti-de Sitter Space", E. Gath, *Classical and Quantum Gravity*, May 1 1989, Vol 6 no 5

151. Dr. Bernhard Haisch has modeled inertial mass as deriving from an accelerated body's interaction with the zero point field (ZPF), consonant with a large body of refereed physics literature.

> Haisch in Feb 1994 *Phys. Rev. A*; *Science* vol 263 p 612; *Scientific American* vol 270, p 30; *New Scientist* 25 Feb 1995 p 30

> "Gravity as a Zero-Point-Fluctuation Force," H.E. Puthoff, *Physical Review A*: General Physics. Mar 1 1989, Vol39 No 5

> The 4 February 1994 issue of *Science* magazine has an article about a new theory of inertia. A recent paper by Bernhard Haisch, Alfonso Rueda, and Hal Puthoff in the 1 Feb 1994 issue of *Physical Review A* -- based on earlier work by Andrei Sakharov -- derives inertia from quantum electromagnetic vacuum fluctuations. The idea is that if inertia is due to some strange quantum EM effects, it might be understood, controlled, and even <u>neutralized</u>.

> Haisch is at the Lockheed Palo Alto laboratories; Rueda, at Cal. State. Long Beach; and Puthoff at the Institute for Advanced Studies in Austin Texas. Needless to say, this new theory is serious but very controversial physics. A test is planned later this year at the SLAC linear accelerator by exposing a high energy electron beam to terawatt laser. Keep tuned! *-- John H. Chalmers Jr*

152. A recent controversial theory of Austin Institute for Advanced Study physicist Hal Puthoff and his collaborators Haisch and Rueda appears to explain Gravity as not an intrinsic property of matter but as an indirect consequence of Maxwellian electromagnetic radiation -- namely that (as earlier suggested by the late Russian dissenter Sakharov) Gravity is a "shadow effect" similar to the Casimir Effect of Quantum ElectroDynamics. Bass points out that if the Haisch-Puthoff-Rueda theory is correct, then Hodowanec's idea of tapping the Earth's gravity field in some electromagnetic way not hitherto suggested is conceivable. *-- Joel McClain*

> Puthoff and his collaborators have gone so far as to use SED (Stochastic Electro-Dynamics) to:
> ● "explain" both gravitational & inertial mass and to show their equivalence
> ● derive Newton's F = Ma
> ● derive Mach's principle (without which Einstein admitted that no theory of gravity could claim to be complete)
> ● derive Dirac's "cosmological numerical coincidences" as inevitabilities
> ● derive Newtonian gravity
> ● derive the Newton-Cavendish parameter G!!! *-- Robert Bass*

**[StealthSkater note: some of this has been archived at** doc pdf URL **]**

152. It is an amazing coincidence that the total Newtonian gravitational potential energy of any object due to all masses in the Universe is equal in magnitude to its total energy (at least to within a small factor), considering that this involves an expression involving multiple factors of the order of 10 to the $40^{th}$ power.

This was pointed out by Dirac in his Large Numbers Hypothesis and used as part of a beautiful illustrative theory by Dennis Sciama[1] in which he constructs a theory of Gravity closely analogous to the classical theory of ElectroMagnetism and shows that inertia can be directly attributed to the gravitational effect of accelerating relative to the gravitational potential sources of the whole Universe (or indeed of accelerating the whole universe relative to the object because in Sciama's theory, the 2 points of view are equivalent).

This theory is obviously consistent with Mach's Principle (which is effectively that inertial motion is in some sense relative to the rest of Universe). Sciama's theory is only a simplified approximation. But it is so neat that it seems likely that some similar principle must apply also within General Relativity.

However, one of its most basic implications is that the gravitational "constant" G would depend on the distribution of matter in the Universe. Which seems to be in direct conflict with GR. I personally think GR is probably not quite right. -- *Jonathan Scott*

[1] D.W.Sciama, "On the Origin of Inertia", *M.N.R.A.S.* Vol. 113, p34, 1953.

153. General Relativity & Quantum Cosmology, Abstract GR-QC/9412012
     From: "Haret Rosu"
     Date: 3 Dec 94 19:36:00 CST
     "Classical and quantum inertia: a heuristic introduction"
     Author(s): Haret C. Rosu
     Report: IFUG-27/94,
     Comments: 20 pages, LaTex 11pt, no figures.
     A non-technical discussion of the problem of inertia is provided both in Classical physics and in the Quantum world. After briefly reviewing the classical formulations (WEP, EEP, and SEP), I pass to a presentation of the equivalence statements for quantum vacuum states. One can also find a number of related comments and suggestions.

Krech, Michael.
The Casimir Effect in Critical Systems
Singapore ; River Edge, NJ
World Scientific, c1994. x, 253 p. : ill. ; 23 cm.
LC CALL NUMBER: QC173.4.C74 K74 1994
SUBJECTS: Critical phenomena. Casimir effect.
ISBN: 9810218451

Cavity Quantum ElectroDynamics / edited by Paul R. Berman.
Boston Academic Press, c1994. xvi, 464 p. : ill. ; 24 cm.
LC CALL NUMBER: QC446.2 .C38 1994
SUBJECTS: Quantum optics. Quantum electrodynamics. Casimir effect.
ISBN: 0120922452 (alk. paper)

Long-range Casimir forces : theory and recent experiments on atomic systems
Edited by Frank S. Levin and David A. Micha.
New York : Plenum Press, c1993.
LC CALL NUMBER: QC680 .L63 1993
SUBJECTS: Casimir effect.
ISBN: 0306443856

Physics in the making: essays on developments in 20<sup>th</sup> Century physics: in honor of H.B.G. Casimir on the occasion of his 80<sup>th</sup> birthday/ edited by A. Sarlemijn and M.J. Sparnaay.

Amsterdam : North-Holland; New York, N.Y., U.S.A. : Sole distributors for the U.S.A. and Canada, Elsevier Science Pub. Co., 1989. xiv, 361 p. : ill. ; 23 cm.

LC CALL NUMBER: QC7 .P48 1989

SUBJECTS: Casimir, H.B.G. (Hendrik Brugt Gerhard), 1909- Casimir, H B.G. (Hendrik Brugt Gerhard), 1909- Sarlemijn, Andries, 1936-Sparnaay, M.J. (Marcus Johannes)

ISBN: 0444881212

154. Edwards-Casimir Quantum Vacuum Drive --

A hypothetical drive exploiting the peculiarities of Quantum Mechanics by restricting allowed wavelengths of virtual photons on one side of the drive (the bow of the ship). The pressure generated from the unrestricted virtual photons toward the aft generates a net force and propels the drive.

155. "Enhancement of the magnetic moment of the electron due to a topological defect"
Author(s): Fernando Moraes (Institute for Advanced Study, Princeton)
Condensed Matter, Abstract COND-MAT/9505108
From: moraes@guinness.ias.edu
(Fernando Moraes)
Date: Tue, 23 May 95 17:12:35 EDT

In the framework of the theory of defects/3-dimensional gravitation, it is obtained a positive correction to the magnetic moment of the electron bound to a disclination in a dielectric solid with the disclination modeled as a parallel plate Casimir effect.

"Maxwell-Chern-Simons Casimir Effect"
Kimball A. Milton, Dept. of Physics and Astronomy, University of Oklahoma
High-Energy Physics: Theory, Abstract HEP-TH/9212077
From: milton@phyast.nhn.uoknor.edu (Kim Milton)
Date: Fri, 11 Dec 92 16:13:13 CST

In odd-dimensional spaces, gauge invariance permits a Chern-Simons mass term for the gauge fields in addition to the usual Maxwell-Yang-Mills kinetic energy term. We study the Casimir effect in such a (2+1)-dimensional Abelian theory.

For the case of parallel conducting lines, the result is the same as for a scalar field. For the case of circular boundary conditions, the results are completely different with even the sign of the effect being opposite for Maxwell-Chern-Simons fields and scalar fields.

We further examine the effect of finite temperature. The Casimir stress is found to be attractive at both low and high temperature. Possibilities of observing this effect in the laboratory are discussed.

"Motion of Inertial Observers through Negative Energy" by L.H. Ford and Thomas R. Roman
General Relativity & Quantum Cosmology, Abstract GR-QC/9303038 *Phys. Rev. D* 48, 776 (1993)
From: lford@pearl.tufts.edu
Date: Wed, 31 Mar 1993 17:47 EDT

Recent research has indicated that negative energy fluxes due to quantum coherence effects obey uncertainty principle-type inequalities of the form $|\Delta E|\,{\Delta \tau} \lprox 1\,.$ Here

$|\Delta E|$ is the magnitude of the negative energy which is transmitted on a timescale $\Delta \tau$.

Our main focus in this paper is on negative energy fluxes which are produced by the motion of observers through static negative energy regions. We find that although a quantum inequality appears to be satisfied for radially-moving geodesic observers in 2- and 4-dimensional black hole spacetimes, an observer orbiting close to a black hole will see a constant negative energy flux.

In addition, we show that inertial observers moving slowly through the Casimir vacuum can achieve arbitrarily large violations of the inequality. It seems likely that in general, these types of negative energy fluxes are not constrained by inequalities on the magnitude and duration of the flux. We construct a model of a non-gravitational stress-energy detector (which is rapidly switched on-and-off) and discuss the strengths and weaknesses of such a detector.

"Semi-Classical Gravity Theory and Quantum Fluctuations" by Chung-I Kuo and L.H. Ford
General Relativity & Quantum Cosmology, Abstract GR-QC/9304008 *Phys. Rev. D. 47*, 4510
   (1993).
From: lford@pearl.tufts.edu
Date: Tue, 6 Apr 1993 12:56 EDT
We discuss the limits of validity of the semi-Classical theory of gravity in which a classical metric is coupled to the expectation value of the stress tensor. It is argued that this theory is a good approximation only when the fluctuations in the stress tensor are small.

We calculate a dimensionless measure of these fluctuations for a scalar field on a flat background in particular cases including squeezed states and the Casimir vacuum state. It is found that the fluctuations are small for states which are close to a coherent state (which describes classical behavior) but tend to be large otherwise.

We find in all cases studied that the energy density fluctuations are large whenever the local energy density is negative. This is taken to mean that the gravitational field of a system with negative energy density (such as the Casimir vacuum) is not described by a fixed classical metric but is undergoing large metric fluctuations. We propose an operational scheme by which one can describe a fluctuating gravitational field in terms of the statistical behavior of test particles. For this purpose, we obtain an equation of the form of the Langevin equation used to describe Brownian motion.

"Casimir Effect of Strongly-Interacting Scalar Fields" by K. Langfeld, F. Schmuser, and H.
   Reinhardt
High-Energy Physics: Phenomenology, Abstract HEP-PH/9307258
From: langfeld@ptsun1.tphys.physik.uni-tuebingen.de (Kurt Langfeld)
Date: Tue, 13 Jul 93 08:04:30 +0200
Non-trivial $\phi^{4}$-theory is studied in a renormalization group invariant approach inside a box consisting of rectangular plates and where the scalar modes satisfy periodic boundary conditions at the plates. It is found that the Casimir energy exponentially approaches the infinite volume limit, the decay rate given by the scalar condensate.

It therefore essentially differs from the power law of a free theory. This might provide experimental access to properties of the non-trivial vacuum. At small interplate distances, the system can no longer tolerate a scalar condensate and a first order phase transition to the perturbative phase occurs. The dependence of the vacuum energy density and the scalar condensate on the box dimensions are presented.

Inverse "Square Law of Gravitation in (2+1)-Diemensional Space-Time as a consequence of
   Casimir Energy" by H.H. Soleng
General Relativity & Quantum Cosmology, Abstract GR-QC 9310007 *Physica Scripta* 48, 649
   (1993)

From: harald@nordita.dk (Harald H. Soleng)
Date: Mon, 4 Oct 93

The gravitational effect of vacuum polarization in space exterior to a particle in (2+1)-dimensional Einstein theory is investigated. In the weak field limit, this gravitational field corresponds to an inverse square law of gravitational attraction even though the gravitational mass of the quantum vacuum is negative. The paradox is resolved by considering a particle of finite extension and taking into account the vacuum polarization in its interior.

"A Modified Schwinger's Formula for the Casimir Effect" by M.V. Cougo-Pinto, C. Farina, and
        Antonio J. Segui-Santonja
High-Energy Physics: Theory, Abstract HEP-TH/9312069
From: segui@cc.unizar.es
Date: Thu, 9 DEC 93 13:50 GMT

After briefly reviewing how the (proper-time) Schwinger's formula works for computing the Casimir energy in the case of "scalar electrodynamics" where the boundary conditions are dictated by two perfectly conducting parallel plates with separation "a" in the Z-axis, we propose a slightly modification in the previous approach based on an analytical continuation method. As we will see, for the case at hand our formula does not need the use of Poisson summation to get a (renormalized) finite result.

"Schwinger's Method for the Massive Casimir Effect" by M.V. Cougo-Pinto, C. Farina, and A.J.
        Segui-Santonja
High-Energy Physics: Theory, Abstract HEP-TH/9401123
From: segui@cc.unizar.es
Date: Tue, 25 JAN 94 21:47 GMT

We apply to the massive scalar field a method recently proposed by Schwinger to calculate the Casimir effect. The method is applied with 2 different regularization schemes: (1) the Schwinger original one by means of Poisson formula and (2) another one by means of analytical continuation.

"The Finite Vacuum Energy for Spinor, Scalar, and Vector Fields" by N. Shtykov
High-Energy Physics: Theory, Abstract HEP-TH/9405060
From: Shtykov Nikolay
Date: Tue, 10 May 94 17:40:50 JST

We compute the one-loop potential (the Casimir energy) for scalar, spinor, and vector fields on the spaces $\,R^{m+1}\, \times\,Y$ with $\,Y=\,S^N\,,CP^2$. As a physical model, we consider spinor electrodynamics on four-dimensional product manifolds. We examine the cancelation of a divergent part of the Casimir energy on even-dimensional spaces by means of including the parameter $\,M$ in original action. For some models, we compare our results with those found in the literature.

"Decoherence and Vacuum Fluctuations" by L.H. Ford, Tufts University
High-Energy Physics: Theory, Abstract HEP-TH/9408172
From: lford@pearl.tufts.edu
Date: Tue, 30 Aug 1994 16:45:05 -0400 (EDT)
(Presented at the Conference on Fundamental Problems in Quantum Theory, University of
        Maryland, Baltimore County, June 18-22, 1994.)

The interference pattern of coherent electrons is effected by coupling to the quantized electromagnetic field. The amplitudes of the interference maxima are changed by a factor which depends upon a double line integral of the photon two-point function around the closed path of the electrons. The interference pattern is sensitive to shifts in the vacuum fluctuations in regions from which the electrons are excluded.

Thus this effect combines aspects of both the Casimir and the Aharonov-Bohm effects. The coupling to the quantized electromagnetic field tends to decrease the amplitude of the interference oscillations, and hence is a form of decoherence. The contributions due to photon emission and to vacuum fluctuations may be separately identified.

It is to be expected that photon emission leads to decoherence as it can reveal which path an electron takes. It is less obvious that vacuum fluctuations also can cause decoherence. What is directly observable is a shift in the fluctuations due, for example, to the presence of a conducting plate.

In the case of electrons moving parallel to conducting boundaries, the dominant decohering influence is that of the vacuum fluctuations. The shift in the interference amplitudes can be of the order of a few percent, so experimental verification of this effect may be possible. The possibility of using this effect to probe the interior of matter (e.g., to determine the electrical conductivity of a rod by means of electrons encircling it) is discussed.

"Averaged Energy Conditions and Quantum Inequalities" by L.H. Ford and Thomas A. Roman
General Relativity & Quantum Cosmolgy, Abstract-QC/9410043 *Phys. Rev. D* 51, 4277(1995).
From: ford@tuhep.phy.tufts.edu
Date: Fri, 28 Oct 1994 20:33 EST

Connections are uncovered between the Averaged Weak (AWEC) and Averaged Null (ANEC) Energy Conditions and quantum inequality restrictions on negative energy for free massless scalar fields.

In a 2-dimensional compactified Minkowski universe, we derive a covariant quantum inequality-type bound on the difference of the expectation values of the energy density in an arbitrary quantum state and in the Casimir vacuum state. From this bound, it is shown that the difference of expectation values also obeys AWEC and ANEC-type integral conditions.

In contrast, it is well-known that the stress tensor in the Casimir vacuum state alone satisfies neither quantum inequalities nor averaged energy conditions. Such difference inequalities represent limits on the degree of energy condition violation that is allowed over-and-above any violation due to negative energy densities in a background vacuum state.

In our simple 2-dimensional model, they provide physically interesting examples of new constraints on negative energy which hold even when the usual AWEC, ANEC, and quantum inequality restrictions fail.

In the limit when the size of the space is allowed to go to infinity, we derive quantum inequalities for timelike and null geodesics which -- in appropriate limits -- reduce to AWEC and ANEC in ordinary 2-dimensional Minkowski spacetime. We also derive a quantum inequality bound on the energy density seen by an inertial observer in 4-dimensional Minkowski spacetime. The bound implies that any inertial observer in flat spacetime cannot see an arbitrarily large negative energy density which lasts for an arbitrarily long period of time.

"On the assignment of frequency spectra to quantum vacuum effects" by Haret C. Rosu
General Relativity & Quantum Cosmology, Abstract GR-QC/9411053
From: "Haret Rosu"
Date: 20 Nov 94 21:15:00 CST
Report: IFUG-25/94

I discuss in an introductory manner (i.e., in the form of comments on available references) the problem of assigning frequency spectra to such fundamental effects like Casimir, Hawking, Unruh, and squeezing effects. This may help to clarify their differences as well as their similarities.

"The Averaged Null Energy Condition and Difference Inequalities in Quantum Field Theory" by Ulvi Yurtsever
General Relativity & Quantum Cosmology, Abstract GR-QC/9411056

From: ulvi@tapir.Caltech.EDU (Ulvi Yurtsever)
Date: Mon, 21 Nov 94 15:56:11 -0800

Recently, Larry Ford, and Tom Roman have discovered that in a flat cylindrical space -- although the stress-energy tensor itself fails to satisfy the averaged null energy condition (ANEC) along the (non-achronal) null geodesics -- when the "Casimir-vacuum" contribution is subtracted from the stress-energy, the resulting tensor does satisfy the ANEC inequality. Ford and Roman name this class of constraints on the quantum stress-energy tensor "difference inequalities."

Here I give a proof of the difference inequality for a minimally coupled massless scalar field in an arbitrary 2-dimensional spacetime using the same techniques as those we relied on to prove ANEC in an earlier paper with Robert Wald. I begin with an overview of Averaged Energy Conditions in Quantum Field Theory.

"Deformation of Particle Distribution Functions due to Q-nonlinearity and Nonstationary Casimir Effect"
Author: V.I. Man'ko
Quantum Physics, Abstract QUANT-PH/9502024
From: MANKO@napoli.infn.it
Date: Mon, 27 Feb 1995 16:32:21 +0200 (CET)

The geometrical phase is shown to be integral of motion. Deformation of particle distribution function corresponding to nonstationary Casimir effect is expressed in terms of multivariable Hermite polynomials. Correction to Planck distribution due to q-nonlinearity is discussed.

"Detecting Casimir Forces through a Tunneling Electromechanical Transducer"
Authors: Roberto Onofrio , Giovanni Carugno
Quantum Physics, Abstract QUANT-PH/9503001
From: onofrio%38619.hepnet@Csa4.LBL.Gov
Date: Wed, 1 Mar 95 08:23:43 PST

We propose the use of a tunneling electromechanical transducer to dinamically detect Casimir forces between 2 conducting surfaces. The maximum distance for which Casimir forces should be detectable with our method is around $1\mu$m while the lower limit is given by the ability to approach the surfaces.

This technique should permit to study gravitational forces on the same range of distances as well as the vacuum friction provided that very low dissipation mechanical resonators are used.

"Casimir Effect Around Disclinations"
Author: Fernando Moraes (Institute for Advanced Study, Princeton)
Condensed Matter Theory, Abstract COND-MAT/9505023
From: moraes@guinness.ias.edu (Fernando Moraes)
Date: Fri, 5 May 95 09:35:57 EDT

This communication concerns the structure of the electromagnetic quantum vacuum in a disclinated insulator. It is shown that a nonzero vacuum energy density appears when the rotational symmetry of a continuous insulating elastic medium is broken by a disclination. An explicit expression is given for this Casimir energy density in terms of the parameter describing the disclination.

"Enhancement of the Magnetic Moment of the Electron due to a Topological Defect"
Author: Fernando Moraes (Institute for Advanced Study, Princeton)
Condensed Matter Theory, Abstract COND-MAT/9505108
From: moraes@guinness.ias.edu (Fernando Moraes)
Date: Tue, 23 May 95 17:12:35 EDT

In the framework of the theory of defects/3-dimensional gravitation, it is obtained a positive correction to the magnetic moment of the electron bound to a disclination in a dielectric solid.

"Mechanical Effects of Radiation Pressure Quantum Fluctuations"

Authors: Marc-Thierry Jaekel (Laboratoire de Physique Th\'eorique de l'Ecole Normale Sup\'erieure) , Serge Reynaud (Laboratoire Kastler-Brossel)

As revealed by space-time probing, Mechanics and Field Theory come out as complementary descriptions for motions in space-time.  In particular, quantum fields exert a radiation pressure on scatterers which results in mechanical effects that persist in vacuum.  They include mean forces due to quantum field fluctuations (like Casimir forces) but also fluctuations of these forces and additional forces linked to motion.

As in classical electron theory, a moving scatterer is submitted to a radiation reaction force which modifies its motional response to an applied force.  We briefly survey the mechanical effects of quantum field fluctuations and discuss the consequences for stability of motion in vacuum and for position fluctuations.

"Quantum Fluctuations and Inertia"

Authors: Marc-Thierry Jaekel (Laboratoire de Physique Th\'eorique de l'Ecole Normale Sup\'erieure) , Serge Reynaud (Laboratoire Kastler-Brossel)

Vacuum field fluctuations exert a radiation pressure which induces mechanical effects on scatterers.  The question naturally arises whether the energy of vacuum fluctuations gives rise to inertia and gravitation in agreement with the general principles of Mechanics.

As a new approach to this question, we discuss the mechanical effects of quantum field fluctuations on 2 mirrors building a Fabry-Perot cavity.  We first put into evidence that the energy related to Casimir forces is an energy stored on field fluctuations as a result of scattering time delays.  We then discuss the forces felt by the mirrors when they move within vacuum field fluctuations and show that energy stored on vacuum fluctuations contributes to inertia in conformity with the law of inertia of energy.  As a further consequence, inertial masses exhibit quantum fluctuations with characteristic spectra in vacuum.

"Sonoluminescence as Quantum Cacuum Radiation"

Author: Claudia Eberlein (Dept of Physics, UIUC, Urbana, IL)

Sonoluminescence is explained in terms of quantum radiation by moving interfaces between media of different polarizability.  It can be considered as a dynamic Casimir effect in the sense that it is a consequence of the imbalance of the Zero-Point fluctuations of the electromagnetic field during the non-inertial motion of a boundary.  The transition amplitude from the vacuum into a 2-photon state is calculated in a Hamiltonian formalism and turns out to be governed by the transition matrix-element of the radiation pressure.  Expressions for the spectral density and the total radiated energy are given.

**[StealthSkater note: the entertaining sci-fi movie "Chain Reaction" starring Keanu Reeves and Morgan Freeman was based on using sonoluminescence to achieve cold fusion => www.imdb.com/title/tt0115857/ ]**

"A precise definition of the Casimir energy"
Authors: K. Kirsten , E. Elizalde
High-Energy Physics: Theory, Abstract HEP-TH/9508086
From: eli@ecm.ub.es (Emili Elizalde)
Date: Fri, 18 Aug 1995 10:14:50 +0200

The somehow arbitrary definition of the Casimir energy corresponding to a quantum system in a $d$-dimensional ultrastatic spacetime (profusely used in the last years) -- which has been criticized sometimes for adopting without a sound argument the minimal subtraction scheme -- is shown to be completely equivalent to the definition steming naturally from the concept of functional determinant through the zeta-function prescription.

This is done by considering the theory at finite temperature and by defining then the Casimir energy as its energy in the limit $T\to 0$. The ambiguity in the coefficient $C_{d/2}$ is understood to be a result of the necessary renormalization of the free energy of the system.

As an example, the Casimir energy corresponding to a general $(1+2)$-dimensional toroidal spacetime with flat spatial geometry, parametrized by the corresponding Teichm\"uller parameters, and its precise dependence on these parameters is obtained under the form of an analytic function.

156. In his book <u>Electromagnetism and Relativity</u> published in 1957, Ernest G. Cullwick was one of the first to provide an analysis of the probable coupling between EM and inertial fields. He realized that Maxwell's equations and most existing theories of electrodynamics assume that the mass of an electron is zero. At Maxwell's time, this was a reasonable assumption. But it is well known today that electrons have mass and therefore an inertial momentum is always associated with an electric current.

Cullwick suggested in his analysis that coupling terms between EM and inertia may be very small but would likely appear sometime in the future as we go to higher current densities. And he was one of the first scientists to predict some of the odd effects which can now seen with superconductors.

Cullwick was also one of the first to identify and attempt an analysis of the relativistic paradoxes and unusual effects which occur in a rotating EM field. His work still stands today as one of the only existing efforts to consider the problem of a **rotating** EM field. **[StealthSkater note: I can't help it! Everytime I hear "rotating field" I think of the P-X or Montauk.]**

AUTHOR:     Cullwick, E.G. (Ernest Geoffrey), 1903-
TITLE:      <u>Electromagnetism and Relativity</u> with particular reference to moving media and electromagnetic induction
EDITION     2d ed.
PUBL.:      New York : J. Wiley,
DATE:1959 (2nd Edition)
SUBJECT: Electromagnetic theory, Relativity (Physics)

AUTHOR:     Cullwick, E.G. (Ernest Geoffrey), 1903-
TITLE:      <u>The Fundamentals of Electro-Magnetism</u>
EDITION     3rd ed.
PUBL.:      London, Cambridge U.P.,
DATE:1966 (3rd Edition)
SUBJECT: Electromagnetism

AUTHOR:     Cullwick, E.G. (Ernest Geoffrey), 1903-

TITLE:     The Fundamentals of Electro-Magnetism; a restatement for engineering students and others of physical and theoretical principles in accordance with modern scientific thought ... With an appendix and numerous examples on the recently adopted MKS. system of practical units ...
PUBL.:     New York, The Macmillan company; Cambridge, Eng., The University Press,
DATE:1939
SUBJECT: Electromagnetism

157. If you work out the metric for EM waves circulating in a cavity, you get some strange results. There is a preliminary discussion of this effect in the article by Houshang Ardavan, "Gravitational Waves from Electromagnetic Waves" in the book Classical General Relativity edited by W.B. Bonner, I.N. Islam, and M.A.H. MacCollum (Cambridge Univ. Press, 1984).

It is something that I have seen done. At the point in an annular cavity where the phase velocity goes from less-than-c to greater-than-c, a term shows up in the derived metric of the system that looks like a source term. On the other hand, you have assumed that the metric is source free in the EM region of the cavity. So you get a solution which contradicts the hypothesis that went into building the solution. You get something which is possibly unphysical.

Now Einstein's equation and the associated geometry is pretty tricky and it is easy to get unphysical solutions. The final arbitors of whether a solution is satisfactory or not is physical reasonability and self-consistency (these are almost the same thing). The cavity problem seems very physically reasonable initially but ends with a self-consistency problem which appears to be unphysical.

Also, Cauchy's theorem does not apply to this case since it becomes a mixed-type problem (elliptic and hyperbolic PDEs). So the Hawking singularity theorems don't a priori apply. It is something very interesting. But to publish it without being scoffed at would take a lot of work and possibly inventing some new math. -- *Jim McClune, University of Missouri*


158. Rotating Fields in General Relativity by Islam, J.N.
    1985 6x9 122 pp. 4 diagrams
    Hardback 0-521-26082-5 $47.95 (£7.99)
    Subject: physics
    Begins with a short introduction to the relevant aspects of General Relativity. This is followed by a detailed derivation of the Wehl-Lewis-Papapetrou form of the stationary axially symmetric metric. The Kerr and Tomimatsu-Sato forms of the rotating interior and exterior solutions of the Einstein equations are then considered.


    >"If an EM field is somehow rotated extremely fast, shouldn't all matter be repelled
    from its center?" -- kgo

How fast do you want it rotated? It's fairly simple to construct a system to produce rotating EM waves at whatever rotational velocity that you wish by feeding a pair of broadside dipole arrays with quatrature phased waves. It is quite simple to construct a system that would have a rotational velocity of C within the uniform field area.

It might also be fairly easy to do this with a Hemholtz coil arangement as well. But the broadside array will be much easier to do at easily engineerable frequencies. Some really interesting paradoxes come about when the rotational frequency is high enough so that the

rotational velocity exceeds C within the uniform field area of the arrays or within the Hemholtz coils. -- *Robert Shannon*

**[StealthSkater note: this is supposedly what the Montauk Project "Delta-T" antenna does that alleges allows time-viewing/travel/manipulation => doc pdf URL .]**

159. <u>Ehrenfest Paradox</u> (Ehrenfest, 1909) --

The Special Relativistic "paradox" involving a rapidly rotating disc.  Since any radial segment of the disc is perpendicular to the direction of motion, there should be no length contraction of the radius.  However, since the circumference of the disc is parallel to the direction of motion, it should contract.

Question by Kung Lo (October 1995):

Take a rigid disk of radius R and spin it up to angular velocity.  As seen by an observer S that is at rest in the center of the disk, the radius is still R but the circumference is contracted by the Lorentz effect.  How is this possible?

More physically, if a fixed ring is just outside the spinning disk and placed with equally-spaced markers on the rim of the disk and on the fixed ring, I know by symmetry that when one marker on the disk is aligned with a marker on the ring, all pairs of markers must be aligned.  This contradicts the fact that for observer S, the distance between successive markers on the disk is reduced by the Lorentz factor.

Answer provided by David Djajaputra (November 1995):

It seems that the rotating disk paradox (it turned out to be Ehrenfest's paradox) has been extensively analyzed by many people (including Einstein himself who developed General Relativity to answer this problem as one author speculates...).  This I found from a nice paper:

O. Gron, "Relativistic description of a rotating disk" *Am. J. Phys.* V43, 869 (1975), and all the references therein.

The key sentence in Gron's paper is at the end of Section IV:
"By definition, a Born rigid motion of a body leaves lenghts unchanged when measured in the body's proper frame . (...)  A Born rigid motion is not a material property of the body but the result of a specific program of forces designed to set the body in motion without introducing stresses. (...)  A transition of the disk from rest to rotational motion -- while it satisfies Born's definition of rigidity -- is a kinematic impossibility."

With this kinematics, the radius is R and the circumference is as measured by observer S (lab frame).  But an observer riding on the disk will measure a distance R to the center and a distance around the circumference (he can do this measurement by slowly walking around the spinning disk with a meter tape).  This is consistent with the usual Lorentz contraction.  The point is that this is NOT a Born rigid motion.  There is much more in Gron's paper.  -- *Vittorio Celli*

160. Several key phrases keep popping up regarding rotating fields, powerful magnetic pulsed fields, and 90-degree cross-field phase shifts.

For example, Preston Nicholes describes a device known as a "Delta-T antenna" in the Montauk series of books.  The Delta-T antenna is described as a pyramidal structure.  But let's just take 2 square loops placed at 90 degrees to each other.  Feed these 2 loops with an RF signal (also

with a 90-degree phase shift) and we will produce a rotating magnetic field within the loops (these loops share a common center point, and each loop is in a plane 90 degrees from the other)

The speed-of-rotation of this magnetic field is a direct function of the frequency of the applied RF signal. At the center of the antenna, the rotational velocity is zero. But as you move out from the center, the rotational velocity increases. At some distance from center would reach the speed-of-light, dependant of the frequency used.

One could imagine that the rotational velocity of this rotating magnetic field could reach the speed-of-light within the antenna structure itself if a way could be found to make the antenna much larger than a normally resonant antenna would be for that same frequency. At several hundred Megahertz, a 2-meter per side square loop would have a rotational velocity well in excess of the speed-of-light within the antenna structure itself.

What <u>effect</u> would there be at the boundary where the rotational velocity reached and then exceeded the speed-of-light? How could the magnetic field even propagate to the center of the antenna structure if it would have to move faster than light to reach that space? If Hemholtz coils were used instead of loops, the magnetic field strength would be uniform inside the structure. But how could the field strength be uniform if there is not sufficient time for the field to propagate through the space inside the structure itself? Could such an effect actually generate a wormhole like phenomena at energy levels far below that of neutron stars and such?

As the causal mechanism, the magnetic field is in rotation. Would this describe a traversable worm hole as has been postulated in relationship to rotating black holes? -- *Robert Shannon*

161. Let me clear this up a bit. The 2 coils are acting as antenna already, producing the rotating field by vector summation of the radiated quatrature phased EM waves. The loops would be operating as the driven elements of a cubical antenna -- not as coils as such.

If you prefer, substitute the 2 loop antenna with a pair of crossed dipoles at 90 degrees. This will also produce the rotating field. But the center will be occupied by the dipoles rather than be open as with loop antenna of by using sets of broadside arrays. Note that this is not the same as the rotational speed reaching c inside the "uniform field" area as described earlier.

It's simple a tool to understand the generation of the rotating field and the relationship between applied frequency and the resultant rotational speed. Rather than loop elements, in practice you might use a phased array of dipole elements that produces a constant phase plane wave (not unlike a pair of Hemholtz coils produced a uniform field within the coil sets). 4 of these "broadside arrays" would from the 4 sides of a cube, inside of which you could induce the fast rotating fields from the radiated EM waves.

In all cases, the driven elements are launching EM waves ac. Only the vector sum of the 2 (of 4) quatrature fields is in rotation. Which leads us back to the question of what happens as the

rotational velocity of the sum of these EM fields reaches c within the field generator, and there is not sufficient time for the fields to propagate across the $V_r=c$ boundary?

This is the point where 2 different physicists have tried to lead me down the garden path of **"red-shifted magnetic fields".** I'm not sure I'm ready to buy that concept just yet. *-- Robert Shannon*

162. "The Rotating Quantum Vacuum"
    Author(s): Paul C. W. Davies , Tevian Dray , Corinne A.
    Manogue Report-no: ADP 95-43/M36 (University of Adelaide)
    General Relativity & Quantum Cosmology, Abstract GR-QC/9601034
    From: Tevian Dray
    Date: Mon, 22 Jan 1996 10:57:03 PST
    We derive conditions for rotating particle detectors to respond in a variety of bounded spacetimes and compare the results with the folklore that particle detectors do not respond in the vacuum state appropriate to their motion. Applications involving possible violations of the Second Law of Thermodynamics are briefly addressed.

163. I'm also saying that a pair of crossed coils will start behaving differently when the driving frequency is so high that the field lines near them try to exceed the speed-of-light. At low frequencies, the coils create a rotating magnetic field. At high frequencies, they send out radio waves having a rotating field vector (i.e., circularly polarized waves.) WITHIN the volume of the coils the fields still rotate, at least until the frequency is raised so high that the coils are many wavelengths across.
    At these frequencies the fields in the center of the crossed coils would be of complex shape. Maybe some kind of contracting spiral. (Which is interesting because at very high frequencies, there would be a "hot spot" at the exact center of the crossed coils.) *-- Robert Shannon*
    **[StealthSkater note: Preston Nichols said that all sorts of strange spinor/tensor waveforms were created/used in the Montauk Project => doc  pdf  URL-doc  URL-pdf ]**

164. On similar topic, anyone ever heard of the "CFA antenna" flap in the UK? CFA is for "crossed-field antenna".

There were a bunch of articles and letters to the editor in the British engineering magazine *EWW* (*Electronics and Wireless World*). The CFA-believers thought they had discovered a way to make 1-foot antennas which were efficient at 100-meter wavelengths. The key to the CFA was to create the E- and B-fields separately. Feed both a coil-loop and a pair of capacitor-spheres with separate high-current and high-voltage signals respectively; orient them 90-deg to produce a broadside wave; shift the phases with L/C networks to form the proper EM wave (90? zero? ),;and then obtain a powerful EM emission from a tiny antenna.

There was a great quantity of argument and name-calling over this -- all done in slow-motion over many months of letters in the letters-to-the-editor column. Then it just died away. Either the pro-CFA side couldn't prove that it worked or nobody believed the proof they did find. *-- William Beaty*

165. And some comments about rotating EM fields by Dr Dennis Cravens in a report titled "Electric Propulsion Study" which was done for the Astronautics Laboratory at Edwards AFB, August 1990. Dennis Cravens was formerly with SAIC Corp and is now working with CETI in development of cold fusion. Anyway, here's some things he says in the electric propulsion report about the "peculiarities" of a rotating magnet:

> ROTATION OF MAGNETS - There is a continuing debate in physics as to the reality of the magnetic field. The prime question is whether the axial magnetic field of a bar magnet rotates with the magnet or is stationary. The Faraday homopolar generator dates back to the 1830s. DePalma, Tewari, and others have attempted to utilize the Faraday generator to produce more power than needed to run it. Most objective reviews of the work have, however, failed to see such effects.

> It is doubtful that these claims will be independently validated and even more doubtful that they will lead directly to a propulsive system. However, the work on homopolar generators as high current devices is reasonable and may be useful for ground uses. The angular momentum complications seem to rule the system out for any practical space applications.

> SEARL EFFECT - The Searl Effect is a separate issue from homopolar generator above. Searl has claimed to produce disk levitation by rapidly rotating magnets. There have been claims of anti-gravity, high electric fields, perpetual motion, inertial loss, and gas ionization. All these claims come from Searl or those supportive of his work and no outside witnesses are available. Searl has not supplied any technical data or specifics of the operation in any easily referenced source. It is not recommended that his work be experimentally followed by the USAF. It is worth noting, however, that a rotating magnet does have some definite theoretical peculiarities.

> Through the years, there have been many interesting developments concerning the Faraday Homopolar generator. DePalma has claimed to get more energy out than is supplied to the generator. None of the claims seem to withstand careful examination and no machine has ever been made self driving. The underlying reason that such claims continue to surface is that rotating magnetic fields are extremely difficult to handle within existing theories. This is because for a rotating frame there is a distance (removed from the axis) which is travelling at velocities greater than c. Although the distance is not within any real physical object, its existence within the mathematical development greatly complicates any calculations.

>> DePalma B.E., "Electro-Mechanical Device for the Amplification of Electrical Power", *The New Age Science Magazine*, No 7, 1980

>> Tewari P., "Generation of Electrical Power from Absolute Vacuum by High Speed Rotation of Conducting Magnetic Cylinder", *Tech. Rep. Dept. of Atomic Energy*, Bombay India, 1985

>> Searl, J.R.R., British provisional patent specification #57578, 1970

166. These articles are indicative of studies of EM waves and rotating bodies. It appears that when EM waves pass through rotating dielectrics some unusual effects are predicted. This may lead to some interesting future technology. -- *Dr Dennis Cravens*

"Some Remarks on Scattering by a Rotating Dielectric Cylinder", D. Schreiber, *Journal of EM Waves and Applications*, Vol 2 No2 1988

"Rotating Bodies and Electrodynamics in a Rotating Reference Frame", I.B. Zeldovich and L.V. Rozhavskii, *Radiofizka* Vol 29 No 9, 1986

Here's an interesting news brief from *Infinite Energy* magazine, July/Aug 1995, Dr Eugene Mallove - editor. (603)-228-4516

A bombshell paper has just been published in the *American Journal of Physics*, Vol 63 No 8, August 1995, pages 694-705, "Maxwell's Equations in a Rotating Medium: Is There a Problem?" by Gerald N. Pellegrini and Arthur R. Swift (the latter of the Dept of Physics and Astronomy, University of Massachusetts, Amherst MA)"

The paper is a direct challenge to Special Relativity. It proves one of two things about a classic 1913 experiment of Wilson and Wilson that was used to verify the prediction of relativity that "a moving magnetic dipole develops an electric dipole moment." The conclusion of the paper is that Special Relativity does NOT agree with this experiment. And no one has ever challenged the quality of the experiment.

Peregrinni told *Infinite Energy* that he thinks that all of relativity as well as Maxwell's equations as descriptors of EM radiation are now called into question.


167. The origin of the "Montauk Project" dates back to 1943 when radar invisibility was being researched aboard the *USS Eldridge*. As the *Eldridge* was stationed at the Philadelphia Navy Yard, the events concerning the ship have commonly been referred to as the "Philadelphia Experiment." The objective of this experiment was to make the ship undetectable to radar and while that was achieved. But there was a totally unexpected and drastic side effect.

The ship became invisible to the naked eye and was removed from time and space as we know it. It went into 10-dimensional hyper-space. For further info into this, read the book called Hyperspace by Dr. Michio Kaku. A movie called "The Philadelphia Experiment" was made but delayed for two years as the Pentagon was able to halt its release.

After the war, research continued under the tutelage of Dr. John Von Neumann who had directed the technical aspects of the Phily Experiment. A massive human factor study was also begun at Brookhaven National Labs on Long Island, New York known as the "Phoenix Project". The Montauk Project culminated on August 12, 1983. A full blown time portal was fully functioning. But things were out of control and the Project was crashed.

An unauthorized video has been widely distributed regarding this story and several lectures have been given on the Montauk Project. One science reporter for the *New York Times* started the Project but tacked off when he discovered to his own surprise that the Montauk Project was indeed real.

Three books have been released by Preston Nichols (who was involved in the Project) and "Peter Moon". They are The Montauk Project: Experiments in Time (1991); Montauk Revisited: Adventures in Synchronicity (1993); and Pyramids of Montauk Explorations in Consciousness

(1995).   This coming year (1996) the next book will be out and the title will be <u>Montauk</u> <u>Reconciled</u>.  -- *Richard Frager*

**[StealthSkater note: the first book is archived at** `doc` `pdf` `URL-doc` `URL-pdf` **.  Excerpts from the fourth book as related to "UFOs" and "artificial realities" are archived at** `doc` `pdf` `URL-doc` `URL-pdf` **.**

**The SAGE radar at Camp Hero at Montauk Point was used to detect foreign threats including strategic bombers and ICBMs.  It was also used in conjunction with the Nike Zeus anti-ICBM system guarding our own ICBM silos in places such as Plattsburgh AFB (near to Montauk).  But early-warning satellites eliminated the need for ground-based radars like SAGE.  And anti-missile treaties forced the Zeus/Sprint missiles to be taken out of service.**

**For some (publicly-unknown) reason, the Montauk SAGE radar continued to operate for several years after the rest of the SAGE systems were taken off-line.  Supposedly this was to provide a "back-up" while the new satellite-based systems were being phased in.  But was <u>something</u> <u>else</u> (i.e., time-manipulation experiments) occurring using this giant RF radar? Also see "Project Looking Glass" =>** `doc` `pdf` `URL` **.]**

168. "Theoretical Motivation for Gravitation Experiments on Ultra-Low Energy Anti-Protons and Anti-Hydrogen"
Authors: Michael Martin Nieto, T. Goldman, John D. Anderson, Eunice L. Lau, J. Perez-Mercader
High-Energy Physics: Phenomenology, Abstract HEP-PH/9412234
From: Michael Martin Nieto 505-667-6127
Date: Mon, 5 Dec 94 09:52:27-0700
Comments: Written version of invited contribution to LEAP'94: Third Biennial Conference on Low-Energy Antiproton Physics.

We know that the generally-accepted theories of Gravity and Quantum Mechanics are fundamentally incompatible.  Thus when we try to combine these theories, we must beware of physical pitfalls.  Modern theories of quantum gravity are trying to overcome these problems.  Any ideas must confront the present agreement with General Relativity but yet be free to wonder about not understood phenomena such as the dark matter problem and the anomalous spacecraft data which we announce here.

This all has led some ``intrepid'' theorists to consider a new gravitational regime -- that of anti-matter.  Even more "daring" experimentalists are attempting (or considering attempting) the measurement of the gravitational force on anti-matter including low-energy anti-protons and -- perhaps most enticing -- anti-hydrogen.

"A Technique for Directly Measuring the Gravitational Acceleration of Antihydrogen" by Thomas J. Phillips, Duke University, Durham, NC
High-Energy Physics: Experiment, Abstract HEP-EX/9412018
From: PHILLIPS@hep.phy.duke.edu
Date: Fri, 30 Dec 1994 16:03:31 -0500 (EST)
Comments: Written version of invited contribution to LEAP'94: Third Biennial Conference on Low-Energy Antiproton Physics.

The gravitational force on anti-matter has never been directly measured. A method is suggested for measuring the acceleration of anti-matter $(\overline g)$ by measuring the deflection of a beam of neutral anti-hydrogen atoms in the Earth's gravitational field. While a simple position measurement of the beam could be used, a more efficient measurement can be made using a transmission interferometer.

A 1\% measurement of $\overline g$ should be possible from a beam of about 100,000 atoms with the ultimate accuracy being determined largely by the number of anti-hydrogen atoms that can be produced. A method is suggested for producing an anti-hydrogen beam appropriate for this experiment.

"Anti-matter Gravity and Anti-Hydrogen Production"
Authors: Michael H. Holzscheiter, T. Goldman, Michael Martin Nieto
High-Energy Physics: Phenomenology, Abstract HEP-PH/9509336
From: Michael Martin Nieto 505-667-6127
Date: Tue, 19 Sep 95 14:08:11 -0600

Certain modern theories of gravity predict that anti-matter will fall differently than matter in the Earth's gravitational field. However, no experimental tests of gravity on anti-matter exist and all conclusions drawn from experiments on matter depend -- at some level -- on a specific model.

We have proposed a direct measurement that would compare the gravitational acceleration of anti-protons to that of negatively-charged Hydrogen ions. Substantial progress towards the development of this experiment has been achieved. Based on our work, a number of alternative proposals for measuring ``$g$'' on both charged and neutral anti-matter have been made. We summarize the present status of our experiment and also discuss the steps that would be necessary to produce anti-Hydrogen in an environment suitable for gravity measurements.

169. Hi Robert --
I have one reference for you. The book is called Suppressed Inventions and other Discoveries. It's an anthology edited by Jonathon Eisen. Authors include: Dr. Brian O'Leary, Christopher Bird, Jeanne Manning, Barry Lynes, and others. As well as Townsend Brown, the inventers/doctors (as well as inventions the book also covers various cancer treatments which have had research suppressed) who are discussed include Naessons, Rife, Hoxsey, Gerson, Tesla, Brown, Reich, and others.

The book covers free energy, various "un-free" though different motive technologies, cancer cures which have worked but not seen approval by the AMA, Roswell, the Mars face. And as a delight to conspiracy buffs, there are also chapters on how various Government bodies have suppressed these technologies as well as how the AMA came to be all powerful in the field of suppressing alternate treatments.

The book is published by:
    Auckland Institute of Technology Press
    Private Bag 92006
    Auckland, New Zealand
        ISBN No. 0-9583334-7-5

For further research, consult the following sources:

Fer-de-Lance by T.E. Beardon
  Tesla Book Company, P.O. Box 121873, Chula Vista, CA 91912 USA

Leading Edge Research Group
  (Leading Edge Journal #77 12/94)
  P.O. Box 7530 Ste 58, Yelm, Washington 98597 USA

Nexus Magazine
  P.O. Box 66, 8400 AB Gorredijk, The Netherlands
  Tel/Fax: 31-(0)5133-5567

**[StealthSkater note: Rife and Priore are archived at `doc` `pdf` `URL` ;**
  **Wilhelm Reich is archived at `doc` `pdf` `URL` ;**
  **and Nikola Tesla is archived at `doc` `pdf` `URL` as well as `doc` `pdf` `URL` ]**

170. The information on the electrogravitics reference list which is of particular interest to me are the Laithwaite and Wallace references. I think my work (Electrical-Dipole Theory of Gravitation) explains what they were observing and why. Here are some additional references. -- *Ralph Sansbury*
  - Fischbach, Sudarsky, Szafer, Talmadge, and Aronson in "Reanalysis of the Eotvos Experiment" (*Phys Rev Let* vol 56 p3 6/1/86)
  - J.H. Pratt and G.B. Airy 1855 *Phil Trans* v145
  - Fredrich Zollner, Explanation of Universal Gravitation through the Static Action of Electricity and the General Importance of Weber's Laws, 1882
  - Immanuel Velikovsky, Cosmos without Gravitation, 1964
  - V.A. Bailey In the May 14, 1960 issue of *Nature*
  - P.M.S. Blackett In the May 17, 1947 issue of *Nature*
  - T. Gold in a later issue (April 2, 1949) of *Nature*
  - Henry Wallace U.S. patent number 3 626 605
  - P.S. Wesson *Phys Rev D* v23 p1730 (1981)
  - Sansbury R.N. *Electrical Engineering Times* (12/28/87)
  - Sansbury R.N. U.S. patent number 4,355,195
  - Sansbury R.N. *Rev. Sci. Instr.* (3/85)
  - Bartlett D.F. *Rev.Sci. Instr.* (10/90)
  - Peter Graneau, *Nature* v295 1982 p311
  - Weiskopf M.C., Carrico, Gould, Lipworth, and Stein, *Physical Review Letters* 1968, vol21 p1645
  - Coles and Good, *Physical Review* 1946 p979
  - Kaufmann W. p502 in World of the Atom by H. Bourse and L. Motz
  - W.J. Duffin, Electricity and Magnetism Wiley 1973
  - R.A. Tricker, Early Electrodynamics Pergamon Oxford 1965

171. "The Dipole Coupling of Atoms and Light in Gravitational Fields" by Karl-Peter Marzlin, 10 pages, LaTeX
Paper: gr-qc/9410019
From: Peter Marzlin
Date: Mon, 17 Oct 94 12:50:28 +0100

The dipole coupling term between a system of N particles with total charge zero and the electromagnetic field is derived in the presence of a weak gravitational field. It is shown that the form of the coupling remains the same as in flat space-time if it is written with respect to the proper time of the observer and to the measurable field components. Some remarks concerning the connection between the minimal and the dipole coupling are given.

The level of difficulty in the above paper is well beyond my grasp. But what is clear is that it presents an analysis which strongly suggests that the textbook wavefunctions for electrons within atomic matter can be best described by the dipole coupling rather than the coulomb gauge. The paper also relates the dipole coupling to a weak gravitational field. The last paragraph of the paper provides substance to the idea that gravity is at least in part, an electric dipole phenomena. Here is the last paragraph:

> "It is interesting to make a comparison of the present results with the well-known formal equivalence between the Maxwell field in curved space and in a dielectric medium (23). In this approach, one defines a formal dielectric displacement vector to describe the influence of gravity on the Maxwell field. In the absence of particles (i.e., for vanishing polarization P), the formal electric displacement agrees with the vector delta defined above. Also the coupling of the Poynting vector to the rotation occurs in the energy of the formal Maxwell field."
>
> The paper referenced (23) is A.M. Volkov, A.A. Izmest'ev, and G.V. Skrotskii, Soviet Physics JETP 32, page 686, (1971)

Note: There are a variety of other theories and experiments which attempt to show that a static gravitational field is identical to that which results from electric dipole moments -- a polarization of the vacuum. And conversely, it is well know that if you accelerate a dielectric material (or in "equivalence", subject a dielectric material to a gravitational field or other mechanical force), an electric field due to dipole moment (polarization P) will be generated within the material.

This effect is especially prevalent in structured crystal dielectrics (e.g., piezoelectric materials) which are used as transducers in accelerometer sensors. You can also find piezoelectric material and conversion of mechanical force to a high voltage electric field in push-button spark igniters used on gas grills and cigarette lighters.

Here's a thought. To enlighten those folks who continue to stubbornly try to debunk the evident relationship between gravitation and electromagnetic, insert one of these spark igniters in a neuro-sensitive body cavity and <click> it as many times as necessary.

172. One issue with the electrostatic dipole hypothesis is that once the magnetic effects of spin etc have been considered, there is no evidence of such dipoles inside atomic nuclei and electrons. However, if magnetic properties of nuclei and electrons can be represented in terms of electrostatic dipoles as recent experiments and theoretical discussion seem to indicate, then this objection is avoided.

The dipole can be produced by a negatively-oriented particle orbiting a positive central particle so that the combination has a net positive charge (see *Rev Sci Instr* Mar 1985 and Geomagnetism: Gravity Measured by Magnetic Materials, ICP Press, Box 492 NY NY 10185 $25US 1994 by R Sansbury)

An added benefit: the observed quadrapole in nuclei and electrons makes more sense in a physically real Taylor expansion by the inclusion of an observed dipole term as well. That is, the dipole term is not observed because its effects are wrongly attributed to another cause (magnetism). Thus magnetism is properly regarded as a derived apparently separate force like the Coriolis sideways force on bodies moved radially on a rotating platform. -- *Ralph Sansbury*

173. About electric dipole precession. The article "Electricity" in *Britannica* includes a resonance equation for dipole precession in dielectrics. It was identical in form to the one used in magnetic resonance except for the obvious differences in units. Dielectric precession (resonance) frequencies were in the optical range.

   Brown didn't use resonance. But he did use a steady frequency. His frequency, too, would damp out if it were discontinued. Greater results than Brown's could probably be achieved with lasers. But I doubt you'll find a better description of dielectric dipole resonance. The Britannica article gives the mathematics.

174. van der Waals force (J.D. van der Waals) -- Forces responsible for the non-ideal behavior of gases, and for the lattice energy of molecular crystals. There are 3 causes: (1) dipole-dipole interaction; (2) dipole-induced dipole moments; and (3) dispersion forces arising because of small instantaneous dipoles in atoms.

175. "The Electric Dipole Moment of the Electron", Bernreuther & Suzuki, *Reviews of Modern Physics*, April 1991 vol 63 no 2
   An electron or any other elementary particle can possess an electric moment (EDM) only by virtue of an interaction that violates parity and time-reversal invariance. The question of whether an electron EDM exists is thus related directly to the unsolved problem of CP violation.
   According to the Standard Model in which CP violation is accounted for in terms of the Kobayashi-Maskawa matrix, the electron EDM is predicted to be far too small to be observed experimentally. However, a number of alternative theoretical models of CP violation predict larger values of the electron EDM. These models are of special interest now when experimental limits on the electron EDM are improving substantially.

   "The Electron Electric Dipole Moment for a CP-violating Neutral Higgs Sector", J.F. Gunion, *Physics Letters:* Part 8, Nov 8 1990

   "New Experimental Limit on the Electron Electric Dipole Moment", Abdullah & Commins, *Physical Review Letters*, Nov 5 1990

   "The Standard Model Prediction for the Electric Dipole Moment of the Electron", F. Hoogeveen, *Nuclear Physics B*, Sep 10 1990

   "Electric Dipole Moment of the Electron and the Neutron", S.M. Barr, *Physical Review Letters*, July 2 1990, Vol 65 No 1

   "Effective Hamiltonian for the Electric Dipole Moment of the Neutron", Boyd, Gupta & Trivedi, *Physics Letters*: Part 8, May 24 1990

"A search for the Electric Dipole Moment of the Neutron", K.F. Smith, *Physics Letters:* Part 8, Jan 4 1990, Vol 234 No 1/2

"Interpretation of the Neutron Electric Dipole Moment: Possible Relationship to Epsilon", Booth, Briere & Sachs, *Physical Review D* Jan 1 1990, Vol 41 No 1

"Inclusion of the Toroidal-Moment Contribution in the Probability of the Electric Dipole Transition", R.G. Nazmitidinov, Soviet Journal of Nuclear Physics, Sep 1 1990, Vol 53 No 2

176. But what is the thing in atomic nuclei that collectively produces the gravitational field of the Earth etc. and which causes individual nuclei to react in the prescribed manner?  The hypothesis proposed is that atomic nuclei contain small electrostatic dipoles ($10^{-37}$C.-m.) with radial and longitudinal components transverse to the west to east spinning direction of the Earth etc.  Such dipoles explain the nuclear magnetic moment and electrostatic quadrapole moment inferred from the hyperfine spectra emitted by some excited atoms and the deflection of molecules such as ortho-Hydrogen in a magnetic field (but not para-Hydrogen because the magnetic moments are anti-parallel in pairs and cancel)

The Cavendish measurement of the horizontal gravitational force between 2 Lead spheres instead of being attributed to the small masses of each can be attributed to the small horizontal component of the radial force, directed to the center of the Earth, due to the mass of the Earth on each of the small masses.  That is, Gravity is not a property of mass per se but only of <u>spinning</u> mass.

The atomic nuclei of all elements except Iron, Cobalt, and Nickel primarily tend to line up in the direction of the surrounding atomic nuclei when the bulk object of which they are a part is moved.  But in the case of the magnetic elements, the bulk material must also move to complete the required alignment.  Hence the north-south and downward movement of a magnetized steel compass needle.  Hence the Wilson-Blackett proportionality between the angular momentum of planets, stars etc and their magnetic moment where the constant of proportionality is the square root of the gravitational constant divided by the speed-of-light. For more information, see *Science News* Aug 6 '94 p82.  *-- Ralph Sansbury*

177. Edward Teller, "Electromagnetism and Gravitation", <u>Proceeds of the National Academy of Science</u>, Vol 74 No 4, Pages 2664-2666.

In this paper, Dr Teller suggests some clues about the coupling between ElectroMagnetism and Gravitation.  In the first part, Teller describes how an electric field due to polarization can be induced in a dielectric material which is subject to angular or linear acceleration or if subject to a gravitational field.  In the second part, Teller describes -- using purely dimensional analysis -- how a magnetic field might be produced by a spinning mass.  He also comments that the magnitude of this magnetic field might be exceedingly small and notes that a "numerical" factor could exist which might act to increase the magnitude of the field.

(Note: It is speculated by others that alignment of microscopic particles with the Macroscopic spin axis of the Earth could result in a large "numerical" factor.  Fact is, the Earth <u>does</u> have a fairly large measurable magnetic field about which there are a variety of theories as to the origin.)

178. Title: New Insight into the Relation between Torsion and Electromagnetism"
    Author: Kenichi Horie (Mainz Univ.)   Paper: hep-th/9506049
    From: HORIE@dipmza.physik.Uni-Mainz.DE
    Date: Thu, 08 Jun 1995 11:23:23 +0100
    Report-no: MZ/TH 95-16
    In several Unified Field theories, the torsion trace is set equal to the electromagnetic potential. Using fibre bundle techniques, we show that this is no leading principle but a formal consequence of another geometric relation between space-time and electromagentism.

"Geometric Interpretation of ElectroMagnetism of Space-Time Torsion" by Kenichi Horie, Institut
    fur Physik, Hohannes Guttenberg-Universit at Mainz, D--55099 Mainz, Germany
High-Energy Physics: Theory, Abstract HEP-TH/9409018
From: HORIE@VIPMZw.physik.Uni-Mainz.DE
Date: Sat, 03 Sep 1994 10:27:48 +0100

A complete geometric unification of Gravity and ElectroMagnetism is proposed by considering 2 aspects of torsion -- its relation to spin established in Einstein-Cartan theory and the possible interpretation of the torsion trace as the electromagnetic potential.

Starting with a Lagrangian built of Dirac spinors, orthonormal tetrads, and a complex (rather than a real) linear connection, we define an extended spinor derivative by which we obtain not only a very natural unification but can also fully clarify the nontrivial underlying fibre bundle structure.

Thereby a new type of contact interaction between spinors emerges which differs from the usual one in Einstein-Cartan theory.  The splitting of the linear connection into a metric and an electromagnetic part together with a characteristic length scale in the theory strongly suggest that **Gravity and ElectroMagnetism have the <u>same</u> geometrical origin**.


179. "Gauge Invariant Electromagnetic Coupling with Torsion Potential" by Richard T. Hammond,
    *General Relativity and Gravitation*, Vol 23 No 11 1991
    Electromagnetism is coupled to Torsion in a gauge invariant manner by relaxing minimal coupling and introducing into the Lagrangian a term bilinear the electromagnetic field tensor and its torsion potential.  The resulting coupling between ElectroMagnetism and Torsion is examined and a solution corresponding to traveling coupled waves is given.  Since Torsion is usually regarded as resulting from the spin of a body, this might establish a Classical relationship between charge and spin.  The results suggest that the effect should be looked for in **high-intensity electric fields of low frequency**.

"Detecting Torsion from Massive Electrodynamics" by L.C. Garcia de Andrade, and M. Lopes,
    *General Relativity and Gravitation*, Vol 25 No 11 1993
    A new method of detecting torsion in the case of massive electrodynamics is proposed. Several authors have proposed methods for the detection of torsion in theories of the Einstein-Cartan type and also in theories where the torsion field propogates.  These theories are based on the studies of Dirac test particles which have spin like the electron and the gyroscope-like precession of these atomic particles.  The interaction energy between the torsion vector Q and an electric dipole p is given by (p dot Q).

AUTHOR(s):     de Andrade, L.C. Garcia
TITLE(s):      Electron gyroscopes to test torsion gravity?
In: Il nuovo cimento delle societa italiana di fisic
OCT 01 1994 v 109 n 10 Page: 1123


AUTHOR:        De Sabbata, Venzo.
TITLE:   "Spin and Torsion in Gravitation" by Venzo de Sabbata, and C. Sivaram.
PUBL.:   Singapore ; River Edge, NJ : World Scientific,
FORMAT:        xii, 313 p. : ill. ; 23 cm.
DATE:   1994
SUBJECTS: Torsion, Gravitation


AUTHOR:        De Sabbata, Venzo.
TITLE:   "Introduction to Gravitation"by Venzo de Sabbata and Maurizio Gasperini.
PUBL.:   Singapore ; Philadelphia : World Scientific,
FORMAT:        ix, 346 p. : ill. ; 23 cm.
DATE:   1985
SUBJECTS: General relativity, Torsion, Gravitation


AUTHOR:        NATO Advanced Study Institute on Cosmology and Gravitation
(1979: Bologna, Italy)
TITLE:   Cosmology and Gravitation: Spin, Torsion, Rotation, and Supergravity
         Edited by Peter G. Bergmann and Venzo De Sabbata.
PUBL.:   New York : Plenum
Press : NATO Scientific Affairs Division,
FORMAT:        ix, 510 p. : ill. ; 26 cm.
DATE:   1980
SERIES: NATO Advanced Study Institutes Series v 58 Series B Physics



180. CONFERENCE :International Conference on Magnetic and Electric Resonance and Relaxation
        (1962: Eindhoven)
   TITLE :Magnetic and electric resonance and relaxation; proceedings of the XIth Colloque
        Ampere, Eindhoven, July 2-7, 1962.
   PUBLISHED :Amsterdam, New York, North-Holland Pub. Co.; Interscience Publishers, 1963.
   DESC :xi,789p. illus.,diagrs.,tables. 24cm.



181. The Lorentz-Dirac equation is a purely Classical expression for the electromagnetic force on a
   point charge including the self-force from the particle's own radiation.  It's a strange equation with
   solutions that are manifestly unphysical under certain circumstances.  If you want to know more
   about it, you might want to look at:
        S. Parrott, Relativistic Electrodynamics and Differential Geometry, Springer-Verlag, 1987.



182: "Consequences of Propagating Torsion in Connection-Dynamic Theories of Gravity" by Sean M.
        Carroll and George B. Field
   General Relativity & Quantum Cosmology, Abstract GR-QC/9403058 *Phys. Rev. D* 50 (1994
        3867)
   16 pages plus 1 figure (plain tex), MIT-CTP #2291.
   carroll@marie.mit.edu (Sean Carroll)

Tue, 29 Mar 1994 19:57:32 -0500

We discuss the possibility of constraining theories of Gravity in which the connection is a fundamental variable by searching for observational consequences of the torsion degrees of freedom. In a wide class of models, the only modes of the torsion tensor which interact with matter are either a massive scalar or a massive spin-1 boson.

Focusing on the scalar version, we study constraints on the 2-dimensional parameter space characterizing the theory. For reasonable choices of these parameters, the torsion decays quickly into matter fields and no long-range fields are generated which could be discovered by ground-based or astrophysical experiments.


183. "Invariant Connections with Torsion on Group Manifolds and Their Application in Kaluza-Klein Theories" by Kubyshin, Yu A., Malyshenko, V.O., and Marin, Ricoy D.
General Relativity & Quantum Cosmology, Abstract GR-QC/9304047
From: Kubyshin%Ebubecm1.Bitnet@frmop11.cnus.fr
Date: Sun, 02 May 93 12:55:30 BCN

Invariant connections with torsion on simple group manifolds S are studied and an explicit formula describing them is presented. This result is used for the dimensional reduction in a theory of multidimensional gravity with curvature squared terms on $M^4$ times S. We calculate the potential of scalar fields emerging from extra components of the metric and torsion and analyze the role of the torsion for the stability of spontaneous compactification.


184. Subject: Antigravity in Jane's
From: "Terry Colvin"

"All those interested in advanced propulsion concepts should check out Jane's Defence Weekly, 10 June 1995. An article discusses anti-gravity schemes and shows drawings of sauceroid vehicles from British Aerospace among others. Area-51 is mentioned as well as an unclassified paper done for the USAF by Science Applications International Corp. in 1990. The subject was [Electric Propulsion], a[n] euphemism for anti-gravity according to Jane's. *--Michael Flora"*

Anti-Gravity for Real -- Discussed in *Jane's Defence Weekly*

Jane's Defence Weekly is a most respected journal in the defense industry. Jane's has often been the first to break the news about secret development of radically new technologies and equipment.

*Jane's Defence Weekly* of 10 June 1995 has an article about advanced aerospace technologies, written by Nick Cook. The idea of **anti-gravity** is taken seriously and is auspicously present throughout the article including 3 artist renditions of future anti-gravity based craft.

The *Jane's* article commences with a mention of anti-gravity technology and also ends with a few paragraphs discussing anti-gravity. In between is the bulk of the article which consists of discussion of "conventional" subjects including: Hypersonics, Gas Turbine Inrements, the Super Cockpit, and Stealth.

At the start of the *Jane's* article, there is some information from the Gravity Rand Report on Electrogravitics which was done for the USAF in 1956 and was recently declassified. Here's an excerpt from the beginning of the *Jane's* article.

Take this example from a specialist U.S. aviation magazine in 1956: "We're already working with equipment to cancel out gravity," Lawrence D Bell, founder of the company that bears his name was quoted as saying. Bell apparently was not the only one working in this field. Others said to be seeking to master this arcane 'science' included the Glenn L Martin Company, Convair, Lear, and Sperry Gyroscope. Within a few years, we were assured that aircraft, cars, submarines and power stations would all be driven by this radical new propulsion technology. Sadly, it was not to be.

Here's the ending section of the Jane's article:

BEYOND 2001
Groom Lake Nevada is the epicenter of classified USAF research into Stealth and other exotic aerospace technologies. Several years after the collapse of the Soviet threat, activity and investment at this remote, highly-secret air base (so secret that its presence is, as yet, unacknowledged by the U.S. Government) is still on the increase. While research into less sensitive technologies such 2-dimensional thrust-vectoring and advanced short take-off and vertical landing (ASTOVL) are pursued in the open at nearby Edwards AFB in California, Groom Lake is set to hang onto its secrets. The USAF's recent confiscation of 1600 acres of public land bordering the facility is consistent with the Pentagon's desire to maintain its lead in quantum leap technologies, some of which -- according to well qualified observers in and around the Nevada area -- defy current thinking into the predicted direction of aerospace engineering.

That aerospace companies continue to look at highly radical alternative air vehicle concepts is evidence of the ongoing quest for breakthrough designs. Glimpses into this world are rare but provide some insight into likely 21$^{st}$ Century research activity. The 1990 unclassified "Electric Propulsion Study" (a quest for antigravity propulsion system by another name) conducted by the USA's Science Application International Corp (SAIC) on behalf of USAF's then Astronautics Laboratory at Edwards AFB shows that USAF visionaries are still being given free reign. Until recently, BAe (British Aerospace) also provided internal resources for its own anti-gravity studies and even went so far as to outline this thinking with artists' concepts (a case of Lawrence Bell's vision perhaps being not so wide of the mark after all).

Before he died, Ben Rich (who headed Lockheed's Skunk Works from 1975-1991) was quoted as saying: "We have some new things. We are not stagnating. What we are doing is updating ourselves without advertising. There are some new programs. And there are certain things -- some of them 20-to-30 years old -- that are still breakthroughs and appropriate to keep quiet about. Other people don't have them yet.

30 years from now, we may still not know the half of what is currently being tested in and around Groom Lake."

[StealthSkater note: also see more from Ben Rich (who formerly was Clarence "Kelly" Johnson's U2 and SR-71 chief propulsion engineer) at doc pdf URL-doc URL-pdf and doc pdf URL-doc URL-pdf ]

185. AUTHOR(s):    McIntosh, C.B.G. Arianrhod, R. Wade, S.
     TITLE(s):      Electric and magnetic Weyl tensors: classification and analysis.
     In: *Classical and Quantum Gravity*, JUN 01 1994 v 11 n 6 Page 1555

AUTHOR(s):    Arianrhod, R. Lun, A.W.-C. McIntosh, C.B.G.
TITLE(s):         Magnetic curvatures.
In: Classical and Quantum Gravity, SEP 01 1994 v 11 n 9 Page 2331


AUTHOR(s):    Arianrhod, R. McInthosh, C.B.G.
TITLE(s):         Principle null directions of Petrov type I Weyl spinors: geometry and symmetry.
In: *Classical and Quantum Gravity*, AUG 01 1992 v 9 n 8 Page 1969


AUTHOR(s):    Hoenselaers, C. Perjes, Z.
TITLE(s):         Multipole moments of axisymmetric electrovacuum spacetimes.
In: *Classical and Quantum Gravity*, OCT 01 1990 v 7 n 10 Page 1819


AUTHOR(s):    de Felice, Fernando Yu, Yunqiang Fang, Jing
TITLE(s):         Relativistic charged spheres.
In: Monthly Notices of the Royal Astronomical Society, NOV 01 1995 v 277 n 1 Page: L17


AUTHOR(s):    de Felice, Fernando
TITLE(s):         Dynamics on a rotating disk.
In: *Physical Review A*, Atomic, molecular, and opt  NOV 01 1995 v 52 n 5 Page 3452


AUTHOR(s):    de Felice, Fernando Yu, Yunqiang Coriasco, Sandro
TITLE(s):         The Lynden-Bell and Katz Definition of Gravitational
Energy: Applications to Singular Solutions.
In: *General Relativity and Gravitation*, AUG 01 1994 v 26 n 8 Page 813


AUTHOR(s):    Cavaglia, Marco de Alfaro, Vittorio de Felice, Fernando
TITLE(s):         Anisotropic wormhole: Tunneling in time and space.
In: *Physical Review D*: particles, fields, gravitation, JUN 15 1994 v 49 n 12 Page 6493


AUTHOR(s):    de Felice, Fernando
TITLE(s):         Rotating frames and measurements of forces in General Relativity.
In: *Monthly Notices of the Royal Astronomical Society*, SEP 15 1991 v 252 n 2 Page 197


AUTHOR(s):    Hammond, Richard
TITLE(s):         Tetrad Formulation of Gravity with a Torsion Potential.
In: *General Relativity and Gravitation*, NOV 01 1994 v 26 n 11 Page 1107


AUTHOR(s):    Hammond, Richard
TITLE(s):         Spin, Torsion, Forces.
In: *General Relativity and Gravitation*, MAR 01 1994 v 26 n 3 Page 247


AUTHOR(s):    Hammond, Richard T.
TITLE(s):         Gauge Invariant Electromagnetic Coupling with Torsion Potential.
In: *General Relativity and Gravitation*, NOV 01 1991 v 23 n 11 Page 1195


AUTHOR(s):    Hammond, Richard T.
TITLE(s):         Magnetic Charge Type Equations from Torsion.
In: *General Relativity and Gravitation*, SEP 01 1991 v 23 n 9 Page 973


AUTHOR(s):    Hammond, Richard T.

TITLE(s):        Dynamic Torsion from a Linear Langrangian.
In: *General Relativity and Gravitation*, APR 01 1990 v 22 n 4 Page 451


AUTHOR(s):    Ringermacher, H.I.
TITLE(s):        An ElectroDynamic Connection.
In: *Classical and Quantum Gravity*, SEP 01 1994 v 11 n 9 Page 2383


AUTHOR(s):    Anandan,J. Hagen, C.R.
TITLE(s):        Neutron acceleration in uniform electromagnetic fields.
In: *Physical review A*, Atomic, molecular, and opt  OCT 01 1994 v 50 n 4 Page 2860


AUTHOR(s):    Anandan, J.
TITLE(s):        Relativistic gravitation and superconductors.
In: *Classical and Quantum Gravity*  JUN 01 1994 v 11 n 6A Page 23


AUTHOR(s):    Georgiou, A.
TITLE(s):        Rotating Einstein-Mazwell fields: smoothly-matched exterior and interior spacetimes with charged dust and surface layer.
In: *Classical and Quantum Gravity*  JAN 01 1994 v 11 n 1 Page 167


AUTHOR(s):    Unnikrishnan, C.S.
TITLE(s):        Experimental gravitation in India: progress and challenges.
In: *Classical and Quantum Gravity*  JUN 01 1994 v 11 n 6A Page 195


AUTHOR(s):    Cowsik, R. Tandon, S.N. Unnikrishnan, C.S.
TITLE(s):        Limit on the strength of intermediate-range forces coupling to isospin.
In: *Physical Review Letters*  NOV 07 1988 v 61 n 19 Page 2179


AUTHOR(s):    Banerjee, A. Panigrahi, D. Chatterjee, S.
TITLE(s):        Evolution of Kaluza-Klein inhomogeneous model with a cosmological constant.
In: *Journal of Mathematical Physics*  JUL 01 1995 v 36 n 7 Page 3619


AUTHOR(s):    Chatterjee, S. Panigrahi, D. Banerjee, A.
TITLE(s):        Inhomogeneous Kaluza-Klein cosmology.
In: *Classical and Quantum Gravity*  FEB 01 1994 v 11 n 2 Page 371


186. It might interest anti-gravity researchers to know (for those not already aware) that Professor E.R. Laithwaite -- a respected British electrical engineer -- has been doing work on this very subject for decades.  Bbut when he tried to demonstrate the viability of his theories to his peers, their closed minds closed ranks and ridiculed his efforts as fantasy.  Laithwaite lost credibility with the scientific community and had to rely just on 1-or-2 close associates in semi-secrecy.

A recent (a year-or-two ago) series of TV programs in Britain (on controversial scientific discoveries that have yet to accepted by the scientific establishment as worthy of further research and funding) ran an episode on Laithwaite.  He claimed that **gyroscopes could transfer mass**.

I know of one book he wrote: Transport Without Wheels published by Paul Elek in 1977 ISBN 0236400665 (info from an old note I made) though this is NOT specifically about his anti-gravity theories.  I remember that it concentrated on propulsion via electrical rails.  I would be most

interested in learning about anything he (or anyone else) might have written specifically on his antigravity work.  -- *George Szaszvari*


"Propulsion by Gyro", Eric Laithwaite, *Space*, Sep 1989 Vol 5 No 5
     In an attempt to reveal the strange, hidden properties of gyroscopes, Professor Eric Laithwaite explains the physics behind the idea that a propulsion system could be built using gyros.


187. AUTHOR(s):     Ljubicic, A. Zovko, N.
     TITLE(s):          Lorentzian component of the fifth force.
     In: *Fizika B*.  JAN 01 1992 v 1 n 1 Page: 1


     AUTHOR(s):     Bertotti, B. Sivaram, C.
     TITLE(s):          Radiation of the <> field.
     In: *Il Nuovo cimento della Societa italiana di fisic*  NOV 01 1991 v 106 n 11 Page: 1299


     AUTHOR(s):     Fujii, Y.
     TITLE(s):          The Theoretical Background of the Fifth Force.
     In: *International Journal of Modern Physics*  a, pa  AUG 20 1991 v 6 n 20 Page: 3505


     AUTHOR(s):     Mannheim, Philip D.
     TITLE(s):          General Relativity and Fifth Force Experiments.
     In: *Astrophysics and Space Science*  JUL 01 1991 v 181 n 1 Page: 55


     AUTHOR(s):     Cho, Y.M. Park, D.H.
     TITLE(s):          Fifth Force from Kaluza-Klein Unification.
     In: *General Relativity and Gravitation*  JUL 01 1991 v 23 n 7 Page: 741


     AUTHOR(s):     Fujii, Y.
     TITLE(s):          Locally-varying particle masses due to a scalar fifth-force field.
     In: Physics Letters: [Part B]  FEB 14 1991 v 255 n 3 Page: 439


     AUTHOR(s):     Hagiwara, Yukio
     TITLE(s):          No gravimetric evidence for the fifth force?
     Summary:       TEXT IN JAPANESE
     In: *Chigaku zasshi*  1991 v 100 n 3 Page: 429


     AUTHOR(s):     Cho, Y.M. Park, D.H.
     TITLE(s):          Higher-dimensional unification and fifth force.
     In: *Il nuovo cimento delle societa italiana di fisic*  AUG 01 1990 v 105 n 8/9 Page: 817


     AUTHOR(s):     Sardanashvily, G.
     TITLE(s):          The Gauge Model of the Fifth Force (E,SUM).
     In: *Acta physica Polonica, B*.  AUG 01 1990 v 21 n 8 Page: 583


     AUTHOR(s):     Schimdt, H.-J.
     TITLE(s):          Fifth force, dark matter, and fourth-order gravity.
     In: *Europhysics letters*  AUG 01 1990 v 12 n 7 Page: 667


     AUTHOR(s):     de Sabbata, Venzo Sivaram, C.

TITLE(s):        Fifth Force as a Manifestation of Torsion.
In: *International Journal of Theoretical Physics*  JAN 01 1990 v 29 n 1 Page: 1


AUTHOR(s):    Timoshenko, E.G. Sardanashvily, G.A.
TITLE(s):        Gauge model for the fifth force.
In: *Moscow University Physics Bulletin*  1990 v 45 n 4 Page: 73


AUTHOR(s):    Hagiwara, Yukio
TITLE(s):        The fifth force-doubt about newton's gravitational law
Summary:       TEXT IN JAPANESE
In: *Chigaku zasshi*  1990 v 99 n 3 n 904 Page: 263


AUTHOR(s):    Gasperini, M.
TITLE(s):        Phenomenological consequences of a direct fifth force coupling to photons.
In: *Physical Review D*, Particles and fields.  NOV 15 1989 v 40 n 10 Page: 3525


AUTHOR(s):    Gasperini, M.
TITLE(s):        Fifth force and the gravi-magnetic hypothesis.
In: *Physics Letters: [part A]*  OCT 02 1989 v 140 n 6 Page: 271


AUTHOR(s):    Fayet, P.
TITLE(s):        The fifth force charge as a linear combination of baryonic, leptonic (or B-L) and
                    electric charges.
In: *Physics Letters*: [Part B]  AUG 17 1989 v 227 n 1 Page: 127


AUTHOR(s):    Mufti, A. Kwong, N.H. Schaudt, K.J.
TITLE(s):        Search for the fifth force using Gauss's law.
In: *Physics Letters*: [part A]  JUL 31 1989 v 139 n 3 / 4 Page: 115


AUTHOR(s):    Bizzeti, P.G.
TITLE(s):        Search for a Composition-Dependent Fifth Force.
In: *Physical Review Letters*.  JUN 19 1989 v 62 n 25 Page: 2901

Summary:  A differential accelerometer consisting of a solid sphere floating freely inside a
                stratified saline solution has been used to search for a composition-dependent force
                originated by a mountain relief.  No evidence of such a force has been obtained.

AUTHOR(s):    T.M. Aliev, Dobroliubov, M.I. Ignatiev, A. Yu.
TITLE(s):        Do Kaon decays constrain the fifth force?
In: *Physics Letters*: [Part B]  APR 20 1989 v 221 n 1 Page: 77


AUTHOR(s):    Riveros, C. Logiudice, E. A. Vucetich, H.
TITLE(s):        On differential fifth force measurements.
In: *Physics Letters*: [part A]  APR 17 1989 v 136 n 7/8 Page: 343


AUTHOR(s):    Kuroda, K. Mio, N.
TITLE(s):        A Free Fall Interferometer to Search for a Possible Fifth Force.
In: *IEEE transactions on instrumentation and measure*  APR 01 1989 v 38 n 2 Page: 189


AUTHOR(s):    Faller, J. E. Fischbach, E. Fujii, Y.
TITLE(s):        Precision Experiments to Search for the Fifth Force.

In: *IEEE transactions on instrumentation and measure*  APR 01 1989 v 38 n 2 Page: 180

AUTHOR(s):     Stubbs, C. W. Adelberger, E. G. Heckel, B. R.
TITLE(s):          Gravitation and Astrophysics: Limits on composition-dependent interactions using a laboratory source: Is there a "fifth force" coupled to isospin?
In: *Physical Review Letters*  FEB 06 1989 v 62 n 6 Page: 609

TITLE(s):          Alternate source of fifth force challenged.
In: *Science News*  OCT 01 1988 v 134 n 14 Page: 214

TITLE(s):          The stimulation of the fifth force.
In: *Nature*  SEP 29 1988 v 335 n 6189 Page: 393


188. One of the first "scientific" DOGMAS fed to new physics students is the doctrine about "projectile motion".  Students are given several formulas or equations from which they can precisely calculate how high and far a projectile will travel given its initial speed and angle from the ground.  But the results are NOT so absolute as students are led to believe even if they take into account air resistance and Coriolis effects.

Recent experiments have shown that if the projectile is SPINNING at HIGH SPEED (at least 27,000 RPM), [axis of spin coinciding with line of projection], the projectile will travel HIGHER and FARTHER than predicted by Newtonian mechanics!  Similarly, experiments with falling gyroscopes have shown that a gyroscope whose enclosed rotor is spinning at high speed (about 27,000 RPM) falls AT A DIFFERENT RATE than when the same gyroscope falls with rotor NOT spinning.

The AMOUNT of DEVIATION might depend on the MATERIAL COMPOSITION of the projectile or rotor as suggested in the text of U.S. Patent #3,626,605 "Method and Apparatus for Generating a Secondary Gravitational Force Field" by Henry W. Wallace, Dec. 14, 1971.

These DEVIATIONS are EASILY REPRODUCABLE and effectively DISPROVE the OVER-HYPED "General Theory of Relativity" which states that Gravity results from a "warping or distorion of space" caused by the MERE PRESENCE of mass. - Robert McElwaine


The late Henry W Wallace died April 1994.  Fellow researchers at GE were not "happy" with his research regarding gravitational fields.  An interesting article was written in *The New Scientist* circa 1980 about Wallace's work.  *-- Ron Kita*


Henry Wallace was an engineer at General Electric about 25 years ago and developed some incredible inventions relating to the underlying physics of the gravitational field.  Few people have heard of him or his work.

US Patent #3626605 -- "Method and Apparauts for Generating a Secondary Gravitational Force Field" awarded to Henry Wm Wallace of Ardmore PA Dec 14, 1971

US Patent #3626606 -- "Method and Apparatus for Generating a Dynamic Force Field" awarded to Henry Wm Wallace of Ardmore PA Dec 14, 1971

US Patent #3823570 -- "Heat Pump" (based on technology similar to the above two inventions) awarded to Henry Wm Wallace of Freeport NY July 16, 1973

Wallace discovered that a force field similar or related to the gravitational field results from the interaction of relatively moving masses. He built machines which demonstrated that this field could be <u>generated</u> by spinning masses of elemental material having an odd number of nucleotides (i.e., a nucleus having a multiple half-integral value of h-bar, the quantum of angular momentum).

Wallace used Bismuth or Copper material for his rotating bodies and "kinnemassic" field concentrators. Aside from the immense benefits to Humanity which could result from a better understanding of the physical nature of Gravity and other fundamental forces, Wallace's inventions could have enormous practical value in countering Gravity or converting gravitational force fields into energy for doing useful work.

So why has no one heard of him? One might think that the discoverer of important knowledge such as this would be heralded as a great scientist and nominated for dynamite prizes. Could it be that his invention does not work? Anyone can get the patents. Study them -- Wallace -- General Electric -- detailed descriptions of operations -- measurements of effects -- drawings and models -- it is authentic. If you're handy, you can even build it yourself. It <u>does</u> work.

So what is going on? One explanation I've heard is that Wallace ran up against the politics of Science as dictated in the late 1960s by the power-block at Princeton who were primarily interested in promoting the ideas of their main man (Einstein) and the "gravitation is geometry" paradigm. And maybe there is some truth to this story.

Nowadays, there seems to be a piss-pot full of theoretical physicists working on abstract geometrical theories and other absurdly difficult mental masturbations while no one seems to have made any effort to provide a theoretical explanation of the physics of a nuts&bolts invention which could have enormous practical value. Maybe we can blame it on the Princeton folks. But I'm more inclined to believe that our defense industry "black project" community has confiscated and suppressed knowledge of Wallace's discoveries. All done, of course, under the most honorable and sacred banner of national security

Well, it's been 25 years. We ought to be real secure by now. Isn't it way past time for some trickle down benefits to real people?

There are 2 paragraphs about the Wallace inventions in the Electric Propulsion Study by Dr Dennis Cravens, prepared in 1991. Cravens had this to say about Wallace's work:

ROTATIONAL ALIGNMENT - Nuclei can also be aligned by rotation. Henry Wallace claimed some unusual effects assigned to electomagnetic and gravitational couplings. This was in 3 US patents (3823570, 3626605, and 362606). The assertion was that the application of a rotational force on a material of half-integral spin would result in a reorientation of the nuclear structure and could be utilized for "altering its gravitational attraction toward other bodies, separation of isotopes by distinguishing between nuclei according to their nucleon content..." The patents are written in a very believable style which includes part numbers, sources for some components, and diagrams of data.

Attempts were made to contact Wallace using patent addresses and other sources. But he was not located.  Nor is there a trace of what became of his work.  However, should the work be real, it may furnish a novel experimental approach to experimental design.  The concept can be somewhat justified on General Relativistic grounds since rotating frames of time-varying fields are expected to emit gravitational radiation.  Even if the work does not give a direct gravitational coupling, it may furnish a new method for nuclear spin alignment.

An article about the Wallace patents appeared in the British magazine *New Scientist* in February 1980.  This was written nearly 10 years after Wallace was awarded his patents.  Here's a paragraph from the article"

"Although the Wallace patents were initially ignored as cranky, observers believe that his invention is now under serious but secret investigation by the military authorities in the U.S.  The military may now regret that the patents have already been granted and so are available for anyone to read."

I know -- it's a tease.  And the rest of the article is the same way.  It provides barely enough information to jab your psyche a little and not nearly enough to get you off your comfortable ass.  And who knows who the anonymous party of "observers" are, who believe that a secret investigation is underway by the military -- or whether these observers even exist at all.

Nonetheless, the *New Scientist* has a fairly well-established track record for accurate identification of new science trends and issues.  And while the editors of this British journal may be prone to enjoyment of gossip and innuendo, it generally turns out be grounded in truth.

189. Nuclear Spin Selectivity of Chemical Reactions" by A.L.Buchachenko, N.N.Semenov
Institute of Chemical Physics, Russian Academy of Sciences
4 Ul. Kosygina, 117334 Moscow, Russian Federation, Fax: +7(095)938-2156
A property of spin selective reactions to sort the nuclei according to their spin and orientation is discussed.  The separation of spin (magnetic) and spinless (nonmagnetic) nuclei forms the basis for the magnetic isotope effect.  The separation of nuclei according to their orientation and creation of nuclear alignment in reaction products is a basis for the chemically induced nuclear polarisation phenomenon.
Bibliography - 50 references.  Received 14 February 1995

190. Collective T- and P- Odd Electromagnetic Moments in Nuclei with Octupole Deformations
Author(s): N. Auerbach , V.V. Flambaum , V. Spevak
*Nuclear Theory*, Abstract NUCL-TH/9601046
From: spevak@TAUPHY.TAU.AC.IL
Date: Tue, 30 Jan 1996 17:18:34 +0200

Parity and time invariance violating forces produce collective P- and T- odd moments in nuclei with static octupole deformation.  Collective Schiff moment, electric octupole and dipole, and also magnetic quadrupole appear due to the mixing of rotational levels of opposite parity and can exceed single-particle moments by more than a factor of 100.
This enhancement is due to 2 factors -- the collective nature of the intrinsic moments and the small energy separation between members of parity doublets.  The above moments induce T- and

P- odd effects in atoms and molecules.  Experiments with such systems may improve substantially the limits on time-reversal violation.

191. The Hughes-Drever experiment was conducted in 1959-1960 independently by Vernon Hughes and collaborators at Yale University and by Ron Drever at Glasgow University.

In the Glasgow version, the experiment examined the ground state of the Lithium-7 nucleus in an external magnetic field.  The state has total angular momentum quantum number 3/2 and thus is spolit into 4 equally-spaced levels by the magnetic field.  When the nucleus undergoes a transition between a pair of adjacent levels, the photon emitted has the same energy or frequency no matter which pair of levels was involved.  The result is a single narrow spectral line.

Any external perturbation of the nucleus that is associated with a preferred direction in space -- such as the motion of the Earth relative to the mean rest frame of the Universe -- will destroy the equality of the energy spacing between the 4 levels since the nuclear wave functions of the 4 levels have different spacial dependencies relative to the magnetic field.  Using nuclear magnetic resonance techniques, the experiments set a limit on the separation or spread in frequency of line that corresponded to a limit on anistropy or bidirectional dependence in the energy of the nucleu at the level of one part in $10^{23}$. -- *Clifford Will*, Chapt 2 of <u>The New Physics</u> edited by Paul Davies

192. Magnetic resonance in its various forms, NMR, EPR, and EFR are all applied to relatively small specimens and -- with the exception of EFR -- are rarely applied to magnetic materials.  EFR means Electron Ferromagnetic Resonance.  The best intro to this subject is by Vonsovskii.  Curiously, there is no published data on EFR for large ferromagnetic specimens.  A literature search at a campus of the University of California revealed nothing.  F. Herlach has said that **there is an "open" literature and a "closed" literature concerning magnetic research**.  -- *Larry Adams*

193. A body which is spinning within a larger Macroscopic body which is also spinning will tend to align the axis of its angular momentum with the angular momentum of the larger body.

For example, a gyroscope located on the Earth -- unless it is in a frictionless gimbal -- with always try to precess due to the rotation of the Earth into alignment with the Earth's polar axis at which point it will no longer precess due to Earth rotation.

Another example …  A cylinder of magnetic material spinning around its longitudinal axis will develop a magnetic field proportional to is angular velocity (Barnett Effect) because the angular momemtum of the electrons in the material will attempt to precess and come into alignment with the macroscopic axis of the spinning cylinder which also brings into alignment the magnetic moment of the electrons, some of which have unpaired spins (ferromagnetic), resulting in generation of a Macroscopic magnetic field.

Similarly, it is know that a static magnetic field itself contains angular momentum.  And spinning the source of the static field -- whether a magnet or DC current loop -- will result in a corresponding increase or decrease in the field strength.

Another example is the inventions of Henry Wallace.  Wallace found that if you spin a material which has an odd number of nucleotides (i.e. having an "un-paired" value of angular momentum),

resulting in a nucleus with a multiple integer of a one-half value of quantum momentum. The spin in the nucleus will begin to line up with the Macroscopic spin axis and will create an unusual force field related to Gravity which he call a "kinemassic" field.

Maybe I've missed it. But I've looked seriously and there seems to be no information in undergraduate or graduate-level Physics reference books which mentions the relationship between Macroscopic and microscopic angular momentum. Much less provides any analysis or explanation linking quantum angular momentum to Macroscopic angular momentum. Why not? How does quantum angular momentum become organized from a microscopic to a Macroscopic level? Has anyone ever published any work about this? I can't find any.


Date: Sun, 5 Nov 1995
From: James Youlton
To: Robert Stirniman
Re: Angular Momentum and the Barnett Effect

On Wed, 1 Nov 1995, Robert Stirniman wrote:
>" Maybe I've missed it. But I've looked seriously and there seems to be no information in undergraduate or graduate-level Physics reference books which mentions the relationship between Macroscopic and microscopic angular momentum. …"

You're catching on. The subject of compound angular momentum, or internal and external angular momentum, or intrinsic and extrinsic angular momentum has been a <u>repressed</u> subject for about 2-and-a-half decades. Add to that list spherical pendulums, Coriolis effect (except as applied to balistics and meteorology as used by the U.S. military), and Shafer's pendulum (that neat little device used as the artifical horizon of aircraft).

>"How does quantum angular momentum become organized from a microscopic to a Macroscopic level? Has anyone ever published any work about this? I can't find any."

There isn't any that I know of although back in the lat-1950s, there was a fellow named Edward Condon at the University of Colorado who was fairly proficient on the subject. So much so that he wrote the rotational dynamics section (called "noninertial dynamics" at the time) of the reference The Handbook of Physics which he also co-edited (Chapter 5). I don't recall offhand who the publisher was (Harcourt/Brace?), though it was endorsed by the American Institute of Physics. Later when Mr Condon was the head of the USAF project 'Blue Book', he labored to supress his own work when the directive was handed down from the Navy's Turtle Island project. *-- James Youlton*


Condon directed a government UFO projec, but was never the head of Blue Book. That position was held for most or perhaps all of Blue Book's life by an Air Force Officer Named Edward Ruppelt. Blue Book was shut down in 1969, shortly after the report of the project that Condon directed ("Scientific Study of Unidentified Flying Objects*"). -- Jim Giglio*


194. AUTHOR:     Cousins, Frank W.
       TITLE:  The anatomy of the Gyroscope.  A report in 3 parts comprising a literature and patent survey directed to the gyroscope and its applications by Frank W. Cousins; edited by John L. Hollington.

PUBL.: Neuilly-sur-Seine, France: North Atlantic Treaty Organization, Advisory Group for Aerospace Research and Development,
FORMAT: 296 p. (in various pagings) ; 30 cm.
DATE:1988
SERIES: AGARDograph no. 313

AUTHOR: Leimanis, E. (Eugene)
TITLE: The general problem of the motion of coupled rigid bodies about a fixed point.
PUBL.: Berlin, New York, Springer-Verlag,
FORMAT: xvi, 337 p. illus. 24 cm.
DATE:1965
SERIES: *Springer Tracts in Natural Philosophy*. v. 7
SUBJECT Dynamics, Rigid Gyroscopes, Two-body problem, Astrodynamics

AUTHOR(s): de Andrade, L.C. Garcia
TITLE: Electron gyroscopes to test torsion gravity?
In: *Il nuovo cimento delle societa italiana di fisic* OCT 01 1994 v 109 n 10 Page 1123

AUTHOR(s): Abe, Hiroshi; Yoshida, Tetsuo; Turuga, Kikuo
TITLE: Piezoelectric-ceramic cylinder vibratory gyroscope.
In: *Japanese Journal of Applied Physics*. part 1, r SEP 01 1992 v 31 n 9B Page 3061

AUTHOR(s): Case, William B.; Shay, Michael A.
TITLE: On the interesting behavior of a gimbal-mounted gyroscope.
In: *American Journal of Physics* JUN 01 1992 v 60 n 6 Page 503

AUTHOR(s): Zhuravlev, V.F.
TITLE: Nutational self-oscillation of a free gyroscope.
In: *Mechanics of Solids* 1992 v 27 n 6 Page 11

AUTHOR(s): Chang, C.O.; Chou, C.S.
TITLE: Partially Filled Nutation Damper for a Freely Processing Gyroscope.
In: *Journal of Guidance, Control, and Dynamics*. SEP 01 1991 v 14 n 5 Page 1046

AUTHOR(s): Chang, C.O.; Chou, C.S.; Liu, L.Z.
TITLE: Stability analysis of a freely precessing gyroscope carrying a mercury ring damper.
In: *Journal of Sound and Vibration* MAY 08 1991 v 146 n 3 Page 491

AUTHOR(s): Imanishi, Akira; Maruyama, Koichi; Midorikawa, Shoichi
TITLE: Observation against the Weight Reduction of Spinning Gyroscopes.
In: *Journal of the Physical Society of Japan* APR 01 1991 v 60 n 4 Page 1150

AUTHOR(s): Petry, Walter
TITLE: Angular Momentum and Gyroscope in Flat Space-Time Theory of Gravitation.
In: *Astrophysics and Space Science* JAN 01 1991 v 175 n 1 Page 1

AUTHOR(s): Zhivkov, A.I.
TITLE: Geometry of invariant manifolds of a gyroscope in the field of a quadratic potential.
In: Mathematics of the USSR: Izvestija. 1991 v 37 n 1 Page 227

AUTHOR(s): Hayashi, Kenji; Shirafuji, Takeshi

TITLE: Frame-Dragging Precession of Orbiting Gyroscopes in New General Relativity and Possible Violation of Equivalence Principle.
In: *Progress of Theoretical Physics*  DEC 01 1990 v 84 n 6 Page 1074


AUTHOR(s):    El-Sabaa, F.M.
TITLE:   On the Periodic Motion of a Gyroscope Supported by Cardan Gimbals.
In: *al-Majallah al-Arabiyah lil-ulum wa-al-handasa*  JUL 01 1990 v 15 n 3 Page 495


AUTHOR(s):    Moffat, J.W.; Brownstein, J.R.
TITLE:  Spinning test particles and the motion of a gyroscope according to the nonsymmetric gravitation theory.
In: *Physical Review D:* Particles and fields.  MAY 15 1990 v 41 n 10 Page 3111


AUTHOR(s):    Nitschke, J.M.; Wilmarth, P.A.
TITLE:   Null result for the weight change of a spinning gyroscope.
In: *Physical Review Letters*  APR 30 1990 v 64 n 18 Page 2115


AUTHOR(s):    Faller, J.E.; Hollander, W.J.; Nelson, P.G.
TITLE(s):        Gyroscope-weighing experiment with a null result.
In: *Physical Review Letters*  FEB 19 1990 v 64 n 8 Page 825


AUTHOR(s):    Rumyantsev, V.V.
TITLE:   Stability of permanent rotations of a nonsymmetric liquid-filled gyroscope.
In: *Mechanics of Solids*  1990 v 25 n 6 Page 1


AUTHOR(s):    Panayotounakos, D.E.; Theocaris, P.S.
TITLE:  On the Decoupling and the Solutions of the Euler Dynamic Equations Governing the Motion of a Gyroscope.
In: *Zeitschrift fur angewandte Mathematik und Mechan*  1990 v 70 n 11 Page 489


AUTHOR(s):    Hayasaka, Hideo; Takeulchi, Sakae
TITLE:   Gravitation and Astrophysics.
Summary:        Anomalous weight reduction on a gyroscope's right rotations around the vertical axis on the Earth.
In: Physical Review Letters  DEC 18 1989 v 63 n 25 Page 2701


AUTHOR(s):    Laithwaite, Eric
TITLE:   Propulsion by Gyro.
Summary:        In an attempt to reveal the strange, hidden properties of gyroscopes, Professor Eric Laithwaite explains the physics behind the idea  that a propulsion system could be built using gyros.
In: *Space*  SEP 01 1989 v 5 n 5 Page 36


AUTHOR(s):    Vitale, S.; Bonaldi, M.; Falferi, P.
TITLE:  Magnetization by rotation and gyromagnetic gyroscopes.
Summary:        We discuss how the general phenomenon of magnetization by rotation may be used probe the angular velocity of the laboratory with respect to a local frame of inertia. We show that gyroscope with no moving parts based on this pheno-
In: *Physical Review B*: Condensed matter  JUN 01 1989 v 39 n 16 p B Page 11993


AUTHOR(s):    Aspden, H.

TITLE:   Anti Gravity Electronics.
Summary:          Reinterpretation of Newton's Third Law of Motion suggests that it depends upon
          and electronic action. Electronic interaction therefore  explains the paradoxical anti-gravity
          properties of the force processed gyroscope.
In: *Electronics&Wireless World*  JAN 01, 1989 v 95 n 1635 Page 29


AUTHOR(s):    Sachs, Mendel
TITLE:  The Precessional Frequency of a Gyroscope in the Quaternionic Formulation of General
          Relativity
In: *Foundations of Physics*  JAN 01 1989 v 19 n 1 Page 105


AUTHOR(s):    Medvedev, A.V.
TITLE:  Motion of a rapidly run-up gyroscope acted upon by a constant moment in a resistive
          medium.
In: *Mechanics of Solids*  1989 v 24 n 2 Page 21


AUTHOR(s):    Starzhinskii, V.M.
TITLE:   An exceptional case of motion of the Kovalevskaia gyroscope.
In: *PMM, Journal of Applied Mathematics and Mechanics*  1983 v 47 n 1 Page 134


AUTHOR:        Gray, Andrew, 1847-1925.
TITLE:   A treatise on gyrostatics and rotational motion; theory and applications.
PUBL.:  New York, Dover Publications
FORMAT:        530 p. illus. 22 cm.
DATE:1959


QA861:P4
Perry, John
Spinning Tops and Gyroscopic Motion by John Perry. Dover, 1957. 102 pages



195. Articles and Books by Kip Thorne:


"The Quantum Propagator for a non-Relativistic Particle in the vicinity of a Time-Machine"
AUTHOR:        Misner, Charles W.
TITLE:  Gravitation (by) Charles W. Misner, Kip S. Thorne, (and) John Archibald Wheeler.
PUBL.:  San Francisco, W. H. Freeman
General Relativty & Quantum Cosmology, Abstract GR-QC/9308009
FORMAT:        xxvi, 1279 p. illus. 26 cm. 1973
SUBJECT: Astrophysics, General Relativity, Gravitation
      We study the propagator of a non-relativistic, non-interacting particle in any non-relativistic
  "time-machine" spacetime of the type shown in Fig. 1: an external, flat spacetime in which 2
  spatial regions (V- at time t- and V+ at time t+) are connected by 2 temporal wormholes -- one
  leading from the past side of V- to t the future side of V+ and the other from the past side of V+
  to the future side of V-.
      We express the propagator explicitly in terms of those for ordinary, flat spacetime and for the
  2 wormholes.  From that expression, we show that the propagator satisfies completeness and
  unitarity in the initial and final "chronal regions" (regions without closed timelike curves) and its
  propagation from the initial region to the final region is unitary.  However, within the time
  machine, it satisfies neither completeness nor unitarity.

We also give an alternative proof of initial-region-to-final-region unitarity based on a conserved current and Gauss's theorem. This proof can be carried over without change to most any non-relativistic time-machine spacetime. It is the non-relativistic version of a theorem by Friedman, Papastamatiou, and Simon which says that for a free scalar field, quantum mechanical unitarity follows from the fact that the classical evolution preserves the Klein-Gordon inner product.

AUTHOR(s):    Thorne, Kip S.
TITLE(s):       Gravitational-wave bursts with memory: The Christodoulou effect.
In: *Physical Review D,* Particles and fields  JAN 15 1992 v 45 n 2 Page 520


AUTHOR(s):    Apostolatos, Theocharis A.; Thorne, Kip S.
TITLE(s):       Rotation halts cylindrical, relativistic gravitational collapse.
In: *Physical Review D,* Particles and fields  SEP 15 1992 v 46 n 6 Page 2435


AUTHOR(s):    Echeverria, Fernando; Klinkhammer, Gunnar; Thorne, Kip S.
TITLE(s):       Billiard balls in wormhole spacetmes with closed timelike curves: Classical theory.
In: *Physical Review D*: Particles and fields  AUG 15 1991 v 44 n 4 Page 1077


AUTHOR(s):    Eich, Chris; Zimmermann, Mark E.; Thorne, Kip S.
TITLE(s):       Giant and supergiant stars with degenerate neutron cores.
In: *The Astrophysical Journal*  NOV 01 1989 v 346 n 1 p 1 Page 277


AUTHOR(s):    Frolov, Valery P.; Thorne, Kip S.
TITLE(s):       Renormalized stress-energy tensor near the horizon of a slowly evolving, rotating black hole
Summary:       The renormalized expectation value of the stress-energy tensor ren of a quantum field in an arbitrary quantum state near the future horizon of a rotating (Kerr) black hole is derived in 2 very different ways. One derivation (restricted for simplicity to a massless scalar field) makes use of traditional techniques of quantum field theory in curved spacetime augmented by a variant of the "ETA formalism " for handling superradiant modes.
In: *Physical Review. D*, Particles and fields  APR 15 1989 v 39 n 8 Page 2125


AUTHOR(s):    Kim, Sung-Won; Thorne, Kip S.
TITLE(s):       Do vacuum fluctuations prevent the creation of closed timelike curves?
In: *Physical Review D*, Particles and fields  JUN 15 1991 v 43 n 12 Page 3929


AUTHOR:        Thorne, Kip S.
TITLE:  Black holes and time warps: Einstein's outrageous legacy
PUBL.:  New York : W.W. Norton,
FORMAT:       619 p. : ill. ; 24 cm. 1994
SERIES: Commonwealth Fund Book Program (Series)
SUBJECT: Relativity, Astrophysics, Physics-Philosophy, Black holes


AUTHOR:        Harrison, B. Kent.
TITLE:  Gravitation theory and gravitational collapse (by) B. Kent Harrison, Kip S. Thorne, Masami Wakano, (and) John Archibald Wheeler.
PUBL.:  Chicago, University of Chicago Press
FORMAT:       xvii, 177 p. illus. 25 cm. 1965

SUBJECT: Astrophysics, Gravitation

AUTHOR:      Thorne, Kip S.
TITLE:       <u>Gravitational Radiation: a new window onto the Universe</u> by Kip S. Thorne, William R. Kenan, Jr.
PUBL.:  Cambridge, (Cambridgeshire) ; New York : Cambridge University Press,
DATE:   1988
SUBJECT: Gravitational radiation

AUTHOR:      Braginskii, V.B. (Vladimir Borisovich)
TITLE:  <u>Quantum Measurement</u> by Vladimir B. Braginsky and Farid Ya. Khalili ; edited by Kip S. Thorne.
PUBL.:  Cambridge (England) ; New York, NY, USA : Cambridge University Press,
SUBJECT: Quantum theory, Physical measurements

AUTHOR:      Braginskii, V.B. (Vladimir Borisovich)
Sistemy s maloi dissipatsiei. English
TITLE:  <u>Systems with small dissipation</u> by V.B. Braginsky, V.P. Mitrofanov, V.I. Panov; edited by Kip S. Thorne and Cynthia Eller
translated by Erast Gliner. PUBL.:      Chicago : University of Chicago Press,
FORMAT:      xii, 145 p. : ill. ; 24 cm. DATE:      1985
SUBJECT: Harmonic oscillators--Design and construction. Physical measurements
NOTES: Translation of: Sistemy s maloi dissipatsiei.  Includes index.

Title: <u>Black Holes: the membrane paradigm</u> edited by Kip S. Thorne, Richard H. Price, Douglas A. Macdonald.
Date/Source: New Haven : Yale University Press, 1986.


196. Selected "Memorable" papers from the American Journal of Physics:

- E.U. Condon, "Where Do We Live?   Reflections on Physical Units and the Universal Constants," 2 (2), 63-69 (1934).
- V.F. Weisskopf, "On the Theory of the Electric Resistance of Metals," 11 (1), 1-12 (1943).
- E.U. Condon and P.E. Condon, "Effect of Oscillations of the Case on the Rate of a Watch," 16 (1), 14-16 (1948).
- G.F. Pake, "Fundamentals of Nuclear Magnetic Resonance Absorption 1," 18 (7), 438-452 (1950); "Fundamentals of Nuclear Magnetic Resonance Absorption II," 18 (8), 473-486 (1950).
- J. . Van Vleck, "Landmarks in the Theory of Magnetism," 18 (8),495-509 (1950).
- Herbert Goldstein, "The Classical Motion of a Rigid Charged Body in a Magnetic Field," 19 (2), 100-109 (1951).
- J.C. Slater, "The Electron Theory of Solids," 19 (6), 368-374 (1951).
- L.I. Schiff, "Quantum Effects in the Radiation from Accelerated Relativistic Electrons," 20 (8), 474-478 (1952).
- Kerson Huang, "On the Zitterbewegung of the Dirac Electron," 20 (8), ' 479-484 (1952).
- F. Keffer, H. Kaplan, and Y. Yafet, "Spin Waves in Ferromagnetic and Antiferromagnetic Materials," 21 (4), 250-257 (1953).
- F.M. Purcell, "Nuclear Magnetism," 22 (1), 1-8 (1954).
- H. G. Dehmelt, "Nuclear Quadrupole Resonance," 22(3), 110-120 (1954).
- C. Kittel, "The Effective Mass of Electrons in Crystals," 22 (5), 250-252 (1954).

- E.J. Zimmerman, "Numerical Coincidences in Microphysics and Cosmology," 23(31), 136-141 (1955).
- W.H. Furry, "Lorentz Transformation and the Thomas Precession," 21 (8), 517-525 (1955).
- C.E. Chase, "Ultrasonic Propagation in Liquid Helium," 24 (3), 136-155(1956).
- E.C. Watson, "On the Relations Between Light and Electricity" (a translation of Reinrich Hertz's Heidelberg lecture of 1889), 25 (6), 335-343 (1957).
- E.M. Purcell, "Gravitation Torsion Balance," 25 (6), 393-394 (1957).
- Leonard Eisenbud, "On the Classical Laws of Motion," 26 (3), 144-159 (1958).
- P. Morrison, "Approximate Nature of Physical Symmetrics," 26 (6), 358-368 (1958).
- Bela G. Kolossvary, "Eotvos Balance," 27 (5), 336-343 (1959).
- Leon N. Cooper, "Theory of Superconductivity," 28 (2), 91-101 (1960).
- R.H. Dicke, "Eotvos Experiment and the Gravitational Red Shift," 28 (4), 344-347 (1960).
- Gerald Holton, "On the Origins of the Special Theory of Relativity," 28 (7), 627-636 (1960).
- F. Rohrlich, "Self-Energy and the Stability of the Classical Electron," 28 (7), 639-643 (1960).
- P.W. Bridgman, "Significance of the Mach Principle," 29 (1), 32-36 (1961).
- Robert Weinstock, "Laws of Classical Motion. What's F? What's m? What's a?" 29 (10), 698-702 (1961).
- T. Gold, "**The Arrow of Time**," 30 (6), 403-410 (1962).
- Robert W. Brehme, "A Geometric Representation of Galilean and Lorentz Transformations," 30 (7), 489-496 (1962).
- David H. Frisch and James H. Smith, "Measurement of Relativistic Time Dilation Using u-Mesons," 31 (5), 342-355 (1963).
- R.H. Dicke, "Cosmology, Mach's Principle and Relativity," 31 (7), 500- 509 (1963).
- R.S. Shankland, "Michelson-Morley Experiment," 32 (1), 16-35 (1964).
- Philip Morrison, "Less May Be More," 32 (6), 441-457 (1964).
- A.L. Schawlow, "Measuring the Wavelength of Light with a Ruler," 33 (11), 922-923 (1965).
- Arthur Komar, "Foundations of Special Relativity and the Shape of the Big Dipper," 33 (12), 1024-1027 (1965).
- R.H. Romer, "Angular Momentum of Static Electromagnetic Fields," 34 (9), 772-778 (1966); "Electromagnetic Angular Momentum," 35 (5), 445-446(1967).
- A. Gamba, "Physical Quantities in Different Reference Systems According to Relativity," 35 (2), 83-89 (1967).
- Emerson M. Pugh and George E. Pugh, "Physical Significance of the Poynting Vector in Static Fields," 35 (2), 153-156 (1967).
- R.H. Dicke, "Gravitation and Cosmic Physics," 35 (7), 559-566 (1967).
- O.L. Brill and B. Goodman, "Causality in the Coulomb Gauge," 35 (9), 832-837 (1967).
- Martin S. Tiersten, "Force, Momentum Change, and Motion," 37 (1), 82-87 (1969).
- W.H. Furry, "Examples of Momentum Distributions in the Electromagnetic Field and in Matter," 37 (6), 621-636 (1969).
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- F.O. Schulz-DuBois, "Foucault Pendulum Experiment by Kamerlingh Onnes and Degenerate Perturbation Theory," 38 (2), 173-188 (1970).
- John Clarke, "The Josephson Effect and e/h," 38 (9), 1071-1095 (1970).
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- Roger Y. Tsien, "Pictures of Dynamic Electric Fields," 40 (1), 46-56 (1972).
- S. Chandrasekhar, "On the 'Derivation' of Einstein's Field Equations," 40 (2), 224-234 (1972).
- Barry R. Holstein and Arthur R. Swift, "The Relativity Twins in Free Fall," 40 (5), 746-750 (1972).

- Henry Pierce Stapp, "The Copenhagen Interpretation," 40 (8), 1098-1116 (1972).
- N. Bloembergen, "The Concept of Temperature in Magnetism," 41 (3), 325-331 (1973).
- Julian Schwinger, "Precession Teats of General Relativity -- Source Theory Derivations," 42 (6), 307-510 (1974).
- Julian Schwinger, "Spin-Precession -- A Dynamical Discussion," 42 (6), 510-513 (1974).
- Allan Franklin, "Principle of inertia in the Middle Ages," 44 (6), 529-545 (1976).
- Hans C. Ohanian, "What is the principle of equivalence?" 45 (10), 903-909 (1977).
- Frederik J. Belinfante, "Can individual elementary particles have individual properties?" 46 (4), 329-336 (1978).
- Timothy H. Boyar, "Electrostatic potential energy leading to an inertial mass change for a system of two point charges," 46 (4), 383-385 (1978).
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- Sidney D. Drell, "When is a particle?" 46 (6), 597-606 (1978).
- Timothy H. Boyer, "Electrostatic potential energy leading to a gravitational mass change for a system of two point charges," 47 (2), 129-131(1979).
- Barry R. Holstein and Arthur R. Swift, "Elementary derivation of the radiation field from an accelerated charge," 49 (4), 346-347 (1981).
- P.C. Peters, "Where is the energy stored in a gravitational field?" 49(6), 564-569 (1981).
- Robert H. Romer, "Motion of a sphere on a tilted turntable," 49 (10), 985-986 (1981).
- H. Richard Crane, "Short Foucault pendulum. A way to eliminate the precesson due to ellipticity," 49 (11), 1004-1006 (1981).
- M. Danos, "Bohm-Aharonov effect. The quantum mechanics of the electrical transformer," 50 (1), 64-66 (1982).
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- Robert Weinstock, "Dismantling a centuries-old myth: Newton's Principia and inverse-square orbits," 50 (7), 610-617 (1982).
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- Allen I. Janis, "Simultaneity and special relativistic kinematics," 51 (3), 209-2l3 (1983).
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- N. David Mermin, "Relativity without light," 52 (2), 119-124 (1984).
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- Victor F. Weisskopf, "Search for Simplicity: Maxwell, Rayleigh, and Mt. Everest," 54 (1), 13-14 (1986).
- M.W.P. Strandberg, "Special relativity completed: The source of some 2s in the magnitude of physical phenomena," 54 (4), 321-331 (1986).
- Hans C. Ohanian, "What is spin?" 54 (6), 500-505 (1986).
- L. Lederman, "Unification, grand unification, and the unity of physics," 54 (7), 594-600 (1986).
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- Michael S. Morris and Kip S. Thorne, "Wormholes in spacetime and their use for interstellar travel: A tool for teaching general relativity," 56 (5), 395-412 (1988).
- Mark A. Heald, "Energy flow in circuits with Faraday emf," 56 (6), 540-547 (1988).

- N. David Mermin, "The amazing many colored relativity engine," 56 (7), 600-6l1 (1988).
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- Harold S. Zapolsky, "On electric fields produced by steady currents," 56 (12), 1137-1141 (1988).
- M. Kugler, "Motion in noninertial systems: theory and demonstrations," 57 (3), 247-251 (1989).
- W. Zimmermann, Jr., "A wave-packet description of the motion of a charged particle in a uniform magnetic field," 57 (7), 593-598 (1989).
- Ray Skinner and John A. Weil, "An introduction to generalized functions and their application to static electromagnetic point dipoles, including hyperfine interactions," 57 (9), 777-791 (1989).
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- Hans Dehmelt, "Less is more. Experiments with an individual atomic particle at rest in free space," 58 (1), 17-27 (1990).
- Robert J. Birgenau, "Novel magnetic phenomena and high-temperature superconductivity in lamellar copper oxides," 58 (1), 28-4O (1990).
- Freeman J. Dyson, "Feynman's proof of the Maxwell equations," 58 (3), 209-211(1990). See also comments by Norman Dombey, Robert W. Brehme, James L. Anderson, and I. E. Farquhar, 59(l), 85-87 (1991).
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- G. Matteucci, "Electron wavelike behavior: A historical and experimental introduction," 58(12), 1143-1147 (1990).

197. Selected Articles from Apeiron magazine:
     Apeiron Magazine (apeiron@aei.ca)
     4405 St-Dominique
     Montreal, Quebec H2W 2B2 Canada.

   Apeiron Number 1 (September 1987)
        * Henrik Broberg (Stockholm) – Particle Mass in a Cosmological Perspective
        * Toivo Jaakkola (University of Helsinki Observatory) – Mach s Principle and Properties of Local Structure

   Apeiron Number 2 (February 1988)
        * Jean-Claude Pecker/Jean-Pierre Vigier (University of Paris) – A Possible Tired-Light Mechanism

   Apeiron Number 3 (August 1988)
        * D.F. Roscoe (University of Sheffield) – Gravitation as an Inertial Process
        * Amitabha Ghosh (Indian Institute of Technology, Kanpur) – Velocity-Dependent Inertial Induction: A Case for Experimental Observation

   Apeiron Number 5 (Fall 1989)
        * S.V.M. Clube (University of Oxford) – Lorentzian Gravity and Cosmology

   Apeiron Number 8 (Autumn 1990)
        * Jacques Trempe (Montreal, Quebec) – Laws of Light Propagation in Galilean Space-Time

* Thomas E. Phipps Jr. (Urbana, Illinois) – Weber-type Laws of Action-at-a-Distance in Modern Physics

Apeiron Numbers 9-10 (Winter-Spring 1991)
* S.V.M. Clube (Astrophysics Department, Oxford University) – Mass Inflation as a Recurring Property of Matter in Astrophysical Situations
* Amitabha Ghosh (Indian Institute of Technology, Kanpur) – Velocity Dependent Inertial Induction: A Possible Tired-Light Mechanism * David Roscoe (Department of Applied Mathematics, Sheffield University) – Gravity out of Inertia
* Henrik Broberg (Djursholm, Sweden) – Mass, Energy, Space * Toivo Jaakkola (University Observatory, Helsinki) – Electrogravitational Coupling: Empirical and Theoretical Arguments

Apeiron Number 12 (February 1992)
* Zaman Akil (Kuwait City) – On the Constant of Gravitation * André K.T. Assis (State University of Campinas, Brazil) – On Hubble's Law of Redshift, Olbers' Paradox and the Cosmic Background Radiation
* S.C. Tiwari (Banaras Hindu University, Varanasi, India) – The Nature of Time

Apeiron Number 13 (June 1992)
* André K.T. Assis (State University of Campinas, Brazil) – On the Absorption of Gravity
* D.F. Roscoe (University of Sheffield) – The Equivalence Principle as a Consequence of the Third Law
* Joop F. Nieland (Arles sur Tech, France) – Vacuum Refraction Theory of Gravitation
* H.E. Wilhelm (University of Utah) – Explanation of Anomalous Unipolar Induction in Corotating Conductor-Magnet Arrangements by Galilean Electrodynamics

Apeiron Number 14 (September 1992)
* Thomas E. Phipps Jr. (Urbana, Illinois) – Lorentz Contraction of the Coulomb Field: An Experimental Proposal
* Peter Huber (Germanistisches Seminar, Heidelberg University) – Does the Velocity of Light Decrease?

Apeiron Number 15 (February 1993)
* H.E. Wilhelm (University of Utah) – Galilei Covariant Electrodynamics of Moving Media with Applictions to the Experiments of Fizeau and Hoek
* S.X.K. Howusu (University of Jos, Nigeria) – The Confrontation between Relativity and the Principle of Reciprocal Action
* Henrik Broberg (Norwegian Telecom, Oslo) – On the Kinetic Origin of Mass

Aperion Number 16 (June 1993)
* C.I. Mocanu (Polytechnical Institute of Bucharest, Romania) – Is Thomas Rotation a Paradox?
* Zu Shaozhi and Xu Xiangqun (Beijing Control Device Research Institute) – On the Relativity of Simultaneity * Martin Kokus (Hopewell, PA) and A.O. Barut, University of Colorado) – Suggestion for Unifying Two Types of Quantized Redshift of Astronomical Bodies

Apeiron Number 17 (October 1993)
* Thomas E. Phipps Jr. (Urbana, Illinois) – Ampere Tension and Newton's Laws

* S.X.K. Howusu (University of Jos, Nigeria) – General Mechanics of a Photon in the Gravitational Field of a Stationary Homogeneous Spherical Body

Apeiron Number 18 (February 1994)
* Toivo Jaakkola (Tuorla Observatory, Turku, Finland) – Radiative and Dynamical Implications of Electrogravity * Peter Huber (Heidelberg University) – The Cosmological Redshift as a Virtual Effect of Gravitation
* H.E. Wilhelm (University of Utah) – Fitzgerald Contraction, Larmor Dilation, Lorentz Force, Particle Mass and Energy as Invariants of Galilean Electrodynamics
* Adolphe Martin (Longueuil, Quebec) – Einstein to Galilean Relativity

Apeiron Number 19 (June 1994)
* S.H. Kim (University of Texas at Arlington) – A Non-Lorentzian Force Stronger than the Lorentz Force
* Constantin Antonopoulos (National Technological University of Athens) – The Semantics of Absolute Space
* P. Graneau (Northeastern University, Arlington) and A.K.T. Assis (University of Campinas, Brazil) – Kirchhoff on the Motion of Electricity in Conductors
* Peter F. Browne (University of Manchester) – Newtonian Cosmology with Renormalized Zero-Point Radiation

Apeiron Number 20 (October 1994)
* V.A. Kuligin, G.A. Kuligina and M.V. Korneva (University of Voronezh, Russia) – Epistemology and Special Relativity
* G. Galeczki (University of Köln) – Physical Laws and the Theory of Special Relativity
* T. Chang (University of Alabama, Huntsville) – A Formulation of the Gravitational Equation of Motion

Aperion Volume 2, Number 1 (January 1995)
* Paul Marmet (University of Ottawa) – Origin of the 3 K Radiation
* Wen-Xiu Li (University of Science and Technology of China) – On the Relativity of Lengths and Times

Apeiron Volume 2, Number 2 (April 1995)
* Amitabha Ghosh (Indian Institute of Technology, Kanpur) – Dynamical Inertial Induction and the Potential Energy Problem
* Halton C. Arp (Max-Planck-Institut für Astrophysik) – New Light on Redshift Periodicities

Apeiron Volume 2, Number 3 (July 1995)
* P.F. Browne (University of Manchester ) – de Sitter Cosmology Reinterpreted


198. Articles and books by Robert L. Forward:

AUTHOR(s):       Cramer, John G.; Forward, Robert L. ;Landis, Geoffrey A.; Visser, M.;
                 Benford, G.
TITLE:       Natural wormholes as gravitational lenses.
In: *Physical Review-D*: Particles, Fields, Gravitation  MAR 15 1995 v 51 n 6  Page 3117
Traversable wormholes, energy condition, time machines

AUTHOR(s):    Forward, R.L.

TITLE:        Statite: A Spacecraft That Does Not Orbit.
In: *Journal of spacecraft and rockets*  SEP 01 1991 v 28 n 5 Page 606


AUTHOR(s):    Forward, Robert
TITLE:        Advanced Space Propulsion.
In: *The Journal of social, political, and economics*  Wint 1990 v 15 n 4 Page 387


AUTHOR(s):    Forward, Robert L.
TITLE:        Light-Levitated Geostationary Cylindrical Orbits: Correction and Expansion.
In: *The Journal of the astronautical sciences*  JUL 01 1990 v 38 n 3 Page 335


AUTHOR(s):    Forward, Robert L.
TITLE:        Advanced space propulsion.
In: *Aerospace America*  JUL 01 1990 v 28 n 7 Page 60


AUTHOR(s):    Forward, Robert L.
TITLE:        Grey Solar Sails.
In: *The Journal of the astronautical sciences*  APR 01 1990 v 38 n 2 Page 161


AUTHOR(s):    Forward, Robert
TITLE:        The power of negative matter:  Does matter with a negative mass exist somewhere in
              the cosmos?  If it does, it would make the perfect space-drive.
In: *New Scientist*  MAR 17 1990 v 125 n 1708 Page 54


AUTHOR(s):    Forward, R.L.
TITLE:        Solar Photon Thruster.
In: *Journal of spacecraft and rockets*  JUL 01 1990 v 27 n 4 Page 411


AUTHOR(s):    Forward, R.L.
TITLE:        Negative matter Propulsion.
In: *Journal of propulsion and power*  JAN 01 1990 v 6 n 1 Page 28


AUTHOR(s):    Forward, R.L.
TITLE:        Space Warps: A Review of One Form of Propulsionless Transport.
In: *JBIS (Journal of the British Interplanetary Society)*  NOV 01 1989 v 42 n 11 Page 533


AUTHOR:   Forward, Robert L.
TITLE:        Negative Matter Propulsion
In: July 1988 AIAA Joint Propulsion Conference
*Journal of Propulsion and Power* Vol 6 no 1 pp 28-37


AUTHOR(S):    Robert L. Forward and Joel Davis.
TITLE:        Mirror Matter: Pioneering Antimatter Physics
Source: New York : Wiley, 1988.
Series: Wiley science editions


AUTHOR:   Forward, Robert L.
TITLE:        Spin Drive To The Stars
In: *ANALOG*, Apr 1981, pp. 64-7O


AUTHOR:   Forward, R.L.

TITLE:        Far Out Physics
In: *Analog Science Fiction/Science Fact*  Vol 95, August 1975 pages 147-166

TITLE: <u>Bibliography of interstellar travel and communication</u>: April 1977
AUTHOR: Mallove, Eugene F. and Forward, Robert L.

TITLE: <u>Camelot 30K</u> / 1993
AUTHOR: Forward, Robert L.

TITLE: <u>Dragon's Egg</u> ; Starquake / 1994
AUTHOR: Forward, Robert L.

TITLE: <u>The flight of the dragonfly</u> / 1985
AUTHOR: Forward, Robert L.

TITLE: <u>Indistinguishable from Magic: speculations and visions of the future</u> / 1995
AUTHOR: Forward, Robert L.

TITLE: <u>Marooned on Eden</u> / 1993
AUTHOR: Forward, Robert L.

TITLE: <u>Martian rainbow</u> / 1991
AUTHOR: Forward, Robert L.

TITLE: <u>Mirror matter: pioneering antimatter physics</u> / 1988
AUTHOR: Forward, Robert L.

TITLE: <u>A national space program for interstellar exploration</u> (1975)
AUTHOR: Forward, Robert L.

TITLE: <u>Ocean under the ice</u> / 1994
AUTHOR: Forward, Robert L.

TITLE: <u>Rescued from Paradise</u> / 1995
AUTHOR: Forward, Robert L.

TITLE: <u>Return to Rocheworld</u> / 1993
AUTHOR: Forward, Robert L.

TITLE: <u>Rocheworld</u> / 1990
AUTHOR: Forward, Robert L.

TITLE: <u>Starquake</u> / 1986
AUTHOR: Forward, Robert L.

TITLE: <u>Timemaster</u> / 1992
AUTHOR: Forward, Robert L.

199. Dr. Harold Aspden recently retired after serving many years as IBM's patent agent in Europe.  He is the discoverer of the "Aspden Effect" or rotational inertia in spinning magnets (*NEN*, Jan. & Feb. 1995).  His Ph.D. thesis involved demonstrations of anomalies in magnetic fields.

Books and articles by Harold Aspden:

AUTHOR:     Aspden, Harold.
TITLE:         Gravitation
PUBL.:         Southampton, Eng. : Sabberton Publications,
FORMAT:    78 p. ; 22 cm.
DATE:         1975
SUBJECT    Gravitation
ISBN:          0850560055. 0850560063

AUTHOR:     Aspden, Harold.
TITLE:         Modern aether science
PUBL.:         Southampton, Eng., Sabberton Publications
FORMAT:    165 p. illus. 22 cm.
DATE:         1972
SUBJECT    Ether (Space)
ISBN:          0850560039 0850560047 (pbk)

AUTHOR:     Aspden, Harold.
TITLE:         The need for a new theory of gravitation
PUBL.:         Southampton (Hants.), Sabberton Publications,
FORMAT:    (1), 4 p. 22 cm.
DATE:         1966
SERIES:       His Aether science paper no. 1
SUBJECT: Gravitation  Relativity (Physics)

AUTHOR:     Aspden, Harold.
TITLE:         Physics unified
PUBL.:         Southhampton : Sabberton Publications,
FORMAT:    xi, 206 p. : ill. ; 22 cm.
DATE:         1980
SUBJECT    Unified field theories
ISBN:          0850560101

AUTHOR:     Aspden, Harold.
TITLE:         Physics without Einstein
PUBL.:         Southampton, Sabberton Publications,
FORMAT:    xiii, 224 p. illus. 23 cm.
DATE:         1969
SUBJECT    Physics
ISBN:          850560012

AUTHOR(s):          Aspden, H.
TITLE(s):      Anti Gravity Electronics
Summary:      Reinterpretation of Newton's Third Law of Motion suggests that it depends upon and electronic action.  Electronic interaction therefore explains the paradoxical anti-gravity properties of the force processed gyroscope.

In: *Electronics&Wireless World*  JAN 01 1989 v 95 n 1635 Page: 29

AUTHOR(s):        Aspden, H.
TITLE(s):    Conservative hadron interactions exemplified by the creation of the kaon.
In: *Hadronic journal*  MAY 01 1989 v 12 n 3 Page: 101

AUTHOR(s):        Aspden, H.
TITLE(s):    The Harwen energy radiation generation.
In: *Speculations in science and technology*  1990 v 13 n 4 Page: 295

AUTHOR(s):        Aspden, H.
TITLE(s):    Instantaneous electrodynamic potential with retarded energy transfer.
In: *Hadronic journal*  NOV 01 1988 v 11 n 6 Page: 307

AUTHOR(s):        Aspden, H.
TITLE(s):    Speculations in energy: editorial introduction.
In: *Speculations in science and technology*  1990 v 13 n 4 Page: 243

AUTHOR(s):        Aspden, H.
TITLE(s):    The theory of the proton constants.
In: *Hadronic journal*  JUL 01 1988 v 11 n 4 Page: 169


200. Selected Publications by Leonard Parker:

* On the Magnetic Moment of a Charged Particle in a Changing Magnetic Field, *Nuovo Cimento* 408 99 (1965).
* Equivalence Principle and Motion of a Gyroscope, *Physical Review* 175, 1658 (1968).
* Motion in a Schwarzschild Field I. Precession of a Moving Gyroscope, *American Journal of Physics* 37, 309 (1969).
* Faster-Than-Light *Inertl Review* 188, 2287 (1969).
* Special Relativity and Diagonal Transformations (with G. Schmieg), *American Journal of Physics* 38, 218 (1970).
* Quantized Matter Fields and the Avoidance of Singularities in General Relativity (with S. A. Fulling), *Physical Review D* 7, 2357 (1973).
* Metric of Two Spinning Charged Sources in Equilibrium (with R. Ruffini and D. Wilkins), *Physical Review D* 7, 2874 (1973).
* Quantized Scalar Fields in a Closed Anisotropic Universe (with B. L. Hu and S. A. Fulling), *Physical Review D* 8, 2377 (1973).
* Adiabatic Regularization of the Energy-Momentum Tensor of a Quantized Field in Homogeneous Spaces (with S. A. Fulling), *Physical Review D* 9, 341 (1974).
* Renormalization in the Theory of a Quantized Scalar Field Interacting With a Robertson-Walker Spacetime (with S. A. Fulling), *Annals of Physics (N.Y.)* 87, 176-203 (1974).
* Adiabatic Analysis and Renormalization in Semiclassical Gravitation Theory (with S.A. Fulling), *Bulletin American Physical Society* 19 108 (1974).
* Conformal Energy-Momentum Tensor in Curved Space-Time: Adiabatic Regularization and Renormalization (with S. A. Fulling and B. L. Hu), *Physical Review D* 10, 3905 (1974).
* Solution of the Einstein-Maxwell Equations for Two Unequal Spinning Sources in Equilibrium (with R. A. Kobiske), *Physical Review D* 10, 2321 (1974).

* The Interaction of Gravity with Quantized Fields (with S.A. Fulling), award winning essay, Gravity Research Foundation Awards, 1974.

* New Developments in the Theory of Gravity Interacting With a Quantized Field, *Journal of General Relativity and Gravitation* 6, 21 (1975).

* Nonlinear Gravitational Effects and Magnetic Monopoles, *Physical Review Letters* 34, 412 (1975).

* Quantized Fields and Particle Creation in Curved Space-Time (66 pages), in Proceedings of the Second Latin American Symposium on Relativity and Gravitation (Universidad Simon Bolivar, Caracas, 1976).

* The Production of Elementary Particles by Strong Gravitational Fields (120 pages), in Proceedings of the Symposium on Asymptotic Properties of Space-Time (Plenum Publishing Corp., New York, 1977), editors, P. Esposito and L. Witten.

* Angular Momentum and Dirac Charge Quantization in Curved Spacetime, (with J. Friedman and S. Mayer), *Physical Review D* 17, 1957 (1978).

* Applied Quantum Gravity: Applications of the Semiclassical Theory in On the Path of Albert Einstein, edited by B. Kursunoglu, A. Perlmutter, and L. F. Scott (Plenum Press, New York, 1979), pp. 145-166.

* Quantized Matter Fields ... (with S. A. Fulling), reprinted in *Cosmology, Selected Reprints*, edited by L. C. Shepley and A. A. Strassenburg (American Association of Physics Teachers, Stony Brook, N.Y., 1979).

* On Renormalization of phi^4 Field Theory in Curved Spacetime I, (with T. S. Bunch and P. Panangaden), *Journal of Physics A* 13, 901 (1980)

* One-Electron Atom in Curved Spacetime, *Physical Review Letters* 44, 1559 (1980).

* The One-Electron Atom as a Probe of Spacetime Curvature, Physical Review D 22, 1922 (1980).

* Self-Forces and Atoms in Gravitational Fields, *Physical Review D* 24, 535 (1981).

* The Atom as a Probe of Curved Spacetime, *Journal of General Relativity and Gravitation* 13, 307 (1981).

* Gravitational Perturbation of the Hydrogen Spectrum (with L.O. Pimentel), *Physical Review D* 25, 3180 (1982).

* Quantum Gravity 2 (book review), *Science* 217, 346 (1982).

* Remote Quantum Mechanical Detection of Gravitational Radiation, (with T. K. Leen and L. O. Pimentel), *General Relativity and Gravitation* 15, 761-776 (1983).

* Renormalization and Scaling of Non-Abelian Gauge Fields in Curved Space-Time in Gauge Theory and Gravitation, edited by K. Kikkawa, N. Nakanishi, and H. Nariai (Springer-Verlag, Berlin, 1983), pp. 96-100.

* Gravitational Perturbations of the Hydrogen Atom in Proceedings of the Third Marcel Grossmann Meeting on General Relativity, edited by Hu Ning (Science Press and North-Holland Publishing Co., New York, 1983).

* Effective Couplings at High Curvature in Proceedings of the Workshop on Induced Gravitation, Erice, Italy (Sept. 1983).

* Renormalization Group Analysis of Grand Unified Theories in Curved Spacetime (with D. J. Toms), *Physical Review D* 29, 1584-1608 (1984).

* Effective Couplings of Grand Unified Theories in Curved Spacetime, (with D. J. Toms), *Physical Review Letters* 52, 1269 (1984).

* Some Cosmological Aspects of Quantum Gravity in Quantum Theory of Gravity, edited by S.M. Christensen (Adam Hilger Ltd., Bristol, 1984), pp. 89-102 (invited paper for volume in honor of 60th birthday of B.S. DeWitt).

* Curvature Dependence of Renormalized Coupling Constants, *Foundations of Physics* 14, 1121 (1984) (invited paper for issue in honor of 75th birthday of Nathan Rosen).

* Effective Coupling Constants and GUTs in the Early Universe in <u>Inner Space/Outer Space, The Interface Between Cosmology and Particle Physics</u>, edited by E. W. Kolb et al. (University of Chicago Press, Chicago, 1985).

* Models of Rapidly Rotating Neutron Stars (with J. L. Friedman and J. R. Ipser), *Nature* 312, 255 (1984).

* Gravity and Grand Unified Theories (with D. J. Toms), *General Relativity and Gravitation* 17, 167 (1985).

* New Form for the Coincidence Limit of Feynman Propagator or Heat Kernel in Curved Spacetime (with D. J. Toms), *Physical Review D* 31, 953 (Rapid Communications) (1985).

* Explicit Curvature Dependence of Coupling Constants (with D. J. Toms), *Physical Review D* 31, 2424 (1985).

* Proof of Summed Form of Proper-Time Expansion for Propagator in Curved Space-Time (with I. Jack), *Physical Review D* 31, 2439 (1985).

* Curvature-Induced Asymptotic Freedom (with E. Calzetta and I. Jack), *Physical Review Letters* 55, 1241 (1985)

* Renormalization Group and Nonlocal Terms in the Curved-Spacetime Effective Action (with D. J. Toms), *Physical Review D* 32, 1409 (1985).

* Rapidly Rotating Neutron Star Models (with J.L. Friedman and J. R. Ipser), *Astrophysical Journal* 304, 115-139 (1986).

* Quantum Gauge Fields at High Curvature (with E. Calzetta and I. Jack), *Physical Review D* 33, 953-977 (1986).

* Renormalization Group Methods in Curved Spacetime (with D.J. Toms) in <u>Quantum Field Theory and Quantum Statistics</u>, edited by I. A. Batalin, C. J. Isham, and G. A. Vilkowisky (invited paper for volume in honor of 60th birthday of Soviet Physicist E. J. Fradkin) (Adam Hilger Ltd., Bristol, 1988).

* Gravitational Particle Production in the Formation of Cosmic Strings, *Phys. Rev. Letters* 59, 1369 (1987).

* Gravitational Singularities and Two-Body Interactions in <u>Nonlinear Phenomena in Relativity and Cosmology</u>, editors, J. R. Buchler et al. (New York Academy of Sciences, Vol. 631, New York, 1991), 31-39.

* Ultrarelativistic Bose-Einstein Condensation in the Einstein Universe and Energy Conditions (with Yang Zhang), *Phys. Rev. D* 44, 2421-2431 (1991).

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* Einstein Equations with Quantum Corrections Reduced to Second Order, *Phys. Rev. D* 47, 1339 (1993) (with J. Simon).

* Physical Solutions of Semiclassical General Relativistic Models with Quantum Corrrections, in Topics on Quantum Gravity and Beyond, <u>Essays in Honor of Louis Witten on His Retirement</u>, editors, F. Mansouri and J.J. Scanio, (World Scientific, Singapore, 1994).

* Atomic Spectra in the Gravitational Field of a Collapsing Prolate Spheroid (with D. Vollick and I. Redmount), *Phys. Rev. D* (submitted 1994) .

* Physical Distinction Among Alternative Vacuum States in Flat Spacetime (with S. Winters-Hilt and I. Redmount), *Phys. Rev. D* (submitted 1994).


201. Publications by Matt Visser (visser@kiwi.wustl.edu)
**http://www.physics.wustl.edu/~visser/homepage.html**

Charge nonconserving decays in ordinary matter. *Physical Review D* 24 (1981) 2542--2544.

Concerning the mass of the photon. *Physics Letters B* 109 (1982) 373--374.

Aspects of supersymmetry breaking. *Lawrence Berkeley Laboratory Report*, LBL--18189, September 1984. [Ph.D. Thesis]

The topological degree for supersymmetric chiral models. *Physical Review D* 32 (1985) 510--512.

Some generalizations of the O'Raifeartaigh model. Journal of Physics A 18 (1985) L979--L982.

An exotic class of Kaluza--Klein models. *Physics Letters B* 158 (1985) 22-25.

A supergravity model without elementary gauge singlets. *Physics Letters B* 160 (1985) 77--80.

Number of massless fermion families in superstring theory. With Itzhak Bars *Physics Letters B* 163 (1985) 118--122.

Tuning the cosmological constant in N=1 supergravity. *Physics Letters B* 165 (1985) 289--291.

Tree level mass spectra in the observable sector. *Nuclear Physics B* 271 (1986) 53-60.

Fermion families in superstring theory. With Itzhak Bars Proceedings of the Oregon meeting, 1985 Annual meeting of the Division of Particles and Fields of the American Physical Society, edited by R. Hwa, (World Scientific, Singapore, 1986), pp. 829--834.

Feeble intermediate range forces from higher dimensions. With Itzhak Bars *Physical Review Letters* 57 (1986) 25-28.

Feeble forces and gravity. With Itzhak Bars *General Relativity and Gravitation* 19 (1987) 219-223. [This essay was awarded Second Prize in the 1986 Essay Competition sponsored by the Gravity Research Foundation.]

Feeble forces. With Itzhak Bars in: Proceedings of the 23rd International Conference in High Energy Physics, Berkeley, July 1986, edited by: S.C. Loken, (World Scientific, Singapore, 1987), volume 2, pp. 1032--1037.

A guide to data in elementary particle physics. (as part of the Berkeley Particle Data Group collaboration) Lawrence Berkeley Laboratory Report, LBL-90 (Revised), UC--34D, September 1986.

Is the `missing mass' really missing? *General Relativity and Gravitation* 20 (1988) 77-81. [This essay was awarded an honorable mention in the 1987 Essay Competition sponsored by the Gravity Research Foundation.]

Determinants of conformal wave operators in four dimensions. With Steve Blau and Andreas Wipf *Physics Letters B* 209 (1988) 209--213.

Zeta functions and the Casimir energy. With Steve Blau and Andreas Wipf *Nuclear Physics B* 310 (1988) 163--180.

Determinants, Dirac operators, and one-loop physics. With Steve Blau and Andreas Wipf
*International Journal of Modern Physics A* 4 (1989) 1467-1484.

A classical model for the electron. *Physics Letters A* 139 (1989) 99-102.

Traversable wormholes: Some simple examples. *Physical Review D* 39 (1989) 3182-3184.

Traversable wormholes from surgically modified Schwarzschild spacetimes. *Nuclear Physics B* 328 (1989) 203-212.

Wormholes, baby universes, and causality. *Physical Review D* 41 (1990) 1116-1124.

Quantum mechanical stabilization of Minkowski signature wormholes. *Physics Letters B* 242 (1990) 24--28. [Based on a talk given at the `Wormshop', Fermilab, May 1989.]

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Canonically quantized gravity: Disentangling the supermomentum and superhamiltonian constraints. *Physical Review D* 42 (1990) 1964-1972.

Quantum wormholes. *Physical Review D* 43 (1991) 402-409.

Wheeler--DeWitt quantum gravity in (2+1) dimensions. in: Beyond the Standard Model II: Proceedings of the International Conference in High Energy Physics, Norman, Oklahoma, 1-3 November 1990, edited by: K. A. Milton, R. Kantowski, and M. A. Samuel, (World Scientific, Singapore, 1991), pp. 354--359.

Wheeler wormholes and topology change: A minisuperspace analysis. Modern Physics Letters A6 (1991) 2663-2667. [Based on an essay that was awarded an honorable mention in the 1990 Essay Competition sponsored by the Gravity Research Foundation.]

Analytic results for the effective action. With Steve Blau and Andreas Wipf International *Journal of Modern Physics A* 6 (1991) 5409-5433.

Dirty black holes: Thermodynamics and horizon structure. Physical Review D 46 (1992) 2445-2451.

>From wormhole to time machine: Remarks on Hawking's chronology protection conjecture. *Physical Review D 47* (1993) 554-565.

van Vleck determinants: Geodesic focussing and defocussing in Lorentzian spacetimes. *Physical Review D* 47 (1993) 2395-2402.

Hawking radiation: A particle physics perspective. *Modern Physics Letters A* 8 (1993) 1661-1670.

Dirty black holes: Entropy versus area. *Physical Review D* 48 (1993) 583-591.

Dirty black holes: Entropy as a surface term. *Physical Review D* 48 (1993) 5697-5705.

Lateral wave contributions to the low-altitude radar propagation factor. With Gerald Gilbert and Eric Raiten  *Radio Science* 29 (1994) 483-494.

Hawking's chronology protection conjecture: Singularity structure of the quantum stress--energy tensor. Nuclear Physics B416 (1994) 895--906.

van Vleck determinants: Traversable wormhole spacetimes. *Physical Review D* 49 (1994) 3963-3980.

Natural wormholes as gravitational lenses. With John Cramer, Robert Forward, Michael Morris, Gregory Benford, and Geoffrey Landis  *Physical Review D* 51 (1995) 3117-3120.

Scale anomalies imply violation of the averaged null energy condition. *Physics Letters B* 349 (1995) 443-447.

Lorentzian Wormholes -- from Einstein to Hawking. Full length technical monograph. American Institute of Physics Press, July 1995.

Acoustic propagation in fluids: An unexpected example of Lorentzian geometry. gr-qc/9311028; gr-qc@xxx.lanl.gov.  Submitted for publication.

Thin-shell wormholes: Linearization stability With Eric Poisson)  gr-qc/9506083; gr-qc@xxx.lanl.gov  Submitted for publication.

New book by Matt Visser. Published 1995:

"Lorentzian Wormholes---from Einstein to Hawking" by Matt Visser (Washington University in St. Louis). American Institute of Physics Press (Woodbury, New York). ISBN 1-56396-394-9

412 pages (including index and 38 figures); hardback; US$59.00 (US$47.20 for APS/AIP members). To order---Voice: 1-800-809-2247; FAX: 1-802-864-7626.

202. Other articles about wormholes:

AUTHOR(s):  Kar, Sayan Sahdev, Deshdeep
TITLE(s):       Restricted class of traversable wormholes with traceless matter.
In: *Physical Review D*: particles, fields, gravitation  AUG 15 1995 v 52 n 4 Page 2030

AUTHOR(s):  Wang, Anzhong Letelier, Patricio S.
TITLE(s):       Dynamical Wormholes and energy Conditions.
In: *Progress of theoretical physics*  JUL 01 1995 v 94 n 1 Page 137

AUTHOR(s):  Clement, Gerard
TITLE(s):       Wormhole cosmic strings.
In: *Physical Review D*: particles, fields, gravitation  JUN 15 1995 v 51 n 12 Page 6803

AUTHOR(s):  Cramer, John G. Forward, Robert L. Landis, Geoffrey A.
TITLE(s):       Natural wormholes as gravitational lenses.
In: *Physical Review D*: particles, fields, gravitation  MAR 15 1995 v 51 n 6 Page 3117

AUTHOR(s):  Agnese, A.G. La Camera, M.
TITLE(s):       Wormholes in the Brans-Dicke theory of gravitation.
In: *Physical Review D*: particles, fields, gravitation  FEB 15 1995 v 51 n 4 Page 2011

AUTHOR(s):  Cadoni, Mariano Cavaglia, Marco
TITLE(s):       Cosmological and wormhole solutions in low-energy effective string theory.
In: *Physical Review D*: particles, fields, gravitation  NOV 15 1994 v 50 n 10 Page 6435

AUTHOR(s):  Cavaglia, Marco

TITLE(s):      Quantum electromagnetic wormholes and geometrical description of the electric charge.
In: *Physical Review D*: particles, fields, gravitation  OCT 15 1994 v 50 n 8 Page 5087

AUTHOR(s):  Singh, Harvendra
TITLE(s):      Magnetic wormholes and vertex operators.
In: *Physical Review D*: particles, fields, gravitation  OCT 15 1994 v 50 n 8 Page 5033

AUTHOR(s):  Li, Xin-zhou
TITLE(s):      Dimensionally continued wormhole solutions.
In: *Physical Review D*: particles, fields, gravitation  SEP 15 1994 v 50 n 6 Page 3787

AUTHOR(s):  Marugan, G.A. Mena
TITLE(s):      Bases of wormholes in quantum cosmology.
In: *Classical and Quantum Gravity*  SEP 01 1994 v 11 n 9 Page: 2205

AUTHOR(s):  Ridgway, S. Alexander
TITLE(s):      S1xS2 wormholes and topological charge.
In: *Physical Review D*: particles, fields, gravitation  JUL 15 1994 v 50 n 2 Page 892

AUTHOR(s):  Cavaglia, Marco de Alfaro, Vittorio de Felice, Fernando
TITLE(s):      Anisotropic wormhole: Tunneling in time and space.
In: *Physical Review D*: particles, fields, gravitation  JUN 15 1994 v 49 n 12 Page 6493

AUTHOR(s):  Cotsakis, Spiros Leach, Peter Flessas, George
TITLE(s):      Minimally coupled scalar field wormholes.
In: *Physical Review D*: particles, fields, gravitation  JUN 15 1994 v 49 n 12 Page 6489

AUTHOR(s):  Visser, Matt
TITLE(s):      van Vleck determinants: Traversable wormhole spacetimes.
In: *Physical review d*: particles, fields, gravitation  APR 15 1994 v 49 n 8 Page 3963

AUTHOR(s):  Hochberg, David Kephart, Thomas W.
TITLE(s):      Can Semi-Classical Wormholes Solve the Cosmological Horizon Problem?
In: *General Relativity and Gravitation*  FEB 01 1994 v 26 n 2 Page 219

AUTHOR(s):  Kar, Sayan Sahdev, Deshdeep Bhawal, Biplab
TITLE(s):      Scalar waves in a wormhole geometry.
In: *Physical Review D*: particles and fields  JAN 15 1994 v 49 n 2 Page 853

AUTHOR(s):  Khatsymovsky, V.
TITLE(s):      Can wormholes exist?
In: *Physics letters*. [part b]  JAN 13 1994 v 320 n 3 / 4 Page 234

AUTHOR(s):  Kim, S.W. Lee, H. Kim, S.K.
TITLE(s):      (2+1)-dimensional Schwarzschild-de Sitter wormhole.
In: *Physics letters:* [part A]  DEC 20 1993 v 183 n 5 / 6 Page 359

AUTHOR(s):  Liu, Liao
TITLE(s):      Wormhole created from vacuum fluctuation.
In: *Physical Review D*: particles and fields  DEC 15 1993 v 48 n 12 Page R5463

AUTHOR(s):  Gonzalez-Diaz, P.F.
TITLE(s):      The conjugate gauge wormhole vertex.