



ADDITIONAL LENT-1 PRELIMINARY EXPERIMENTAL DATA

By Hal Fox

The LENT-1 reactor was used with a variable power supply in efforts to replicate the experimental results of the transmutation of thorium as published by the Cincinnati Group. The basic experimental equipment used was our own power supply which allows for the selection of either a.c. or d.c. power from ten to five hundred volts. In these particular experiments, we used the LENT-1 reactor obtained from the Cincinnati Group, the power supply, and a computer-acquisition system for counting and storing data from a Geiger Counter. The entire equipment used for these experiments cost less than \$5,000 including \$3,000 attributed to the cost of the LENT-1 Kit. Therefore, even small companies can participate in the development of this new technology.

The LENT-1 reactor consists of a cylindrical electrode with a disk shaped inner electrode so that the electrical current flows between the disk and the inside of the cylindrical electrode through the electrolyte. The plane of the circular-disk electrode is perpendicular to the axis of the cylindrical electrode. The reactor is operated with the axis of the cylindrical electrode parallel to the laboratory bench top. The reactor is filled about half full with a mixture of thorium nitrate and distilled water. About 0.1 gram of thorium is processed in each experiment.

The resistance of this special electrolytic cell is a function of the amount of thorium nitrate, the spacing between the disk electrode and the cylindrical electrode, the temperature of the electrolyte, and the chemical changes that are caused to occur in the electrolyte during processing. The resistance of the cell changes

dramatically, as computed by the voltage divided

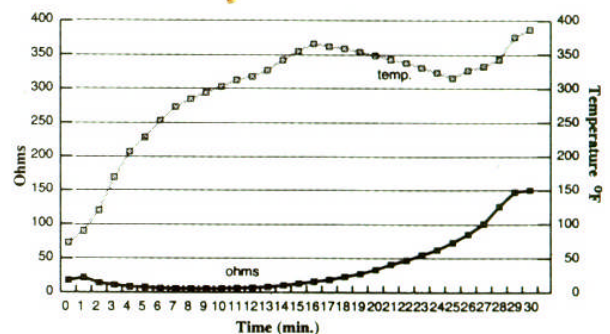


Fig. 1 The Variation of the Resistance and Temperature of the LENT-1 Cell with Processing Time

by the current, during the processing time.

At the initiation of the processing of the thorium solution about 100 watts of power is introduced into the reactor. This power input causes a gradual rise in temperature of the reactor as measured by a digital thermometer with a surface sensor affixed to the outside of the cylindrical electrode of the reactor. Following the prescribed protocols provided with the LENT-1 Kit, the voltage is increased by ten-volt steps as the internal resistance of the electrolyte increases. Therefore, the experiment is operated using an approximately constant power input. Typically, after about fifteen minutes of operation the temperature of the electrolyte stabilizes at about 350 F +/- 50°F. It is believed that if nuclear reactions occur, it is during this time period that the major portion of such nuclear reactions take place. **This preliminary belief (hypothesis) must be explored by techniques that extract samples of the electrolyte at**

various time intervals during the reactor process.

From about fifteen to thirty minutes of the processing time, the resistance of the electrolyte strongly increases. This experimental measurement suggests that the thorium is being removed from solution faster than other chemical ions are added to the solution. As inferred by the temperature of the reactor, the internal pressure of the cell ranges from atmospheric pressure at the start to as high as more than twenty atmospheres (about 15 to 400 psig). If proper assembly and operation of the cell has taken place, the steam produced in the cell is contained within the cell. Note: due to the possibility of the generation of very high pressures, this experimental apparatus should be placed behind a barrier in the case of any fracture of the reactor! **THIS IS NOT A TOY AND SHOULD BE USED ONLY BY EXPERIMENTERS WELL TRAINED IN SAFETY PROCEDURES!** However, the LENT-1 is designed for at least 1,000 psig operation.

BEFORE & AFTER RESULTS

The electrolyte, the disk electrode, and the inner surface of the cylindrical electrode were measured for radioactive emanations by using a Geiger counter. **More sophisticated instrumentation should, of course, be used.** The **before-processing** measurements of the electrodes were essentially at background. The thorium solution showed counts considerably above background. The **after-processing** Geiger counter measurements showed a reduction of radioactivity of the electrolyte **and a dramatic increase of the radioactivity on the surface of the electrodes.**

Any skeptic of the possible transmutation of elements using low-energy would immediately proclaim that this is clear evidence that the thorium had been electroplated from the electrolyte onto the surfaces of the electrodes. This is clearly a possible explanation. **However, by placing the disk electrode near the sensor of the Geiger counter, we have found that the radioactivity of the electrode is dramatically reduced with time, on a near-exponential basis, from about three times background to about one-third above background over a period of less than 100 hours.**

Dr. John O'M. Bockris was asked about the plating out of thorium by the use of alternating current. He stated that the expected results of plating by the use of a.c. is old and obscure. One of the explanations can be that an experimental setup may be using a partial d.c. current, such as 99% a.c. and 1% d.c. An alternative explanation might be that a particular element plates out more rapidly than it dissolves back into the electrolyte. **It is important to emphasize that there must be considerable analytical work performed on the electrodes as well as the before-processing and after-processing samples to ensure that the thorium has been transmuted.** The experimental evidence is that the thorium is removed from the electrolyte and that the electrodes become radioactive. The radioactivity of the electrodes suggests that elements are present with relatively short half-lives and that the radioactivity of the electrode decays exponentially with time. Thorium has a very long half life but some of the thorium daughter products (from natural radioactive decay) have much shorter half lives. One could surmise that somehow the thorium daughter products were plated out onto the electrodes which resulted in the observed radioactive reduction after processing. **The electrodes must be submitted for more extensive analysis to determine the type of materials that are on the electrode.** The simplest explanation, at present, is that most of the thorium has been transmuted into other elements and that some of those elements have short half-lives.

A careful inspection of a Chart of Nuclides will show that any reasonably expected fissioning of a heavy element will result in smaller elements. However, the elements produced can be expected to be among those hundreds of short-lived elements that are "radioactive", usually with short-half lives where the newly-produced elements may be transformed into other element by beta-emission. The elemental transformation by beta emission is explained by a process in which a neutron emits an electron (a beta particle) and thereby become a proton. (See the article "Aneutronic Nuclear Reactions" in the

September, 1997, issue of *New Energy News*, pages 13-15, which discusses the way Nature can support nuclear reactions without the emission of neutrons.) Many of these **first-produced** elements may be unstable and transmute to stable elements by beta emission.

The **before-processing** and **after-processing** samples were submitted for ICP mass spec analysis. The most notable change in the 12 elements selected for analysis was the dramatic decrease (by over 95%) in the amount of thorium in the electrolyte. Due to the relative high costs of analytical services, a complete elemental analysis has not as yet been accomplished. A commensurate number of newly-produced elements has not, as yet, been determined. Copper and silicon were noticeably increased in the solution. It must be recognized that many of the elements that could have been produced could combine with electrolysis by-products, notably H and O to produce compounds that are not soluble in the aqueous electrolyte. Of course, this is evident by the dramatic increase in the resistance of the electrolyte.

Fig. 1 is a plot of the resistance of the electrolyte during the processing time as measured by dividing the measured potential by the measured current. This change in resistance of the electrolyte **does not take into account a change of resistance in the electrolyte caused by a change in temperature of the electrolyte, which is deemed to be less effective in changing resistance than the amount of thorium ions.** As can be seen in Fig. 1, the minimum resistance is observed after about 8 to 10 minutes of processing time. At this time the temperature of the outside of the cylindrical electrode is about 300 F. After about ten minutes of processing time the resistance of the electrolyte increases rapidly and the temperature of the cylinder increases at a slower rate with a maximum temperature of about 360 F after about 16 to 18 minutes of processing time. From about fifteen to twenty-five minutes of processing, the resistance increases rapidly and then increases more rapidly to the end of the thirty-minute processing time. This data is not inconsistent with the idea of plating out the thorium onto the electrodes, however, similar experiments have been reported by the Cincinnati group with no evidence of thorium being plated onto the electrodes. The data

shown in Fig. 1 is consistent with the concept that the thorium is being processed **on the surface of the electrodes and transmuted into other elements. With the presence of both hydrogen and oxygen ions on the electrode surface, it would be expected that some of the new elements could be chemically changed into oxides or hydrides and precipitate out of solution.** The rate at which the resistance of the electrolyte changes in the 15 to 20 minutes after processing would suggest that the bulk of the transmutation is taking place during this time period.

Note: This preliminary report is made possible by permission of **Trenergy, Inc.**, the Utah corporation that funded the experimental investigation. Trenergy is expected to have a stock offering in the near future and intends to use some of the capital raised to purchase sophisticated equipment to augment this experimental work. *NEN* expects to receive further experimental data from Trenergy. In addition *NEN* expects to report on the month-to-month changes in share prices for this and any other **New-Energy Companies**. Perhaps, we can define and provide a **New-Energy Index** reflecting the changes in the share value of several new-energy companies. Editor.

In Memorium

CHRIS TINSLEY DIES IN UK

By Jed Rothwell

I am deeply sorry to announce that my dear friend Christopher Tinsley died yesterday, 1 October 1977, of a heart attack.

I depended upon Chris every day for help, suggestions, editing, humor and inspiration. He was a contributing editor to our magazine, and one of the best hands-on experimental scientists in the field of cold fusion. He was a fine chemist and electrical engineer. He made major contributions to the design of first generation computers in England in the 1960s. A disk drive

he worked on is now exhibited near the Babbage Difference Engine at the London Science Museum. He said the sight of it made him feel like a fossil. Scott Little wrote: Chris visited us briefly a couple of years ago and the experience was truly memorable. We meshed like we'd been working together for years. He had a no-frills way of looking at physics and the business of measuring things that was simply beautiful."

Chris was 54 years old. His wife Sian died in December 1994. He is survived by a son, Chris, Jr., a daughter, Kay, and a fiancée, Susan Seddon. The funeral will be held Thursday, 9 October, at 12:30 pm at Saint Leonard's Church in the Wollaton district of Nottingham, England.

Research Contacts Wanted

By Dr. Patrick Bailey, INE President

We need your help! The INE is keeping track of all of the advanced energy devices that we can learn about. These are listed in the INE database on the INE website. We currently have about 115 devices listed, and many more will be added soon. We need RESEARCH CONTACTS to provide us with detailed and truthful data on each of these devices! Adopt a device, or several, and become the official INE Research Contact, provide us with the requested data on the device, and be listed in the database! If you prefer, you can use the INE website address (at PO Box 201, Los Altos, CA 94023), instead of your personal address, as the contact point listed within the database, and pseudonyms can also be used if deemed necessary.

The ten people that are currently working on this database cannot cover all of the devices in the depth of detail that they all deserve. Please volunteer to be a Research Contact for devices of your choice within the INE database. The data needed is essentially the same for all of the devices, as listed in each device page on the site. These web pages are automatically created. All we need is the data to list! (We use Excel, tab delimited text fields.) All of the Device Names, Inventor Names, and Research Contact

Names, etc., can all be found on the INE website within the Device Database at:
<http://www.padrak.com/ine/db/devices.html> .

Interested researchers can also email me at ine@padrak.com.

Thank you.

Fusion Briefings

ABSENCE OF TRITIUM YIELD

Chem. Abs., vol 126, no 1 (1997)

A. Bertin, M. Bruski, V.M. Bystritskii, A. Vezziani, S. Vechchi, M. Villa, A. Vitale, Ya. Voznyak, D. Galli (Ob'edinennyi Inst. Yadernykh Issledovani, Dubna, Russia), "Absence of the Tritium Yield in the Metal-Deuterium Systems," *Yad. Fiz.*, vol 59, no 6 (1996), pp 976-980, in Russian.

AUTHORS' ABSTRACT

No tritium yield from the low-temperature nuclear d-d fusion reaction was found within measurement error in titanium of different modifications and intermetallic compounds ZrNbV, LaCo₅, LaNi_{4.9}Al_{0.1}, Mo_{0.7}Ti_{0.3}Mn₂. The upper limit estimates for the rate of d-d fusion reaction with tritium production in titanium and intermetallic compounds are found at the 90% confidence level: $\lambda_f(\text{Ti}) \leq 2 \times 10^{-23} \text{ s}^{-1} (\text{d-d})^{-1}$; $\lambda_f^{\text{eff}}(\text{Ti}) \leq 6 \times 10^{-24} \text{ s}^{-1} (\text{dd})^{-1}$.

MAGNETICALLY CATALYZED FUSION

Chem. Abs., vol 126, no 3 (1997)

Jeremy S. Heyl, Lars Hernquist (Lick Observ., Univ. Calif, Santa Cruz; Am. Phys. Soc.), "Magnetically Catalyzed Fusion," *Phys. Rev. C: Nucl. Phys.*, vol 54, no 5 (1996), pp 2751-2759.

AUTHORS' ABSTRACT

We calculated the reaction cross section for the fusion of hydrogen and deuterium in strong magnetic fields as are believed to exist in the

atmospheres of neutron stars. In the presence of a strong magnetic field ($B \geq 10^{12}$ G), the reaction rates are many orders of magnitude higher than in the unmagnetized case. The fusion of both protons and deuterons is important over a neutron star's lifetime for ultrastrong magnetic fields ($B \geq 10^{16}$ G). The enhancement may have dramatic effects on thermonuclear runaways and bursts on the surfaces of neutron stars.

Pd-BLACK ASSISTS TRITIUM PRODUCTION

Gilbert Bellanger (Comm. à l'Energie Atomique Ctr. d'Etudes de Valduc, Dept. Tritium, Is sur Tille, France), Jean Jacques Rameau (Domains Univ., St. Martin d'Heres, France), "Determination of Tritium Adsorption and Diffusion Parameters in a Palladium-Silver Alloy by Electrochemical Impedance Analysis," *Fusion Technol.*, vol 32, no 1, Aug. 1997, pp 94-105, 12 refs, 14 figs, 4 tables.

AUTHORS' ABSTRACT

The diffusion and adsorption parameter values of tritium in palladium-silver cathodic membranes used to produce pure tritium gas and its isotopes from highly concentrated tritiated water are determined. It is shown that permeation increases with applied cathodic potential, temperature, and the presence of a palladium black deposit on the cathodic entry surface. The diffusion coefficient, tritium concentration in the alloy, and the diffusion layer thickness depend on temperature. The presence of a palladium black deposit on the palladium-silver membrane improves the adsorption of tritium.

SPHEROMAK-LIKE FORMS

Alexander B. Kukushkin, Valentin A. Rantsev-Kartinov, Arkady R. Terentiev (Inst. Nucl. Fusion, Rus. Research Ctr., Kurchatov Inst., Moscow), "Formation of a Spheromak-Like Magnetic Configuration by a Plasma Focus Self-Transformed Magnetic Field," *Fusion Technol.*, vol 32, no 1, Aug. 1997, pp 83-92, 17 refs, 7 figs.

AUTHORS' ABSTRACT

Experimental results are presented that verify the formerly predicted possibility of the formation of a closed, spheromak-like magnetic configuration (SLMC) by the natural magnetic field of a plasma focus discharge. The model is based on the self-generated transformation of a toroidal (i.e.,

azimuthal) magnetic field into a poloidal one. At the final stage of the discharge, the SLMC takes the form of a squeezed spheromak, which includes a combined Z- θ pinch as its major axis, **exhibiting a power density several orders of magnitude larger than that measured experimentally on a force-free flux-conserving confined spheromak formed by helicity injection.** The results suggest the possibility of further concentrating the plasma power density by means of compressing the SLMC-trapped plasma by the residential magnetic field of the plasma focus discharge.

A qualitative model is given for the scenario of the SLMC-producing plasma focus discharge. Special emphasis is placed on the difference of this approach from conventional approaches to the role of magnetic field reconnection processes in plasma focus dynamics. The operational conditions necessary to stimulate SLMC formulation in high-current gaseous discharge systems and the use of SLMC-trapped plasmas are discussed briefly.

A SHORT REVIEW: A.B. KUKUSHKIN'S PAPER

by Dr. Jin

The magnetic field in a plasma focus discharge could, in principle, be transformed to other types of configurations, for example, the spheromak-like configuration as the paper proposed. The main problem of this type of plasma device is that because of various macroscopic and microscopic plasma instabilities, the confinement time of the plasma could not be high (only $\sim 10^{-6}$ s). Therefore, it can be used as radiation and/or neutron source, but there is no possibility to be developed to a (hot) fusion reactor.

This is not a device for charge-cluster formation:

1. What it confines is charge-neutral plasma, not charged particles.
2. The density of the plasma in the plasma focus discharge is about $10^{12} - 10^{14}$ particle / cm^3 , not as high as $\sim 10^{23}$ / cm^3 , like in EV.
3. It is for confinement of plasma, not for acceleration of charge clusters.

ELEMENTAL ENERGY

[name change for *Cold Fusion* magazine]
Issue 22, partial contents:

James Patterson & Dennis Cravens, "**System for Electrolysis**," U.S. Patent #5,607,563, issued 4 March 1997, filed 4 Dec. 1995, 15 claims.

This patent provides coverage for an array of the original cell, essentially by using series of plated beads to increase the effectiveness of the cell.

H. Kozima & K. Khaki (Shizuoka Univ., Japan), "**TNCF Analysis of Excess Heat in Ni/H/K System**," pp 40-44, 20 refs.

The authors analyze the results of experimental reports by Mills and Kneizys (a nickel, light water, potassium carbonate system) and also a similar system obtained from Hydrocatalysis Power Corp. (now BlackLight Power) with the experiment performed by Niedra, Myers, and Baldwin for NASA. In both cases the authors get essentially identical results by using their Trapped Neutron Catalyzed Fusion model. The conclusions are that cold fusion phenomenon occurs in a system not only with heavy water but also with light water and that acceptable cathodes are palladium, titanium, and nickel.

H. Kozima (Shizuoka Univ.), "**On the Reduced Radioactivity of Tritium Absorbed by Titanium**," pp 45-48, 15 refs.

A remarkable experimental result of reduced radioactivity to tritium absorbed by titanium observed by O. Reifenschweiler is analyzed on the TNCF model. The radioactivity measured is not discriminated in energy and is the total result of the beta from tritium and neutron in the sample. In TNCF model, trapped thermal neutron in a crystal can be affected by its decay behavior by the interaction with lattice nuclei. The reduction of the radioactivity is interpreted as a result of the neutron-lattice interaction, i.e. the disappearance of the radioactivity of some neutrons in the sample in an optimum condition. The density of the trapped thermal neutron contributing to the phenomenon observed was determined at

approximately $10^{10}/\text{cm}^3$ in accordance with the previous data obtained in different experiments.

[The concept of the TNCF model is that there are trapped neutrons in many metal lattices and that the density of the trapped neutrons ranges from 10^5 to 10^{15} neutrons per cu. cm. If it is assumed that the atomic density in a metal lattice is about the same as Avagadro's number (about 6×10^{24} atoms per gram-molecular mole) then the ratio of atoms to thermal neutrons is in the range of 10^{18} to 10^8 . Also, it appears that the standard half-life of a neutron in a vacuum of about 10.4 minutes must be considerably different for a thermal neutron imbedded in a metal lattice. Ed.]

H. Kozima, Masayuki Ohta, Masahiro Nomura, & Kasuhiko Hiroe (Shizuoka Univ.), "**Analysis of Excess Heat Generation in a Proton Conductor**," pp 49-53, 10 refs.

A careful observation of the excess heat generation in a proton conductor ... in D_2 gas ... was analyzed using the TNCF model. ... The data was analyzed on the assumption that the excess heat was generated by reactions of the trapped neutron with nuclei in the volume and in the surface layer ... The experimental results including the excess heat without d.c. power were explained consistently. The density of the trapped neutrons was determined ... [to be about] 4.0×10^{10} neutrons per cm^3 , which is in the middle of the values determined in other cold fusion materials.

H. Kozima, Katsuhiko Hiroe, Masabiro Nomura, & Masayuki Ohta (Shizuoka Univ.), "**Explanation of Experimental Data of X-ray, Heat Excess and ^4He in a Pd_x/Li System**," pp 54-57, 12 refs.

Experimental data using the X-ray, the excess heat and ^4He in Pd_x/Li cathodes were analyzed using the TNCF model. A quantitative relation between the number of ^4He atoms and the amount of the excess heat generated in the cathodes were consistently explained using a single adjustable parameter n_n , density of the trapped thermal neutron, the value of which was determined as approximately 10^9 neutrons per cm^3 . A ratio of the number of the events N_Q generating the excess heat Q and the N_{He} were evaluated from the

experimental data as 1 to 5 while the theoretical value was 1 using the model.

Hideo Kozima, Kaori Khaki, & Masayuki Ohta (Shizuoka Univ.), "**The Physics of the Cold Fusion Phenomenon**," pp 58-78, 52 refs.

AUTHORS' SYNOPSIS

More than 25 typical experimental data on the cold fusion phenomenon had been analyzed phenomenologically by the TNCF (Trapped Neutron Catalyzed Fusion) model based on an assumption of the quasi-stable existence of the thermal neutrons in solids with special characteristics, giving a consistent explanation of the whole data. The densities of the assumed thermal neutron in solids were determined in the analyses from various experimental data and were in a range of 10^3 to about 10^{12} neutrons per cm^3 . The success of the analyses verifies the validity of the assumption of the trapped thermal neutron. Physical basis of the model were speculated facilitating the quasi-stable existence of the thermal neutron in the crystals satisfying definite conditions.

[The real key to the assessment of the virtues of the TNCF model will be to check all of the many nuclear reactions that occur and determine if such nuclear reactions can be produced by neutrons and meet the requirements of the conservation rules for nuclear reactions. For further discussion, see the article, "Aneutronic Nuclear Reactions" in this issue. Ed.]

ULTRA-LOW ENERGY NUCLEAR REACTIONS

Chem. Abs., vol 126, no 4 (1997)

Makoto Okamoto (Res. Inst. Nucl. Reactor, Tokyo Inst. Technol., Japan), "Normal Temperature Condensation Phase Nuclear Reaction," *Hoshasen Kagaku (Tokyo)*, vol 39, no 9 (1996), pp 325-330, 7 refs, in Japanese.

AUTHOR'S ABSTRACT

A review is given on nuclear reactions in the ultra-low energy (temperature) region, detection of excess heat in electrolysis of D_2O containing LiOD electrolyte using a Pd cathode and a Pt anode, and the abnormal phenomenon a nuclear phenomenon.

TERMINATION OF ORIGINAL PONS-FLEISCHMANN LICENSE:

ENECO, Salt Lake City – ENECO has now completely re-directed its business plan and internal development activities around its own "second generation" non-electric technology. In late May, we terminated our exclusive license agreement with the University of Utah regarding the original 1989 Pons-Fleischmann electrolytic patent applications. The timing of the decision to cancel the license was driven by the U.S. patent office's final rejection of the licensed applications. The only remaining recourse for ENECO, as the licensee, was to pursue an expensive appellate process at an estimated cost in excess of \$1 million over the next two to three years. ENECO terminated the license, with its impending high legal costs and other technical difficulties, to devote full corporate resources towards its own proprietary technology that is believed to have a quicker route to commercial success.

dt- AND d^3He -SYSTEMS

Chem. Abs., vol 126, no 7 (1997)

V.S. Popov, B.M. Kornakov (Inst. Theor. Eksp. Fiz., Moscow), "Model-Independent Description of dt- and d^3He -systems Near Low-Energy Resonances," *Zh. Eksp. Teor. Fiz.*, vol 110, no 5 (1996), pp 1537-1574, in Russian.

AUTHORS' ABSTRACT

The expansion of the effective radius (r_{cs}) is used for a model-independent description of the dt- and d^3He -systems in the region of low-energy resonances of $^5\text{He}^*(3/2^+)$ and $^5\text{Li}^*(3/2^+)$. The nuclear-Coulombic scattering length a_{ca} and the r_{cs} for a state with an orbital momentum $l = 0$, as well as the astrophysical function $s(E)$, are extended from existing experimental data for the nuclear fusion reaction cross sections of $\text{dt} \rightarrow n\alpha$ and $\text{d}^3\text{He} \rightarrow p\alpha$ in the vicinity of resonances (in the case of the dt-system data were also obtained on elastic dt- and $n\alpha$ -scattering).

ATOM ACCELERATION IN NONEQUILIBRIUM CRYSTALS

Chem. Abs., vol 126, no 7 (1997)

V.I. Sugakov (Nat. Acad. Nauk Ukraini, Viddilennya Fiziki i Astronomii, Ukraine), "Conditions for Inducing, Dynamics, and Manifestation of Atom Acceleration in Nonequilibrium Crystals," *Ukr. Fiz. Zh.*, vol 41, no 9 (1996), pp 834-839, in Ukrainian.

AUTHOR'S ABSTRACT

The conditions are discussed of inducing, dynamics, and experimental manifestation of atom acceleration in a system characterized by a double-well potential along a crystal row. A numerical modeling of atomic collisions in such system is carried out. An analysis of the energy losses, which affect the energy of accelerating atoms, is given. The possible existence is shown of a double-well potential in the vicinity of a dislocation core at high external mechanical loads; the dislocation motion is accompanied by a creation of high-energy atoms (accelerons). Using the concept of accelerons, different anomalous phenomena in crystals are explained: luminescence of metals under strong mechanical load, accost-luminescence of semiconductors and dielectrics, anomalous mass transfer under impulse loading of metals and cold nuclear fusion.

Space Energy

TORSION FIELDS MODELS

A.E. Akimov & V. Ya. Tarasenko, "Models of Polarized States of the Physical Vacuum and Torsion Fields," translated from *Izvestiya Vysshikh Uchebnykh Zavedenii, Fizika*, no 3, pp 13-23, March 1992. ©1992, Plenum Publishing Corp.

AUTHORS' ABSTRACT

A model is proposed of the physical vacuum, taking into account the existence of fields generated by classical spins or angular momenta of rotation.

Here are some important excerpts from the translation:

"The papers of the Soviet astrophysicist Kozyrev allow one to assume that the actions of objects possessing rotational momentum are propagated with a speed incommensurably larger than the speed of light."

...

"We will consider the physical vacuum as a material medium consisting of elements formed by pairs of particles and antiparticles (according to PI Dirac, electron-positron pairs). The now classical experiments on the annihilation of particles and antiparticles can be considered as a demonstration of the process of creation of elements of the physical vacuum, and the experiments on the creation of pairs of particles and antiparticles by streams of γ -quanta of definite energies as the process of destruction of the elements of the physical vacuum. Such an approach in contemporary theory is interpreted otherwise...."

"Let us yet again formulate the problem. Assuming that the elements of the physical vacuum consist of particles and antiparticles, it is necessary to determine which conditions the particles-antiparticle system must satisfy, starting from a unique requirement – the fact of unobservability of the physical vacuum in the unperturbed state..."

"We will call a system of particles and antiparticles possessing the indicated properties a fiton (Fig. 1). A dense packing of fitons will then form a medium, which we will call the physical vacuum (Fig 2). Let us again emphasize that in the approach laid out we obtain a convenient simple model, although differing from contemporary representations, of the physical vacuum...."

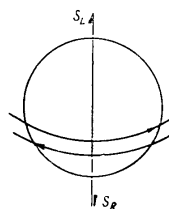


Fig. 1

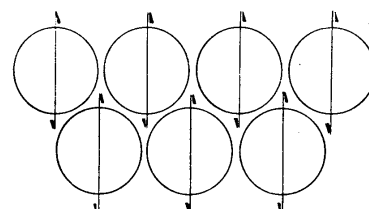


Fig. 2

As a result, in some space surrounding the source of perturbation the physical vacuum will be in a state of spin transverse polarization. This polarization state of the physical vacuum in its physical sense could be called the spin-field (S-Field). The spatial orientation of the static spin field is presented in Fig 6. Following Cartan and Dirac, S-fields are interpreted as long-range

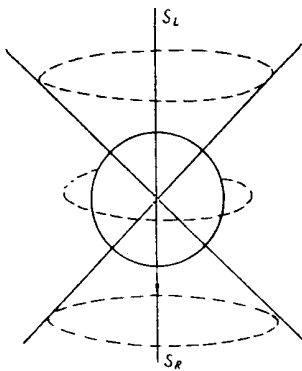


Fig. 6

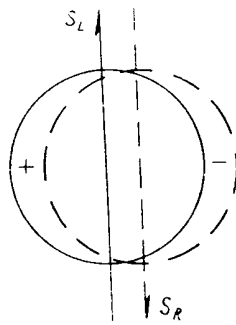


Fig. 8

spinors...”

“In the framework of models under consideration all three fields – electromagnetic, gravitational and torsion (E,G,S) – can be considered as different “phase” states of one medium – the physical vacuum. From his position the ESG-fields are true.”

“Considering that the torsion and gravitation fields in the constructed model have a spin nature, one can expect that these fields can possess similar properties and essentially differ from the electromagnetic field. Actually, experiments show that torsion fields, as well as gravitational, are not screened by natural media...”

“Since the charge polarization leads simultaneously from the charge to spin nonequilibrium, (Fig 8), then always when an electrostatic field arises, in the entire space where the electrostatic field appears, a torsion field automatically arises. Electrostatic fields without a torsion field do not exist. In this manner, the sources of electrostatic or electromagnetic fields are the second class of sources of torsion fields. In the conceptual plan, the deduction that torsion fields always accompany the appearance of electromagnetism is extremely important for a large number of fundamental and applied problems...”

“On the qualitative level one can indicate the analogue of this phenomenon in electromag-

netism. The residual magnetism on a magneto-susceptible sheet of metal in a domain where a magnet laid on this place, forms a metastable magnetic phantom, for which with the help of a magnetic probe the spatial characteristics of the residual magnetism (magnetic phantom) can be measured, according to which it is possible to make specific deductions regarding the absent magnet...”

“The main deduction from the considered positions consists first of all in the fact that the base of the four interactions is completed by the fifth interaction. Consequences of this situation are evident and do not require commentary. Experiments with the use of the developed torsion generator, including the technological nature in the domain of connection, material sciences, medicine, and other areas, testify to the serious reality in scientific and technical spheres generated by the new concepts of torsion fields...”

SPACE POWER FOR SPACE TRAVEL

Marc G. Millis (NASA Lewis Res. Ctr., Cleveland, OH), “Breakthrough Propulsion Physics Research Program,” *Space Energy Journal*, vol 8, no 3, Sept. 1997, pp 30-35, 25 refs, 1 fig.

AUTHOR'S ABSTRACT

In 1996, a team of government, university and industry researchers proposed a program to seek the ultimate breakthroughs in space transportation: propulsion that requires no propellant mass, propulsion that can approach and, if possible, circumvent light speed, and breakthrough methods of energy production to power such devices. This Breakthrough Propulsion Physics program, managed by Lewis Research Center, is one part of a comprehensive, long range Advanced Space Transportation Plan managed by Marshall Space Flight Center. Because the breakthrough goals are beyond existing science, a main emphasis of this program is to establish metrics and ground rules to produce near-term credible progress toward these incredible possibilities. An introduction to the emerging scientific possibilities from which such solutions can be sought is also presented.

Miscellaneous

NEW PARTICLE MODELS

David Bergman, "Physical Models for Elementary Particles, Atoms and Nuclei," *Electric Spacecraft J.*, issue 21, Jan/Feb/Mar 97, pp 20-23, summary of paper given at 4th Int. Sci. Conf.: Problems of Space, Time & Motion, in St.-Petersburg, Russia.

AUTHOR'S ABSTRACT

The erroneous idealization of the elementary particles as point-like entities has necessitated relativity theory to describe high-speed electrical phenomena and quantum mechanics to describe the stable states of the atom. These theories would not have been necessary had Maxwell's equation for Faraday's law expressed the electrostatic and magnetostatic fields in the same frame of reference and allowed for finite-size effects. A theory attributing to the electron and proton their observed finite sizes, and modeling fundamental particles as rings of circulating charge, resolves many paradoxes of modern physics in terms of first principles.

The point-like model continues to underlie the basic principles of electrodynamic theory. Intuitively, however, a physical model of matter must be physical with a structure. It must describe mechanisms for processes within and between material objects. Equations may describe, but not constitute matter in the physical world. Furthermore, the laws of physics as observed, especially the law of cause and effect, must be obeyed on all scales at all times.

[Paper tells how replacing the classical point-like elementary particles with toroidal entities resolves numerous enigmas of modern physics.]

ENERGY SYSTEMS OF TOMORROW

Mike Carrell (RCA, retired), "An Overview of Emerging New Energy Systems," *Frontier Perspectives*, pp 63-65, 17 refs.

INTRODUCTION

In recent years, several unconventional energy sources and devices have emerged that promise to end our dependence of fossil fuel and to modify, over time, the political and economic structures based on the control of energy resources. The existence of these devices and systems illustrated the limitations of our current understanding of physics in a very fundamental sense, for accepted theory cannot accommodate demonstrated systems performance. Many of these are nearing commercial deployment within the next few years.

NUCLEAR THERMALIZATION

Chem. Abs., vol 126, no 2 (1997)

M. Cavinato, E. Fabrici, E. Gadioli, E. Gadioli Erba (Ist. Naz. di Fis. Nucl., Univ. Milan, Italy), "Nuclear Thermalization," *Acta Phys. Hung. New Ser.: Heavy Ion Phys.*, vol 2, nos 3-4 (1995), pp 225-237.

AUTHORS' ABSTRACT

The thermalization of a composite nucleus formed when two heavy ions fuse, that is the transformation of the orderly transitional motion energy of the two ions into chaotic, thermal motion energy, may be described by a set of Boltzmann master equations which allow one to calculate the time evolution of the single nucleon energies within the composite nucleus. The theoretical assumptions and the results of the analysis of the experimental data are discussed.

CLEANUP OF HANFORD SITE DELAYED

Staff (A.P.), "Another Delay Is Foreseen In Hanford Nuclear Cleanup," *Salt Lake Tribune*, 8 Sept 1997, pg D4.

After a five-month delay approved in January 1997, the Hanford Advisory Board has been advised that another 14-month delay will likely be needed. The DOE is working on a plan to analyze the wastes that have leaked from many of the old stainless-steel tanks into the sandy soil in the bend of the Columbia River. About 60 of the older tanks are "thought to be leaking". In addition one of the two indoor pools containing 2,300 tons of

spent nuclear fuel pellets has leaked. The DOE proposes moving the spent fuel pellets into canisters and storing them in a building under construction that is removed farther from the river. This removal is planned to begin July 1999 and be completed in July 2001. The original estimated cost of \$814 million will be added by \$10 million per month for the extended delay.

Editor's Comments: Now that it has been demonstrated that radioactivity can be decreased by low-energy nuclear reactions, **it is time that the DOE become aware of this new technology and spends some of its funds on developing on-site radioactive reduction systems.**

ENERGY EFFICIENCY CONFERENCE

Courtesy of Johnson Controls

On June 18, 1997, the Eighth Annual Energy Efficiency Forum was held at the National Press Club in Washington, D.C. Co-sponsored by the United States Energy Association and Johnson Controls, this year's conference emphasis was "Energy Efficiency in Restructured Markets". About 350 energy experts heard several presentations covering "deregulation", "restructuring", or "de-monopolization" (whichever term you like) of the electrical utility industry.

Governor Tom Ridge stated, "Technology thrives in this new free market. Competition unleashes innovation in a way not possible under a government plan." Congressman Dan Schaefer (Congressman from Colorado) presented in his speech the following: "My legislation would ensure that all consumers, no matter their size or location, would have the power to choose their own suppliers." **Hopefully Schaefer will include consumers choosing to utilize new-energy technologies and getting off the grid.**

Joseph Romm, Acting Assistant Secretary for Energy Efficiency and Renewable Energy made the following cogent comment: "We expect that public policy, private sector, market and individual decisions related to energy supply and use will shift to incorporate energy efficient and renewable energy technologies to a greater extent. We will come to appreciate that these technologies are not pie in the sky as some critics may charge. We will also begin to see a greater appreciation for the

support of these technologies by the federal government and the realization that the application of energy efficiency and renewable energy technologies at home and abroad can return multiple benefits in a cost-effective manner."

FUTURE TECHNOLOGY INTELLIGENCE REPORT

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LATIN AMERICA ENERGY INDEPENDENCE?

Courtesy of Gordon Moody

Gordon Moody, "Editorial," *Global Energy Outlook*, July 1997, vol 2, no 7, page 1.

Gordon Moody, Editor and publisher of *Global Energy Outlook*, a monthly energy newsletter especially for the oil and gas industry, has made the following observation in a recent editorial:

"Mexico and South America offer the greatest opportunities for the Western Hemisphere to become energy independent from the instability associated with the Middle East and Central Asia. The recent broadening of the Mexican political scene, in which [political] power is now shared with three separate parties, may offer U.S. companies unlimited opportunities to expand the North American Free Trade Agreement into the energy sector. The current expansion of major pipeline projects in South America may unlock gas and oil reserves to our Latin American neighbors

whose economies are expanding at nearly twice the rate of the United States."

Other energy tidbits from this issue:

◆ The U.S. Energy Information Administration (EIA) forecasts increased demand (with probably rise in prices) for natural gas due to a combination of nuclear power plant outages, higher air-conditioning usage, and a burgeoning economy. The good news is that the EIA expects oil prices to be stable between \$19 and \$20 per barrel through 1998.

◆ The 1995 figures show that about one-third of the U.S. Trade Deficit is directly due to imports of crude oil by the U.S. [New energy sources can cure one-third of the trade deficit. If we become an exporter of new-energy devices, we can, perhaps, cure all of the U.S. balance of payments. Ed.]

◆ The global oil refining industry expects a rebound as worldwide demand for refinery products increases by ten million barrels per day (over current demand) by the end of 1999.

◆ Proposals to limit greenhouse emissions could end up increasing your electric bill by 25 percent. Industries that rely on cheap energy are, obviously, not in favor of President Clinton's plan to agree to stringent greenhouse emissions.

◆ Foreign central banks own about 17 percent of the U.S. Treasury bills and notes. [Nice to know who we get to pay off with possible tax revenues on new-energy devices and systems. Ed.]

[For further info contact World Energy Group, Inc., P.O. Box 13830, Arlington, TX 76013, phone 817-451-9355.]

DOE REPORT ON RAD-WASTES

U.S. Nuclear Waste Technical Review Board:
Report to the U.S. Congress and the Secretary of Energy – January to December 1996

Executive Summary

The Department of Energy's (DOE) *Program Plan* officially introduced a new program milestone, the viability assessment (VA). The VA is to be completed by September 30, 1998. According to the DOE, the viability assessment will include four components:

"(1) the preliminary design concept for the critical elements for the repository and waste package; (2) a total system performance assessment, based upon the design concept and the scientific data and analysis available by September 30, 1998, describing the probable behavior of the repository in the Yucca Mountain geological setting

relative to the overall system performance standards; (3) a plan and cost estimate for the remaining work required to complete a license application; and (4) an estimate of the costs to construct and operate the repository in accordance with the design concept."

Perhaps the single most important technical decision facing this program is determining the suitability of Yucca Mountain as a site for a repository. The Board believes "that the VA will not provide adequate information for that decision. Rather, it is an assessment that the site continues to be a candidate that requires additional study, leading to a determination whether it is suitable to be recommended to the President for repository development in 2001. Nothing has been found to date to indicate that the site is unsuitable. ...

... However, the Board also realizes that the planned VA may trigger other significant decisions such as selecting the location of a centralized facility for storing spent fuel. ...

About four years would elapse between selection of a site for a centralized storage facility and the first receipt of commercial spent fuel there. ...

Characterization of Yucca Mountain during 1996 produced a great deal of scientific information which substantially improved the understanding of the site. Until recently, Yucca Mountain was thought to have very little water available at depth to affect repository performance. During 1996, analysis and synthesis of several types of data suggested that more water flows through the proposed repository level than was previously expected. ...

The safety of a proposed repository can be assessed by using a total system performance assessment (TSPA), that is, a predictive model of the repository's ability to contain and isolate waste. ...

Although there is no formal requirement that the public accept the TSPA, to proceed without acknowledging the importance of such acceptance is condescending at best and a prescription for failure at worst. The likelihood of public acceptance of a TSPA will be significantly affected

by its transparency. If the perception is that the TSPA is like a large black box whose results can be dictated by some manipulator arbitrarily adjusting hidden knobs, then no matter how good the underlying rationale, public acceptance will not be attainable. ...

An important element in designing and constructing the underground repository is ground support for the waste emplacement tunnels. Providing and maintaining stable tunnels for waste emplacement will be a major item in the cost of the repository. After the repository is closed, the waste packages are to provide containment for "thousands of years."...

Recommendations of the Board

The recommendations in this report are summarized below:

- A decision to locate the nation's primary centralized storage facility for spent fuel at or near Yucca Mountain should be deferred until the suitability of the site as a repository location has been determined.
- To the extent possible under the market-driven initiative, efforts to develop storage and transportation casks should retain the advantages (e.g., standardization) previously offered by the multipurpose canister concept.
- Before making a determination of the suitability of the Yucca Mountain site for a repository, the DOE should complete additional studies of the area west of the current exploratory studies facility, where wastes would be emplaced, to determine its geologic, hydrologic, and geochemical properties. The best way to obtain the needed information is excavation of a tunnel westward across the proposed repository block.
- The DOE should make a concerted effort to ensure that future TSPAs are transparent and valid, that uncertainty is treated properly, and that any peer review of performance assessment elicitation of expert judgment is objective.
- The DOE should consider ways of increasing public understanding and acceptance of TSPAs. One possibility is to establish processes, modeled on the lines suggested in a recent report by the congressionally chartered Commission on Risk Assessment and Risk Management, for involving and engaging the public.
- The DOE should develop and examine alternative concepts to the proposed remote underground repository operations, for example, ventilation of emplacement tunnels and shields for waste packages. Some alternatives should be developed in time for consideration in the viability assessment.
- The DOE should evaluate alternative design assumptions to determine whether enhanced repository performance or improved operations can be achieved cost effectively.
- The DOE should evaluate the use of precast or cast-in-place concrete tunnel liners to achieve adequate long-term tunnel support. The evaluation should consider cost and possible effects on waste isolation.
- Given the inevitable uncertainties about repository performance, more attention to defense-in-depth (multiple, redundant barriers) is needed in the waste package and repository designs. In particular, *comprehensive* studies of alternative engineered barriers – such as fillers, backfill materials, drip shields, and engineered inverts – should be completed.

Added by *NEN*:

- **The DOE should learn that Low-Energy Nuclear Reaction Systems can be developed that will provide technology for ON-SITE REMEDIATION of high-level nuclear wastes.**

INFINITE ENERGY & TRANSMUTATION

A review of the latest Double Issue

Volume 3, nos 13 & 14 of *Infinite Energy* has the cover headline "TRANSMUTING ELEMENTS." This issue provides about 20 pages of information on the Cincinnati's Group latest developments in transmuting naturally radioactive thorium into stable elements. In addition, a report on the nuclear reactions obtained with the latest work of

James Patterson is presented. Here are the highlights of this issue of *Infinite Energy*:

Dr. Daniel Cevicchio of Greenwich Venture Partners to head up the New Energy Technologies Investment Fund slated to begin in 1997. See page 10. The fund is scheduled to raise a minimum of \$10 million with \$1 million already pledged. We hope that one of the first funding efforts is the founding of a **New Energy Mutual Fund** so that small investors can participate.

"Radioactive Amelioration Summary," pages 14-15. This article reviews the results of radioactive amelioration where naturally radioactive uranium and thorium were processed by James Patterson in his patented cell with about half of these elements being transmuted. The short article does not state the time required for this reduction in radioactivity.

Eugene Mallove, "The Cincinnati Group Discloses Its Radioactivity Remediation Protocol... and begins to Sell LENT-1 (Low Energy Nuclear Transmutation) Kits," page 16.

"Protocol for Thorium Activity Remediation, Data and Diagrams, courtesy The Cincinnati Group," page 17.

Robert W. Bass, "Low-Energy Bulk-Process Alchemy, One-tenth Gram of Thorium Becomes Titanium and Copper," pages 18-19.

Robert Liversage, "Third-Party Verification of Cincinnati Group's Thorium Transmutation Process," pages 20-29. This article provides extensive data based on before and after materials from the LENT-1 reactor.

Robert T. Bush, "Cold Fusion / Cold Fission to Account for Radiation Remediation," page 30. This article presents an outline of a model to explain the observed transmutation results of the LENT-1 reactor.

Robert W. Bass, "Eagleton's Theory of the CG's LENT Process," pages 31-32. A brief view of several patents-pending on nuclear remediation.

[Editor's Note: For further experimental results from the LENT-1 Kit, see the report in this issue by Hal Fox on page 1.]

Jed Rothwell, "Cold Fusion and The Future, Part 2 – A Look at Economics and Society," pages 33-43. An article exploring the economics and social results of the development of new energy

sources. "Energy is the biggest industry on earth."

John W. Moreland, "An Update on the Continuing Research into T.H. Moray and Other Free Energy Devices, with Conclusions," pages 46-51.

Paul M. Brown, "An Alternative Interpretation of Mass-Gain at Near Light Velocities," pages 52-53. Paul Brown is the developer of a nuclear battery (patent 4,835,433).

Christopher Tinsley and Jed Rothwell, "Testing the Ragland Triode Cell," pages 55-58. Possible improvement on the Pons-Fleischmann Cell but no excess heat on this experiment.

Christopher Tinsley, "Smiting the Wild SMOT... The Things We Get Up To..." pages 59-61. A report on experiments with the Simple Magnetic Over-unity Toy.

John Humphrys & Martin Fleischmann, "On the Ropes: Martin Fleischmann Interviewed by John Humphrys," pages 66-69.

Ira Flatow, "Talk of the Nation," pages 70-76. A report of an interview by Ira Flatow with T. Kenneth Fowler and Eugene F. Mallove on cold fusion issues.

Lenora Anderson, "Champion of Aether Energy: The Robert Adams Story," pages 77-80. Background information about Robert Adams.

Robert W. Bass and P. T. Pappas, "Dr. Stefan Marinov – A Suicide," pages 83-84. Two tributes to Stefan Marinov who was a frustrated seeker of truth and a burr under the saddle of conventional physics.

Stephen Kaplan, "The Launching of The Catalyst Institute," page 85-86. A report on a meeting of science and environmental activists hosted by Linda McClain in Los Angeles in June 1997.

Peter Graneau, "The Amazing Discovery of Cold Fog Explosions... Extracting Intermolecular Bond Energy From Water," pages 92-95. When a small amount of energy stored in a capacitor is discharged into a small amount of water a strong explosion can result with anomalous results.

Graneau appeals to energy stored in water as a source of the excess energy observed. [This editor proposes that the creation of charge clusters may account for the excess energy.]

Moray B. King, "Charge Clusters: The Basis of Zero-Point Energy Inventions," pages 96-102. A scholarly look at the new charge-cluster technology and its role in explaining many observed experimental results from cold fusion to transmutation.

Joseph L. McKibben, "Catalytic Behavior of One (or Two) Subquarks Bound to Their Nuclear Host," pages 103-105.

Graham Toquer, "Neutrino Power," pages 106-111. A discussion that cold fusion power could be neutrino power.

Remi Cornwall, "Work in Constant Energy Systems," pages 112-120. A hypothesis that macroscopic perpetual motion may be possible.

A.A. Nassikas, "The Hypothesis and the Equations of the Unified Matter Field," pages 120-124. A discussion of the hypothesis that any spacetime is matter.

GLOBAL WARMING - \$150 BILLION FIX?

Gordon Moody, Ed., "Global Warming Promises to Become a Gushing Source of National Hypocrisy," *Global Energy Outlook*, Sept 1997, vol 2, no 9, p 4.

Editor's Summary: The unproved concept of global warming coupled with demands that the U.S. (but not other polluting countries) make the most effort to decrease carbon dioxide emissions, is creating a new expense for all energy users. Coupled with this is new and unreasonable regulations by the EPA that are estimated to cost \$150 billion per year. The combination could do great economic damage to U.S. industry.

A much better method of controlling pollution **at a much greater cost-benefit**, is to fund the development of new-energy devices and systems that will replace the burning of fossils fuels.

ORIGINS OF LAWS SOUGHT

Milo Wolff (Technotran Press, Manhattan Beach, CA), "Exploring the Universe and the Origins of Its

Laws," *Frontier Perspectives*, pp 44-56, 18 refs, 5 figs.

ABSTRACT

Philosophers have sought the origin of natural laws in the relationship between the microscopic world and the vast universe. Now simple questions provide surprising answers. The origins of the laws and their relationship to cosmology is a consequence of quantum wave structures, particularly the electron. In this quantum world, every particle exchanges information with all other matter so that energy exchange and the laws of physics depend on the entire ensemble. These origins of natural laws are reviewed.

NET JOURNAL

The *Net Journal* is a high-class, German-language, new-energy news magazine published in Zurich, Switzerland. The journal is edited by the man and wife team of Adolf and Inge Schneider. Adolf and Inge have just completed a new-energy tour of the United States. We were privileged to have them visit with us here in the Fusion Information Center.

The August/September 1997 issue of the Journal (volume 2, numbers 8/9) was presented to us by the editors. In this issue, the cover story is the death of our friend Stefan Marinov. Other articles include an interview with the water-expert Hans Anon Rieder; and article about faster than Light phenomena; an article about the "Herbrand Turbine;" and the 70th anniversary of Franz Weber.

We welcome the addition of this fine publication to the ranks of new-energy media. We expect to exchange information with the Schneiders. If you are interested in subscribing to this journal the price is \$70 for one year subscription sent airmail. The address is New Energy Technologies, Jupiter-Verlag/TransAltec; Wattstr. 3; P.O. Box, CH 8050 Zuerich, Switzerland. Phone +411-1-310-28-60; Fax +411-310-28-64.

ENERGY SYNTHESIS

Alfred Wakeman, "Energy Synthesis," *Electric Spacecraft Journal*, Issue 21, Jan/Feb/Mar 1997, pp 6-13, 13 refs.

INTRODUCTION

Physics now recognizes self-organization, increasing returns, and systems that never come to rest in nature. While fundamental to biology, the evidence contradicts classical assumptions. Investigating these phenomena, by the mid-1980s, a new interdisciplinary science began to take shape, identified variously by key works such as nonlinear dynamics, complexity, and far from equilibrium systems. Energy synthesis (ES) theory fits within this new realm of study. A practical culmination of this theory is the proposed apparatus shown in Fig. 1. It consists of a symmetrical set of chambers in which flow resonances may be generated to ever-increasing energy levels.

Energy synthesis theory began in 1975 when I noticed toroidal recirculation underlying all sustainable evolution, from a vortex in water to growth of a plant, from storms to solar systems to spiral galaxies. Within this view of nature, we find that the entire universe down to its least atom exists in perpetual motion, revealing repeating

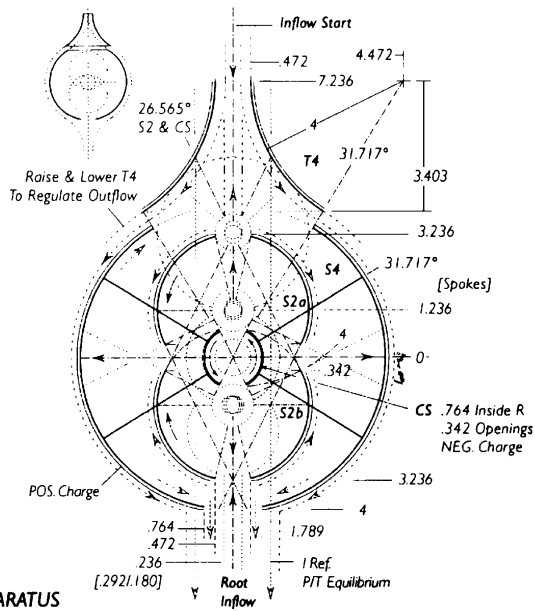


Fig. 1

patterns of underlying fluid dynamics. Presumably, then, if an atom is a fluid dynamic phenomenon, and if we can discover the flow

topology preserving an atom, we will have a universal model for understanding sustainable existence at any level of complexity. My investigation reveals that a process of inverse entropy, or energy synthesis, may be taking place as the sustaining source of an atom's energy.

ENERGY PROFITS - NUMBER ONE

Staff, "Petroleum Refining 4th Largest Global Industry – 1st in Profits," *Global Energy Outlook*, Sept 1997, Vol 2, no 9, pg 9.

Editor's Comments: After commercial and savings banks; global trading companies, and motor vehicles, the petroleum refining industry is the fourth largest industry according to the *Fortune* 500 list. In terms of profits, the petroleum refining industry ranks number **one**. The top profit-makers of oil companies were Royal Dutch Shell; Exxon U.S.; Mobil U.S.; British Petroleum; Elf Aquitaine; followed by Texaco U.S. and 25 other world refiners. The total gross income was \$991.4 billion in 1996.

New-energy devices and systems will have a potential profitable operation penetrating a billion dollar a year market (just for petroleum refining). This opportunity is the greatest potential marketing opportunity of the century. Where are the investors?

TREENERGY TO SELL SHARES

Hal Fox, as president as President of Trenergy, Inc., reports that the board of directors of Trenergy, Inc. has authorized the company to file with the appropriate security agencies to sell 500,000 shares of its common stock at \$2 per share. Because the amount to be raised is small, the shares are planned to be registered for sale only in Utah and Nevada. The major asset of Trenergy is its license rights to the plasma-injected transmutation technology (an invention of Fox, Jin, and Bass). If there is sufficient interest by potential investors in other states, Trenergy could file for the sale of its shares in such states. This is not an offer to sell shares. Contact your broker for further information or call Tom or David Morrison in Salt Lake City at 800-891-7779. Subsequent to the close of the stock offering, Trenergy expects to file for its shares to be traded

Over The Counter until the company is qualified for trading on a major exchange.

ANTIGRAVITY NEWS

Courtesy of the Editor

ANTIGRAVITY NEWS and SPACE DRIVE TECHNOLOGY is a new bimonthly newsletter published by J.E.Cox Enterprise, P.O. Box 655, Marietta, GA 30061-655 (phone 770-218-9693). Volume 1, number 1, July-August 1997 provides the reader with a review and update on the latest developments in antigravity. Some anomalous results have been obtained from more than one source. This newsletter has been inspired by the work of Podkletnov and has its purpose to share with the readers the latest reports on anti-gravity. A second purpose of the newsletter is to review antigravity research. A third purpose is to report on various achievements of inventors who are not mainstream scientists.

James E. Cox is a graduate of California State Polytechnic University with a B.S. degree in Physics. He has had extensive experience working with aerospace firms in a variety of engineering specialties including communications and propulsion. This first issue of *AGN* provides a good review of the work that has been reported on antigravity. At \$36 per year for U.S. and \$48 per year foreign, it is expected that this newsletter will be a leading publication in the strange and developing world of antigravity.

Articles

THE EMPEROR'S VIRTUAL CLOTHES

Wingate A. Lambertson, Ph.D.

This summer I have been trying to teach our oldest grandson, Tony, about zero-point energy conversion and it has been a challenge. It is not easy to explain even though it should be quite simple. In my search for clarity I found an analogy in the fairy tale by Hans Christian Anderson on "The Emperor's New Clothes" [1]. Zero-point energy conversion is serious business but some of the terminology which we use puts us in the Emperor's class.

When I was a senior in high school, I knew that I knew more than my parents. Then, when I became a senior in college, I realized that I did

not know everything but I thought that I knew where to find whatever I did not know. Tony is a senior in chemical engineering. At the completion of my doctorate, I realized that I knew very little and I was not so sure about being able to find everything. I have spent the last week in the local library preparing a glossary of the terms which I throw around frequently and I now know that the dictionaries and encyclopedias in common use are inadequate sources.

The Emperor had a "thing" about new clothes and liked to show them off to everyone in his kingdom. Two "rascally swindlers" came to town and claimed that they could weave the most beautiful cloth imaginable but that it was invisible to those who were stupid or unfit for their jobs. Of course, no one would admit that they could not see the new clothes. Finally, on the Emperor's parade through town, a little child said, "But the Emperor has no clothes on!" Everyone then began to repeat the little child's observation.

At the library I found the definition for zero-point energy as "Energy from the vacuum. The vibrational energy retained by molecules and crystals at 0° Kelvin." "There," I said to Tony, "It is in the dictionary and there are several known ways for utilizing it.

Tony's response was, "Everyone knows that energy flows downhill and 0° Kelvin is the lowest temperature you can get. There is no downhill from that point. What about the Carnot cycle?" It has been many years since I have studied about the Carnot cycle so I went back to the library again. "I was taught that the vacuum was the absence of everything - just empty space," said Tony.

"We usually call it the vacuum continuum, to distinguish it from your kind of vacuum and it is a seething sea of energy filled with virtual pairs of charged particles. In fact, it has an energy content of 10^{96} g/cc, according to one of our leading theoreticians [2]," said I.

Tony came back with, "What do you mean by virtual, isn't that imaginary? I am not interested in imaginary particles. As an engineer, I have to deal with real things. And while you are at it, doesn't that energy content put it in the black hole

category? Everyone knows that nothing can escape a black hole."

Clearly, this was time for me to regroup and take a different approach. "You were probably taught that electrostatics was one of the four fundamental forces. When you stand in front of a television tube and the hair stands up on your arm, how does the force get from the tube to your arm? There are two zero-point energy conversion methods based on the electrostatic force. There is the Hyde method [3] and the Swiss M-L machine [4]. I have seen a video tape of the Swiss M-L machine and have talked with people who have seen it operate. It generates electric power with no outside input and is self-running without an outside power source."

"If they can generate electricity with no outside input, why are no commercial models available?" said Tony.

Switching the subject, I showed Tony my pair of ferrite magnets with a magnetic probe and asked him, "You believe in magnetism, don't you? You were probably taught that electromagnetism is one of the four fundamental forces. How does that force get from the magnet to the probe? It has to go through the vacuum. Teruo Kawai from Japan was able to develop 62.16 watts output in an electric motor with an input of 19.55 watts for a yield of 318 percent [4]. Clearly, electromagnetism can also be used to collect energy from the vacuum.

"The Kawai patent issued two years ago and I have not seen any Kawai mopeds running around Lexington yet," observed Tony. "Why hasn't Honda or Harley jumped on that invention?"

Switching the subject again, I said, "Cold fusion is another way in which useful energy can be extracted from the vacuum. This was invented by Pons and Fleischman in 1989 and is being commercialized today by Patterson in Sarasota, Florida. You were probably taught that nuclear fusion has been studied as a potential answer to the world's energy needs for the past 44 years."

"We know that the scientists at Oak Ridge National Laboratory proved that cold fusion doesn't work in that same year," said Tony. "Everyone agrees that Pons and Fleischman did not follow accepted scientific procedures." [5] "There is a lot of difference between nuclear fusion and vacuum energy – if there is such a thing."

"Of course there is," I responded. I then showed him the news clip from the TV program "Good Morning America" on the Patterson cold fusion method. [6, 7] At that point, I thought I had him - that some modicum of teaching was beginning to come through. That was when I made my next mistake. I added, "Present thinking is that the driving force in the Patterson method is zero-point energy from the vacuum and that acceleration is achieved through the Casimir effect" [8].

Tony was not about to let a new term get past him. "What is the Casimir Effect," he asked. As much as I searched in the library, I could find no mention of Casimir and his effect. Fortunately, I had been exposed to a 1997 paper by Lamoreaux in which he actually measured the force from the vacuum and called it the Casimir Force [9]. This paper had been reviewed in *The Economist* which places it in the public knowledge domain.

Use of the word "virtual" is appearing more and more frequently. It was used in the Sunday paper suggesting that we can now take a virtual vacation on Mars through the Rover. Economists are utilizing virtual studies to estimate the standard of living 50 years ago and before television was developed. I chose to use it for the Emperor's invisible clothes.

I am with Tony in one respect. He is interested only in methods in which an excess of energy can be measured and utilized. If there are imaginary electrons and protons flying around in the vacuum, this is of no interest to him. In my work, I have to deal with energy which can be measured. I am like the Anderson's little child in that I have to agree with what I can see.

1. Hans Christian Anderson, Fairy Tales, Selected and illustrated by Lisbeth Zwerger, Picture Book Studio, Saxonville, Mass. 1991.
2. H.E. Puthoff, "The Energetic Vacuum: Implications for Energy Research," *Speculations in Science and Technology*, vol. 13, no. 4, page 247, 1990.
3. W.W. Hyde, "Electrostatic Energy Field Power Generating System," U.S. Patent No. 4,897,592; Jan. 30, 1990.
4. D.C. Kelly, "The Swiss M-L Converter - Revisited," *Space/Energy Newsletter*, vol. 4, no. 2, June, 1993.

5. Leland Johnson, Daniel Schaffer, Oak Ridge National Laboratory - The First Fifty Years, pp. 218-219, The University of Tennessee Press, Knoxville, 1994.
6. James A. Patterson, "Method for Electrolysis of Water to Form Metal Hydride," U.S. Patent No. 5,318,675, Jun. 7, 1994.
7. C.B.S., Good Morning America, June 10, 1997.
8. Hal Fox, "Charge Cluster Transmutation," *New Energy News*, vol 5, no 2, pp 16-19, June, 1997, P.O. Box 58639, Salt Lake City, UT 84158-8639.
9. S.K. Lamoreaux, "Demonstration of the Casimir Force in the 0.6 to 6 um Range," *Physical Review Letters*, vol 78, no 1, pp 5-81, 6 January 1997.

LETTERS

From: WFHassel@aol.com
 Date: Fri, 12 Sep 1997 18:48:17 -0400 (EDT)
 To: halfox@slkc.uswest.net
 Subject: **Aether Flow into Massive Bodies**

The article in the *NEN* August issue on Suggested Experiments for detecting motion of the aether brought to mind a letter I read in a magazine in the 1950's or 1960's. The premise was that a massive body is associated with an inflow of aether. This experimenter claimed to have detected a difference in the velocity of light in the vertical direction as compared to the horizontal, as measured by a simple experimental procedure, the details of which I do not recall. The reported difference was not marginal, but quite significant. Unfortunately, I have never read of anyone replicating his experiment.

If the effect of the earth's gravity on incoming light velocity were as great as several per cent, then a laser measurement system might be adequate to determine the difference in path length between a reflected beam in the vertical and horizontal directions. Otherwise, an interferometer could be set up with a fixed horizontal leg and a very rigid perpendicular leg which could be varied in elevation from zero to 90 degrees. The viewing telescope arrangement would require some modification from the conventional set-up.

On the other hand, if the above premise on aether flow is true, then why wouldn't significant errors have been noticed in the altitude readings provided by the Global Positioning System (GPS),

which utilizes signal phase differences to determine position and altitude?

Sincerely, William F. Hassel

LETTER FROM DR. INOMATA

I am really surprised at your information about the passing of Mr. Marinov. I talked with him over the telephone a few months ago. Today, I have news about two tragic deaths from Europe, i.e, that of the divorced UK queen and that of Mr. Marinov.

Mr. Marinov has desperately tried to crash the walls of the old paradigm scientific journals, such as *British Nature*, *Physical Review*, *American Journal of Physics* and many other journals, whose editors erroneously believe that the law of energy conservation is the secret tenet of conventional physics that cannot be violated.

All scientific laws are empirical laws and our understanding of Mother Nature is essentially limited; there will be exceptional cases for them. The law of energy conservation is of no exception. If one insists on the contrary, that amounts to the arrogance on the part of the scientist.

I will tell the sad news to the participants of JPI Sept. meeting to be held in Tokyo on 20th this month. Mr. Marinov has been fairly famous in Japan.

Sincerely yours
 Shiuji Inomata, PhD
 President, JPI.

LETTER FROM DONALD REED

Enclosed is a copy of an important paper on torsion research by A.E. Akimov. It has much more detail than the St. Petersburg report you summarized in the March '97 issue of *NEN*. Also, the English translation from Russian of this new paper is clearer, since it appeared in *Soviet Physics Journal*, 1992. It is my hope that you could publish this new article in its entirety in *Journal of New Energy*.

In case you are unable to obtain permission for reprinting it verbatim, I would be glad to write an

informed summary of its contents since I have been following the developments in this research area closely since you originally wrote on it in March.

Please advise me on this matter soon.

Thank you, Donald Reed

[The paper by Akimov is abstracted on page 8.]

LETTER FROM BERT SCHREIBER

I have a paper on why the current 'photon' does not exist. There is NO STANDARD (voted in by a democratic vote and issued by decree by SI) as to exactly what a 'photon' is. ERGO, anytime anyone writes and uses said 'photon' they are speaking and writing nonsense unless they specifically define what or which or their own version as to what this 'imaginary' photon is.

I know *NEN* will not accept this simple fact but anytime said work 'photon' appears, it might as well be a '#\$!/(*)' or anything else. Again, why send my paper (It gives at least 7 current definitions and none agree to any extent) when it will be ignored as usual.

Why don't **you** now define a photon for usage in *NEN* and inform all said submitters of your decision. After all, you are the Editor and can set the rules to your heart's content.

Sincerely,
/s/ Bert Schreiber

EDITOR'S NOTE: *NEN* and the *Journal of New Energy* will accept the following definition of a photon: It is an elementary particle having zero rest mass, travels at the speed of light, has zero charge, unity spin, and zero color. If the author is using some other understanding of a photon, then the author should define his/her useage of "photon". History Note: The lump of energy that is thought to be related to the particle behavior of light was named **photon** in 1905 by Einstein, in order to explain the nature of the photoelectric effect. For this he was given the Nobel prize – not for his peculiar theory of relativity which is becoming less and less accepted. The photon has assigned to it an energy of $h\nu$ (ν =Greek letter nu), a momentum of $h\nu/c$, and an angular momentum $h/2\pi$, where h is Planck's constant and ν is the frequency. There is still not a general understanding of how light (photons) can act as both a particle and a wave. The energy of a gamma photon may be many times larger than a

blue-light photon, however, we treat its frequency as being much higher.

Meetings

THE MEETING OF THE MINDS '97 10th Anniversary

When: October 24, 25, 26, 1997
Where: Casa Royale Convention Center
Hidden Valley, Arkansas

It's been 10 years! What's changed? What's new? What do you think about it? Come, share your ideas and meet with others who are at the forefront of alternate energy. This 10th year anniversary meeting of the 1987 meetings will bring back as many of the previous attendees as possible. We can find out where everyone is, how they have been doing with their projects and what kind of success they have had. We can then better plan for more MEETING OF THE MINDS gatherings and decide what direction they should take.

We will also tour the new ENER*RUN ALTERNATE ENERGY HEADQUARTERS BUILDING. This 22,000 square foot building dedicated to alternate energy has vehicles, energy information, a library and many alternate energy displays. It should be informative and exciting!

Cost: \$300.00 per person

This includes three days and two evenings. We will furnish morning coffee and donuts, refreshments during breaks, lunches, and two evening social events (for you and your mate). We will not be furnishing transportation, dinners or motel rooms,

**CALL FOR INFORMATION PACKAGES!
870-856-4445**

ICCF-7

INTERNATIONAL COLD FUSION FORUM

Vancouver, B.C., Canada

April 19-24, 1998

With the maturation of the field, ICCF-7 seeks to attract a more diverse audience including additional scientists, research institutes, students, national funding agencies, commercial interests, journalists, and spouses. It is the objective of ICCF-7 to provide a productive international forum for communication and education.

Calendar:

December 1997: Final notification to all presenters regarding the format of their presentation.

January 1998: Deadline for final abstracts to be published in ICCF-7 Program Manual and Website.

April 1998: Conference. All presenters must hand in their final papers during the conference for timely inclusion in the publication ICCF-7 Proceedings.

A different topic is planned for each day at ICCF-7. An invited presentation with summary review or global implications for the entire field will begin each day's topic, followed by five oral presentations on the topic. Afternoons will be entirely devoted to enhanced poster sessions, which include a 3-5 minute oral preview and summary. A "Top Ten" poster presenters will be selected by the attendees, and each will conduct an expanded 15 minute presentation to the full audience on Thursday afternoon. Three evening workshops will also be held.

Topics include: Heat & Related Products, Nuclear Processes & Products, Materials & Innovative Approaches, and Theory & Nuclear Physics.

For more information or to get on mailing list, contact: ICCF-7 c/o ENECO
391-B Chipeta Way, Salt Lake City, UT 84108
USA
Phone (801) 583-2000 Fax (801) 583-6245
jaeger@ENECO-USA.com

18th International Symposium on Discharges & Electrical Insulation in Vacuum

August 17-21, 1998

Eindhoven, The Netherlands

Hosted by the Eindhoven University of Technology

Scientific Program, Papers will be presented on all aspects of: Fundamentals of Discharges and Breakdown in Vacuum; Vacuum Discharge Devices and Applications; and Vacuum Insulation Technology and Applications.

Mini-Courses held parallel with conference: Diagnostics for Vacuum Devices, and Production Technology for Vacuum Insulated Devices

A **technical exhibition** will be held featuring components and systems in the area of vacuum discharge devices and vacuum insulated devices (e.g. vacuum switchgear, vacuum deposition and coating, X-ray and microwave tubes and other beam-devices, high-power devices, and equipment for analysis, monitoring and test purposes).

Hotel accommodation in downtown Eindhoven, a short distance from the University Conference Centre, is available through the EUT Conference office at reduced rates.

Information for Authors

Authors should submit a 250 word abstract by November 1, 1997. Authors of accepted abstracts will be notified in Dec. 1997. Deadline for camera-ready manuscripts is April 1, 1998. Accepted papers will be published in conference proceedings, available at the registration. A limited number of accepted papers will be selected for publication, in a modified and extended version, in Special Issues of *IEEE Transactions on Plasma Science* and *IEEE Transactions on Dielectrics and Electrical Insulation*. The working language of the symposium is English. All printed matter will appear in English.

Correspondence should be sent to:

Carla Schreurs

Congress Office ISDEIV'98, Aud.2.26

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fax: (011)-31-40-245-8195
 E-mail: C.L.A.Schreurs@ieb.tun.nl
 Website: <http://www.ele.tue.nl/evt/isdeiv/>

CALL FOR ABSTRACTS

"Meeting Global Energy and
 Environmental Needs"
**33rd Intersociety Energy Conversion
 Engineering Conference (IECEC)**
 August 2-6, 1998 Colorado Springs, CO

Sponsored by the American Nuclear Society, American Inst. of Chemical Engineers, Society of Automotive Engineers, American Inst. of Aeronautics and Astronautics, American Society of Mechanical Engineers, and Inst. of Electrical and Electronics Engineers.

Abstract Deadline: Postmarked by Monday, 15 Dec. 1997

Prospective authors are invited to submit a brief (about 250 words, double spaced) abstract for consideration by IECEC Program Committee. The abstract, along with three copies, should include the following information: a descriptive title, one appropriate topical subject area, name/address/ telephone/e-mail/fax of the corresponding author.

Contact for author's packet:
 ANS Proceedings Office, IECEC '98
 555 North Kensington Ave.
 La Grange Park, IL 60526
 Phone: 708/579-8253; fax 708/352-6464
 Web page: www.inspi.ufl.edu/IECEC98

Commercial Column

The following companies (listed alphabetically) are commercializing cold fusion or other enhanced energy devices: [Listings with your additional copy, or boxed, for small annual service fee.]

COMPANY: PRODUCT

American Pure Fusion Engineering and Supply:
 Warren Cooley, 1-800-789-7109 or 503-585-6746.
 Email to: Coolwar@aol.com

Clustron Sciences Corp.: Contact: Ron Brightsen, 703-476-8731.

ENECO: is in the business of commercializing the exciting new field of low energy induced nuclear reactions in solids via patent licensing, joint-ventures, and co-operative research. ENECO, University of Utah Research Park, 391-B Chipeta Way, Salt Lake City, Utah 84108 USA. Contact Fred Jaeger, Voice 801-583-2000, Fax 801-583-6245. Email: jaeger@ENECO-USA.com

E-Quest Sciences: Contact Russ George, FAX 415-851-8489.

Fusion Information Center (FIC): Research and development of new energy systems. The world's most complete resource depository for cold fusion research information, as well as other new energy research including zero-point energy; space energy research; electronic, electromagnetic, and mechanical over unity devices and transmutation. We are the publishers for **New Energy News**, and **the Journal of New Energy**. Voice 801-583-6232, Fax 801-583-2963. Contact Hal Fox.

Holotec AG: Clean Energy Technology, contact André Waser, Gen. Mgr., Bireggstrasse 14, CH-6003, Luzern, Switzerland. Phone 011 41-41 360 4485, or Fax 011 41-41 360 4486.

Hydro Dynamics, Inc.: Rome, Georgia. Contact James Griggs, Voice 706-234-4111 Fax 706-234-0702.

JET Energy Technology, Inc.: Weston, MA. Contact Dr. Mitchell Swartz, Voice 617-237-3625. Fax 617-237-3625.

Labofex, Experimental and Applied Plasma Physics: Ontario, Canada. Contact Dr. Paulo N. Correa. Tel 905-660-1040 Fax 905-738-8427

Magnetic Power Inc.: Sebastopol, CA. Contact Mark Goldes, voice 707-829-9391, Fax 707-829-1002.

Nova Resources Group, Inc.: Denver, CO. Call Chip Ransford, Phone 303-433-5582.

Trenergy, Inc., has acquired rights to develop and produce a new-type of thermal power based on the controlled production of clean nuclear reactions from plasma injected transmutation. Contact through P.O. Box 58639, Salt Lake City, UT 84158-0639, Voice 801-583-6232, Fax 801-583-2963.

UV Enhanced Ultrasound: Hong Kong.
FAX 852-2338-3057.

"YUSMAR"- Scientific-Commercial Company:
President: Dr. Yuri S. Potapov, 277012 Kishinev,
Moldova. Phone and Fax 011-3732-233318.

Zenergy Corp.: Founded in 1996 to facilitate the
introduction of commercially viable energy alternatives.
390 South Robins Way, Chandler, AZ 85225. Contact
Reed Huish, 602-814-7865, Fax 602-821-0967, e-mail:
info@zenergy.com

Note: The Fusion Information Center has been acting as
an information source to many of these companies. We
expect to augment our international service to provide
contacts, information, and business opportunities to
companies considering an entry into the enhanced
energy market.

INFORMATION SOURCES

Academy for New Energy (ANE) 216 Commerce Drive,
Ste. 4, Fort Collins, CO 80524. Tel. 970-482-3731
ANE Newsletter, quarterly publication of ANE,
edited by Robert Emmerich.

Advanced Energy Network Newsletter, quarterly.
Advanced Energy Network, P.O. Box 691, Rondebosch
7700 Capetown, Rep. South Africa.

Cold Fusion Times, quarterly newsletter published by Dr.
Mitchell Swartz, P.O. Box 81135, Wellesley Hills MA
02181.
Home Page: <http://world.std.com/~mica/cft.html>

Cycles, a R&D newsletter, published by Dieter
Soegemeier, Editor, GPO Box 269, Brisbane, QLD.4001,
Australia.
Phone/Fax: +61 (0)7 3809 3257.

Electric Spacecraft Journal, quarterly, edited by Charles
A. Yost, 73 Sunlight Drive, Leicester, NC 28748.

Electrifying Times, 3/year magazine. 63600 Deschutes
Market Rd, Bend, OR 97701
541-388-1908, Fax 541-388-2750,
E-mail <etimes@teleport.com>
www.teleport.com/~etimes/

Elemental Energy, monthly newsletter, edited by Wayne
Green, 70 Route 202N, Petersborough, NH 03458.

Fusion Facts has become a section in the *Journal of
New Energy*.

Fusion Technology, Journal of the American Nuclear
Society, edited by Dr. George Miley, 555 N. Kensington
Ave., La Grange Park, IL 60525.

Infinite Energy, bi-monthly magazine. P.O. Box 2816,
Concord, NH 03302-2816. Voice: 603-228-4516. Fax:
603-224-5975

E-mail 76570.2270@compuserve.com

Institute for New Energy (INE), organization to
promote and help find funding for new energy
research.

Visit our **Home Page**: www.padrak.com/ine/ which
contains many important scientific papers and
current reports on all areas of research.

E-mail: halfox@slkc.uswest.net
or ine@padrak.com

Salt Lake City, Utah. Voice 801-583-6232,
Fax 801-583-2963.

New Energy News monthly newsletter for
INE, highlighting the research and
development in the worldwide new energy
arena. Edited by Hal Fox.

Journal of New Energy, quarterly, presenting
papers representing the new areas of energy
research, leading-edge ideas in the development
of new energy technology, and the theories behind
them. Published by the Fusion Information Center,
Inc. Editor: Hal Fox. Address & phone above.

KeelyNet BBS - Jerry Decker, 214-324-3501
Internet: www.keelynet.com
E-mail: jdecker@keelynet.com

Planetary Association for Clean Energy Newsletter,
quarterly, edited by Dr. Andrew Michrowski. 100
Bronson Ave, # 1001, Ottawa, Ontario K1R 6G8,
Canada.
Web page: <http://energie.keng.de/~pace>

Space Energy Journal, quarterly, edited by Jim Kettner
& Don Kelly, P.O. Box 1136, Clearwater, FL 34617-
1136.

The above list of commercial and information sources
will be growing. New listings will be added as
information is received. Send information to *NEN*, P.O.
Box 58639, Salt Lake City, UT, 84158.

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