8th International Workshop on Anomalies in Hydrogen / Deuterium Loaded Metals

13-18 October 2007
Sheraton Catania, Hotel and Conference Center
Via Antonello da Messina 45, 95020 Cannizzaro(CT), Sicily.

Organizing Committee:
William Collis (Chair), Antonio Spallone, Sebastiano Truglio, Fulvio Frisone, Xingzhong Li

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Book of Abstracts

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Outline Program

	Saturday 13 October	Sunday 14 October	Monday 15 October	Tuesday 16 October	Wednesday 17 October	Thursday 18 October
9:00-11:00		**Opening Session**	**Oral Session**	**Oral Session**	**07:30 Excursion to Mount Etna Volcano**	**Closing Remarks**
11:00-11:30		***Coffee-break***				
11:30-13:00		**Oral Session**	**Oral Session**	**Oral Session**		*Departure*
13:00-14:30		***Lunch***				
14:30-16:00		**Oral Session**	**Oral Session** FP7	**Oral Session** CR39	**Oral Session**	
16:00-16:30		***Coffee-break***				
16:30-17:30	**Registration**	**ISCMNS AGM**	**Oral Session**	**Oral Session**	**Oral Session**	
20:00	***20:00 Welcome Reception & Buffet***	***Dinner*** Film: Il figlio della Luna by kind permission of RAI English subtitles	***Gala Dinner*** *"Cunti e Canti" Music by Tonino Buonasera*	***Dinner***	***Dinner***	

Notes.

1) **Lunch and dinner are served in the restaurant, "Il Timo", near the swimming pool, at the Sheraton Hotel.**
2) **No smoking is allowed in any public building in Italy (shop, bar, restaurant etc.). You may smoke out of doors.**
3) **The cost of the excursion to Etna on Wednesday is not included in the workshop fees. Please register at the reception desk by Sunday.**
4) **At the end of the Workshop, a DVD will be distributed to all participants who return the questionnaire. The DVD will contain the ISCMNS website updated with these abstracts, and such photos and presentations as may be submitted during the meeting.**
5) **Please submit complete papers by 31st October 2007.**
6) **Some mini-excursions will be organized for accompanying persons. Ask at the workshop reception in Sala Sestante.**
7) **The presentation hall is Pegasus 2 on the ground floor.**

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Welcome to the 8th International Workshop!
Bill Collis

Here is some information which I hope will make your participation at the Workshop more enjoyable.

There's a fairly standard regime every day. Starting times, coffee breaks, meals are always at the same time. Every presentation is 25 minutes long with 5 minutes for questions. As you can seen it's quite an intense program fitting some 50 oral presentations and many posters. Please be punctual! Moderators will strictly adhere to the time-table!

Presenters may either load their work onto the main computer or simply use a USB memory key (also on sale at reception). Any files left on the computer will be deemed submitted for publication of the Workshop DVD and later the ISCMNS web-site. Material may be modified or withdrawn at any time. There are strict requirements for naming files. You must use the filename designated displayed at registration and on the website at http://www.iscmns.org/catania07/program.htm You may access the "Link" business center computers to make any last minute modifications to your presentations, or to access the Internet.

Please ensure all pages of presentations are numbered! This allows questions to be made to specific points.

There is time to relax too. Coffee breaks are 30 minutes long which allows you to chat, shower or even go the the beach! Lunch is a generous 90 minute break! The Sheraton has a private beach which can be reached by pedestrian tunnel going under the main road which can be reached from the swimming pool.

Residents at the Sheraton are entitled to all meals on the program. Non residents are entitled to the lunches and Gala Dinner only. If you have any special dietary requirements, please inform reception in the Sala Sestante (where Registration is).

Like many European countries, Italy has adopted a law which prohibits smoking in any building open to the public. If you need to smoke, please do so outside!

On Wednesday morning, there will be an organized excursion to Mount Etna volcano. You can book this at reception. Don't forget to bring your camera, strong shoes, and warm clothing (Etna is 3,000 m above sea level!). There may be Ladies' program on other days for those not following the technical presentations. Enquire at reception.

Reception will process your Workshop registration, issue attendance certificates, ISCMNS membership certificates, receipts for ALL payments (please insist on getting one!), and will sell DVDs, USB Memory keys, various conference proceedings in hard copy.

This workshop will publish its transactions on:-

1) The Workshop DVD
2) The ISCMNS web-site www.iscmns.org/catania07/
3) A hardback conference proceedings book.

I hope you will find this workshop enjoyable. If it is, the reason will certainly be the generous support of our sponsors (see front page) and the tireless efforts of the organizing committee and reception staff. A big thank you to you all!

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Cool nucleus syntheses in terrestrial cortex on base the electro-category.

Tarasenko G.V., Demicheva E.A. Aktau, Kazakhstan, tarasenko-genadi@rambler.ru

Many explorers score presence of discharges of electricity in an earth's crust, just as in thunderstorm clouds. Streak lightings generate spherical. An example of their activity in an earth's crust serve spherical concretions. On the basis of the lead geologist -geophysical investigations in a constitution of a planet the Earth and spherical concretions (Tarasenko G.V. 1993-2007 г.г.), Experimental works on building electro-discharges naturally have been lead. In the pot - reactor made of a muff of force - compressor tubes designed on pressure up to 1000 Атм, various ingredients layers fluids and rocks positioned. The pot - reactor positioned in the stator of the electric motor on 30 Kw on which the strain of 20-30 volt moved, the current rose up to 35 amperes. In too time for the pot - reactor discharges through the condenser battery in capacity 16 Mkф on a strain 6 Kv moved. During discharges the pot - reactor heated up to 70^0C. On the sphere gap there was a gradual augmentation of an arc, passes in constant glow, the strain has falled up to zero. At augmentation of a backlash at the sphere gap, short circuit descended in the pot - reactor. Pressure has mounted up to 300 Атм. After disassembly of the pot - reactor and a plum of fluids, on electrodes there was spherical asphalt-resinous residual. Their formation contacts cold nuclear синтезем, descending due to electro-discharges and adducting to formation of division of fluids and formation concretions from minerals and asphalt-resinous bitumen. Experiences confirm formation spherical concretions, coal, polymetals from products mud volcano and layers the fluids generated in the mantle and the lithosphere.

For obtaining a new view of energy it is necessary to frame the mechanism at which there will be all devices of a constitution of a planet the Earth.

To them concern:

1. A radiator.
2. The electro-condenser.
3. The generator.

The last the ball lightning will serve.

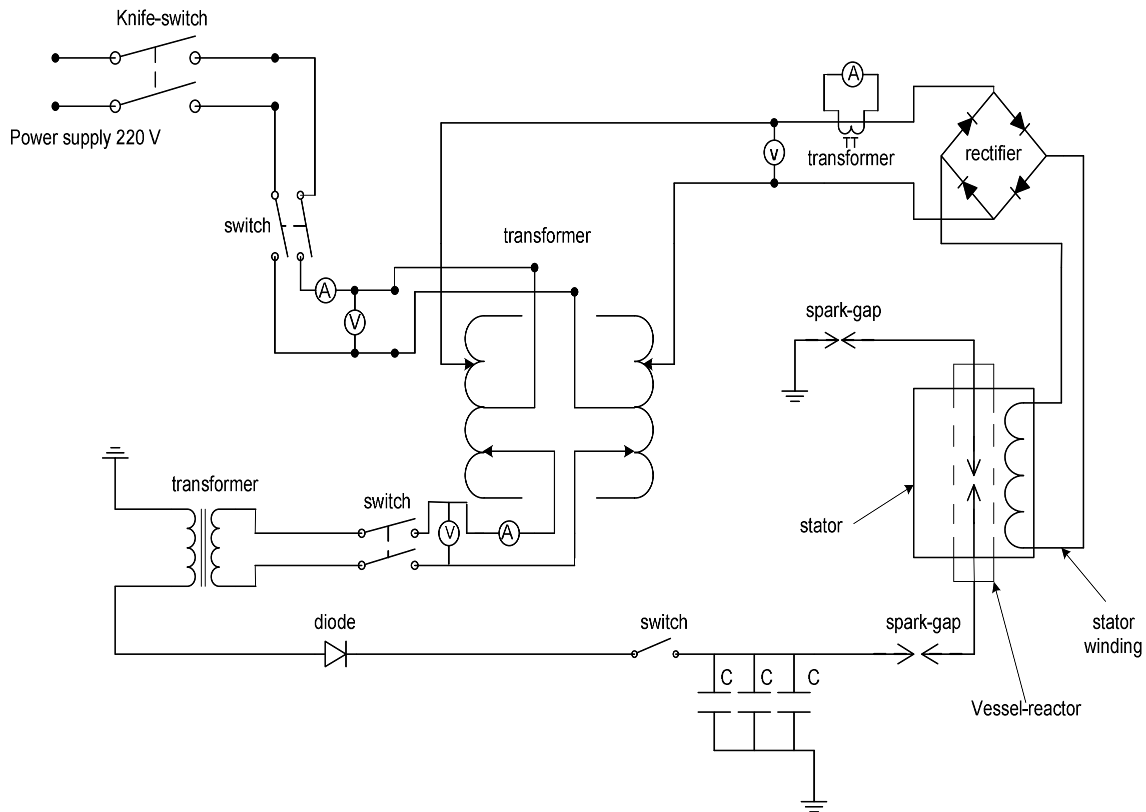

Fig. 1. The Principle circuitry conducted experience.

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D-Cluster Dynamics and Fusion Rate by Langevin Equation*

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Abstract:
Condensed matter nuclear effect, especially 4D-cluster fusion, in metal-deuterium complex systems, has been studied by applying Langevin equations[1,2].
One dimensional Langevin equations for solving time-dependent d-d distance $R_{dd}(t)$ for deuteron-clusters under the Platonic symmetry were formulated for D-atom, D_2 molecule, D_2^+ ion, D_3^+ ion, 4D/TSC and $6D^{2-}$/OSC. Established values of ground state d-d distances R_{gs} were reproduced by expectation-value equations, which were obtained by ensemble averaging with weight of quantum mechanical wave functions (Gaussian wave functions), for D-atom, D_2, D_2^+, and D_3^+ molecules.
In analogy to above Langevin equations, the Langevin equation for 4D/TSC under the tetrahedral double Platonic symmetry was derived and numerically solved by the Verlet time-step method. It was shown that only 4D/TSC among 5 D-systems except D-atom could condense ultimately from $R_{dd}(t=0)$=74 pm to very small charge neutral entity with about 10 fm radius at TSC-min state after about 1.4 fs condensation time. The $6D^{2-}$/OSC system converged at R_{gs}=about 40 pm, namely converged on the way of condensation from $R_{dd}(t=0)$=74 pm.
Time-dependent Coulomb barrier penetration probabilities (barrier factors) for condensing 4D/TSC were calculated by the Heavy Electronic Quasi-Particle Expansion Method. 4D fusion rate per TSC generation was obtained based on the Fermi's first golden rule to result in almost 100% 4D fusion per 4D/TSC generation. Fusion rates were compared with those of muonic dd molecule, D_2 molecule and dde*(2,2) Cooper pair molecule to meet good consistency. Major nuclear products of 4D fusion are two 23.8 MeV α-particles. 4H/TSC should condense in the same way until when TSC-min state with classical electron radius (2.8 fm) comes, but no strong interaction exists among protons and will make 1p to 4p capture transmutations with host metal nuclei when 4H/TSC has sufficient drift (CMS) momentum.

1) A. Takahashi, N. Yabuuchi: Condensed matter nuclear effects under platonic symmetry, submitted to Proc. ICCF13, Sochi, 2007
2) A. Takahashi, N. Yabuuchi: Study on 4D/TSC condensation motion by non-linear Langevin equation, submitted to Proc. New Energy Technologies, American Chemical Society, 2007

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A new nuclear process or an artifact?

Ludwik Kowalski,
Montclair State University, New Jersey, USA

Abstract:

Numerous tracks of charged nuclear particles, emitted during electrolysis, were discovered by Oriani and Fisher (Jpn. J. Appl. Phys. 41,6180, 2002 and ICCF10, 2003). More recently, residual activity -- emission of nuclear particles after electrolysis -- was discovered by Oriani (draft of an unpublished paper). This presentation, prompted by The Galileo Project, describes several experiments conducted to replicate the reported results. Common CR-39 detectors were used in these experiments. A total of eight clusters of post-electrolysis tracks were found in two of three replication experiments. No excessive tracks (in comparison with background) were found in two experiments, conducted to observe tracks due to residual activity. Arguments are presented against trivial explanation of clusters, such as natural radioactivity and cosmic rays.

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Quantization of Atomic and Nuclear Rest Masses

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First of all, the structure of a hydrogen atom was established (F.A. Gareev, I.E. Zhidkova, ArXiv: nucl-th/0610002). Proton and electron in a hydrogen atom move with the same frequency that creates attractive forces between them, their motions are synchronized. A hydrogen atom represents radiating and accepting antennas (dipole) interchanging energies with the surrounding substance. We perform for the first time phenomenological quantization of differences between atomic and nuclear rest mass for the systems decaying via beta -, alpha and nucleon emission or absorption; the differences between nuclear and atomic rest masses are quantized by the formula $\left(\text{in } \frac{MeV}{c^2}\right)$:

$$\Delta M = 0.0076293945 \cdot \frac{n_1}{n_2}, \quad n_1 = 1, 2, 3, \dots, \; n_2 = 1, 2, 4, 8 .$$

The accuracy of this formula (up to seven significant figures) could be increased if we take into account in our calculations all masses of atoms and nuclei (3177) up to ten significant figures

$$M = 0.0076293945312 \cdot \frac{n_1}{n_2}, \quad n_1 = 1, 2, 3, \dots, n_2 = 1, 2, 4, 8 .$$

Note that this quantization rule is justified for atoms and nuclei with different A, N and Z, and the nuclei and atoms represent coherent synchronized systems – a complex of coupled oscillators (resonators). It means that nucleons in nuclei and electrons in atoms contain all necessary information about the structure of other nuclei and atoms. This information is used and reproduced by simple rational relations, according to the fundamental conservation law of energy.

The motions of nucleons in nuclei and electrons in atoms are quantized and the basic quanta are the same for nucleons and electrons. We can make two global conclusions: the nuclei and atoms represent self-sustained cooperative synchronized resonators – superposition of coupled oscillators with commensurable frequencies: the whole system is non-decomposable into independent subsystems. The nucleon and the electron motions should be considered as unified processes. This is a real phenomenon of cooperative resonance synchronization of nucleons in nuclei and electrons in atoms. LENR (low energy nuclear reactions) can be stimulated and controlled by the super-low energy external fields. If an external field frequencies are equal or multiple or commensurable with frequencies of nucleon and electron motions, then we should have a resonance enhancement of LENR. Therefore, we have now real possibilities to stimulate and control many anomalous phenomena including LENR.

The Balmer formula (1885) was as cornerstone for foundation of quantum theory the same role should play our formula for quantization of the rest atomic and nuclear masses in development a new theory for open systems.

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Common Mechanism of Superconductivity, Superfluidity, Integer and Fractional Hall Effects, and Cold Fusion

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It is well known in optics (in quantum mechanics too) that the transition coefficient of light through the layer is equal to one if the following relations between the thickness R of the layer and wave length λ exist

$$R = \frac{n_1}{n_2}\lambda, \quad n_1 = 1, 2, 3, \ldots, \; n_2 = 2, 4\,. \tag{1}$$

It means that the layer does not plays any role at such conditions. It is interesting to note that: the Bohr quantization conditions for a hydrogen atom, and the quantization conditions for superfluid ^4He, and the Tomasch quantization conditions for tunnelling are the same as (1).

We have carried out a systematic analysis of interatomic distances for a huge number of systems, using (1), in which $\lambda = \lambda_e$ =0.33249nm is the de Broglie electron (proton) wave length in the ground state of a hydrogen atom. We came to the conclusion that the superconductivity can be explained by the assumption: channel motions in systems like that and electron motion in the ground state of a hydrogen atom are exactly synchronous. Therefore, superconductivity systems represent a coherent synchronized state – complex of coupled resonators with the commensurable frequencies.

- It means that we have in principle found out the possibility to achieve superconductivity at room temperature [1].

The parameter – free formula for interatomic distances in molecules and biomoleculas, superconducters, and size of nanostructures has been obtained [1] which is the same as (1) except that $n_2 = 1, 2, 3, \ldots$ Moreover integer and fractional Hall quantization formula can be rewrite such way that it will be same as (1). This establishes some bridge between the structures of different phenomena (conductivity, superconductivity, insulator – metal transmission, quantum Hall effect, superfluidity, quantization of nanostructure cluster size, size of biomolecules). This connection can be considered as an indication of existence of same physical phenomena in the structures of the superconducting and living systems.

Understanding of the origin and evolution of the genetic code must be the basis for a detailed knowledge of the relationship between the basic building blocks of DNA and environment. As is widely accepted today, essentially all the DNA in an eukaryotic nucleus are formed of histones and different chromatin structures folded hierarchically. At least five orders of DNA and chromatin organization and folding (nucleotide, helix, nucleosome, solenoid and chromatin fibre loop) have been described in literature. A DNA chain is a long unbranched polimer composed of only four types of subunits. These are nucleotides containing the basis adenine (A), cytosine (C), guanine (G), and thymine (T). These nucleotides form complementary flat pairs and the distances between these plains are equal to λ_e.

- It means, that the structures, formed in above-mentioned systems, produce the one–, two– and three–dimensional waveguides with the sizes which are commensurable with the de Broglie electron (proton) wave length in the ground state of a hydrogen atom.
- We will bring arguments in our talk that conductivity, superconductivity, superfluidity, quantum integer and fractal Hall effects (no room for fractal charge), sizes of molecules and biomolecules, DNA, nanostructure sizes, cold fusion,… have the same basic fundamental mechanism – all these systems constructed commensurable way with the properties of hydrogen atom in which λ_e play the role of the standard distances.

[1] F.A. Gareev, G.F. Gareeva, STP 2000, 22-24 June 2000, Novosibirsk, 2001, p.161. .

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Radiation Produced By Glow Discharge In Deuterium

Edmund Storms and Brian Scanlan
Kiva Laboratory, LLC

Abstract

Radiation produced by low-voltage discharge in a gas containing deuterium was measured using a Geiger counter located within the apparatus. This radiation was found to consist of energetic particles that were produced only when the voltage was above a critical value. In addition, the emission was very sensitive to the presence of certain elements in the gas along with deuterium. When the required conditions were present, emission was very reproducible with production rates in excess of 10^8 events/second.

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Improving the Erzion Model

William Collis mr.collis@physics.org

Abstract

In the early 1990s, Hagelstein proposed that neutrons could be transferred between natural isotopes producing energy and explaining transmutation of heavy nuclei. The beauty of this idea was that there is no Coulomb barrier for neutral particles. Alas, the nuclear energy barrier, typically about 8 MeV, is sufficient to suppress the rate of neutron hopping to immeasurably small values, and the idea was duly abandoned by 1996.

However it may be that Exotic Neutral Particles (ENP) could catalyse neutron transfer without insuperable energy barriers. Independently John Fisher proposed a model involving poly-neutrons and Yuri Bazhutov proposed another based on Erzions. Both classes of particles are, of course hypothetical, but share numerous common features. In particular, the rates of reaction are expected to be very high permitting a tiny number of ENPs to create substantial heat and transmutation products.

In this paper we show that appropriate adjustment of the Erzion masses can result in a model which substantially eliminates Bremstrahlung and gamma radiation but nevertheless predicts many of the transmutation products including He, tritium, neutrons etc.

References

1. Bazhutov Yuri N.; "Influence of Spin and Parity Preservation Laws on Erzion Model Predictions in Cold Fusion Experiments", in *The Seventh International Conference on Cold Fusion*. 1998, pp 437-440. Vancouver, Canada: ENECO, Inc., Salt Lake City, UT.

2. Hagelstein P L, Kaushik S.; "Neutron Transfer Reactions", *Proc. ICCF4,* Vol **1**, 10-1. 1993.

3. Fisher J C, "Poly-neutrons as agents for Cold Fusion reactions", *Fusion Technology* Vol **22**, p 511, Dec 1992.

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5. Collis W; "ENSAP Software Tool To Analyse Nuclear Reactions" in *The Seventh International Conference on Cold Fusion*. 1998. Vancouver, Canada: ENECO, Inc., Salt Lake City, UT. (Demo version at www.iscmns.org/software/ENSAP/ensap.htm)

6. E. Campari, S. Focardi, V. Gabbani, V. Montalbano, F. Piantelli, S. Veronesi, "Overview On H-Ni Systems: Old Experiments And New Setup", presented at 5th Asti Workshop on Anomalies in Hydrogen / Deuterium Loaded Metals, 2004, www.iscmns.org/meetings/asti/papers/piantelli.doc

7. Collis W; "The Interactions of Erzions with Natural Isotopes", Proc ICCF13, Sochi, Russia.

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Preparata Medal Lecture - A Tribute to Giuliano Preparata, A True Pioneer In Cold Fusion Theory

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Anyone who attended an ICCF or ASTI meeting before 2000 remembers the brilliant and fiery theoretical physicist, Giuliano Preparata. He provided new insight into the deep mysteries of cold fusion, and greatly enlivened the meetings with his lively debates. My own discussions with him usually concerned thin film electrolysis. I recall encountering him after one of his ICCF talks and questioning one of his conclusions. Giuliano snapped back – "George, you haven't read chapter 8 of my book!! Read it before you talk to me again!" I responded that I had read it but still didn't understand!! Giuliano took pity on me and just laughed (As others knowing him will recognize, this was a "mild" interaction compared to usual). His book, *QED Coherence in Matter*, is a gem; it provides a view into Giuliano's unique approach to coherence of matter and cold fusion (the "famous" chapter 8). It is not easy reading, so, I subsequently put his book in my briefcase and pulled it out whenever I found time on a trip. Indeed, I still had it with me when I sadly learned of his untimely passing. I pulled the book out and stared at the cover, then moved to the dedication page where Giuliano credits his father for teaching him the meaning of "honour and honesty". His father must have been proud since Giuliano learned the lesson well. The community lost a leading light that day.

Giuliano was born in Padova, Italy in 1942. After receiving his Ph.D. in 1964, he became immersed in strong interaction physics theory. In 1967, he joined Princeton University and after several positions, ended up in 1970 as Assoc. Professor at NYU. From 1980 until his death, he was the Chair Person of High Energy Nuclear Physics at Milan University. In the early days of cold fusion, Giuliano joined the activities of the National Cold Fusion Institute in Salt Lake City. This experience peaked his interest in the physics of this exciting new field. His later cold fusion research was done at Milan University and in collaboration with the ENEA Frascati Laboratory where he played a key role in both theory and interpretation of cold fusion experiments.

This lecture includes recollections of Giuliano's participation in ICCF meetings. In addition, the relation of his coherence theory to other more recent theories will be discussed.

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Report on Electrolysis Experiments at Energetics Technologies

I. Dardik, T. Zilov, H. Branover, A. El-Boher, E. Greenspan,
B. Khachaturov, V. Krakov, S. Lesin, A.Shapiro and M. Tsirlin

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Abstract

Several different types of cathodes and modes of operation were experimented with in the electrolytic cells in an attempt to increase the reproducibility of excess heat generation and to increase the coefficient of performance. All these experiments used Dardik's modified SuperWaves to drive the electrolysis. The highest reproducibility is obtained with ultra-sound excitation. Also promising are Pd/SWCNT/Pd targets made of a sandwich of palladium and Single Wall Carbon Nanotubes, as well as Pd foils that underwent etching by glow-discharge of deuterium ions.

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Observation of mantle tritium in the crater lakes: evidence for natural nuclear fusion in deep Earth

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Abstract

Mantle helium and other volatiles may be released to the crater lakes. In this paper, we present the observation of presence of "excess ^3H" in the bottom of the crater Lakes Nemrut (Turkey), Laacher (Germany) and Pavin (Fance)[1, 2, 3]. The excess ^3H is explained that was released from mantle source considering the correlation of excess ^3H and mantle ^3He and ^4He. The helium concentration in the bottom layer of the lakes had a large increase. The ^4He and ^3He concentrations in Lakes Nemrut, Laacher, and Pavin were determined to be 25 and 190, 10 and 50, and 70 and 500 times larger than the atmospheric saturation value respectively. The isotopic ratio of the helium excess, $^3He_{ex}/^4He_{ex}$ in Lakes Nemrut, Laacher and Pavin was $(1.032\pm0.006)\times10^{-5}$, $(7.42\pm0.03)\times10^{-6}$ and $(9.09\pm0.01)\times10^{-6}$ respectively. The ratios clearly indicate that a large amount of helium isotopes were released from mantle source. The excess ^3H at the bottom of Lakes Nemrut, Laacher and Pavin is estimated to be 3.7±1.4 TU, ~ 1.4 TU and ~4 TU respectively.

This paper concludes that the excess ^3H in the Lakes, after the origin of the excess ^3H from atmosphere and conventional nuclear reactions are excluded and the correlation of the excess ^3H and mantle ^3He is considered, might be from the mantle source and produced by nuclear fusion (d-d reaction) in an environment rich in H atoms and (U+Th) at high temperature and high pressure in the deep Earth.

The physical mechanism of natural nuclear fusion in the deep Earth is still not quite clear. A study of this reaction mechanism is already in progress.

[1] R. Kipfer, W. Acschbach-Hertig, H. Baur, M. Hofer, D.M. Imboden, P. Signer, Earth Planet. Sci. Lett. 125(1994)357-370.
[2] W. Aeschbach-Herting, R. Kipfer, M. Hofer, D.M. Imboden, R. Wieler, P. Signer, Geochim. Cosmochim. Acta 60(1996)31-41.
[3]. W. Aeschbach-Hertig, M. Hofer, R. Kipfr, D.M. Imbodem, Hydrobiologia 487(2002)111-136.

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Investigation Of Light Magnetic Monopoles And Observation Of Monopole Nuclear Catalysis

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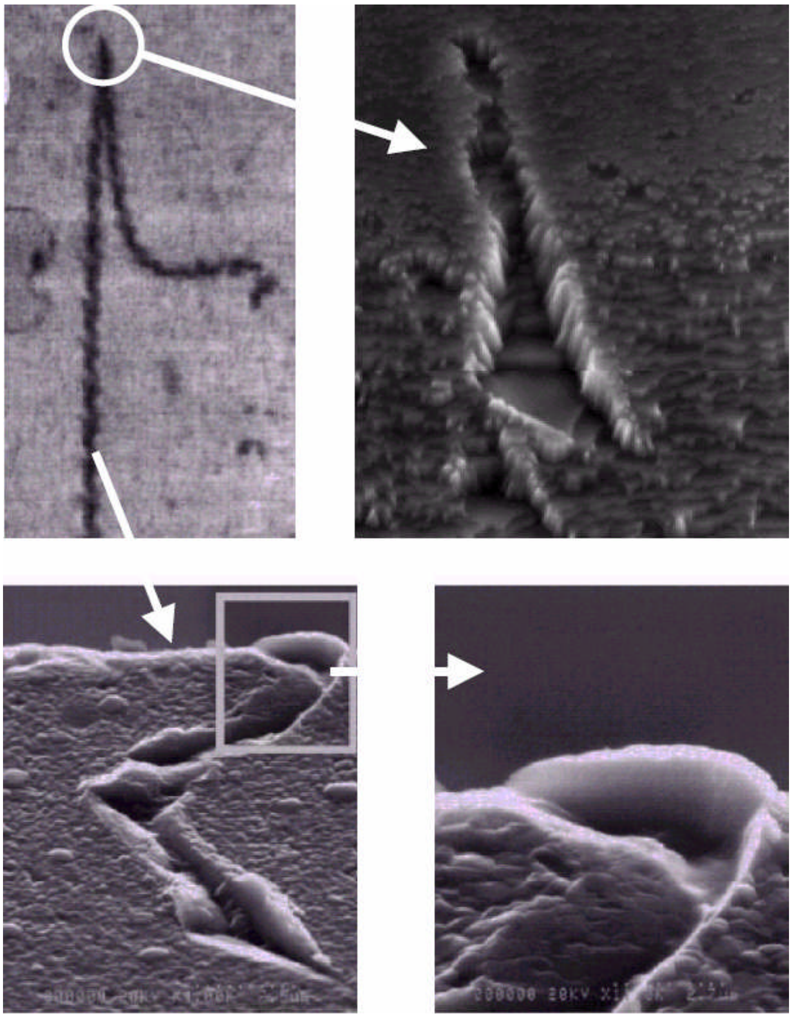
[1]Electrodynamics Lab. "Proton-21", Kiev, Ukraine; [2]Kiev Shevchenko University, Kiev, Ukraine

In the report the results of observation, modeling of motion and nuclear catalytic possibility of magnetic-charged particles (light magnetic monopoles) on the multilayer surfaces are presented and discussed. During experiments in 1999-2007 years at Kiev Electrodynamics Laboratory "Proton-21" on achieving the superdense state of the matter (the state of electron-nuclear collapse [1-4]) by using the high-current electron driver, the traces of strongly ordered thermo-mechanical impact on surfaces of the multilayer targets were registered (see Fig.). Each trace looked like the ideally ordered hollow mechanical breakage of oscillating trajectory type with the constant period that is periodically goes deep into the target volume up to the *Si* substrate and then returns back to it's surface. The target was composed from *Si* plate covered with the thin SiO_2 and *Al* layers. Evaluations taking into account full thermal and mechanical work that is necessary for destroying and melting of the surface and the upper layers volume along the trace result in $\Delta Q_{tot} \approx 2.10^5$ GeV for full energy-release and $dQ/dl \approx -10^6$ GeV/cm for specific energy-release.



Possible mechanism of the origin of such traces is discussed in this paper. In the scope of the *Al* layer, this charge can stimulate the running of various nuclear reactions, including the synthesis reactions

$Al^{27} + p^1 = Si^{28}$, $Al^{27} + C^{12,\,13} = K^{39,\,40}$ with participation of *Al*, *H* and *C* entering the composition of a very thin oil film on the surface of *Al* and release of a great energy (ΔE_R = 12...17 MeV). It supposed that it is connected with interaction of hypothetical light magnetic monopoles [5] (which could burn in the collapse zone) with the different layers of the target surface, the combination of paramagnetic (*Al*) and diamagnetic (SiO_2 and *Si*) materials. The mechanism of forming the oscillating trajectory is considered. Several mechanisms of monopole nuclear catalysis (including discussed above) are also investigated.

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2. Adamenko S.V., Vysotskii V.I. //Foundations of Physics Letters, v. 17, No. 3 (2004), p. 203-233.
3. Adamenko S.V., Vysotskii V.I. //Foundations of Physics, v. 34, No. 11 (2004), p. 1801-1831.
4. Adamenko S.V., Vysotskii V.I. //Foundations of Phys. Letters, v.19, No. 1 (2006), p. 21-36.
5. Lochak G. //Z.Naturforsch., v.62b (2007) p.231-246.

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Erzion Model Features In Cold Nuclear Transmutation Experiments

Yu. N. Bazhutov

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It is described the history of Erzion Model appearance from Cosmic Rays from 1982 & it's development to explain the main features of Cold Fusion Experiments. Moreover, Erzion Model can give principle explanation for many problems in Astrophysics and Geophysics, such as: 1) dark matter in Universe; 2) Solar neutrino problem; 3) Jupiter energetic unbalance; 4) Tritium & He^3 abundance in volcano products; 5) Ball-lightning & wood fire nature and some else. Some applied problems can be decided in framework of Erzion Model, such as: 1) to create the new energy-capacious, ecology-pure with simple technology nuclear energetics; 2) principle & radical utilization of radioactive wastes; 3) cheap production of some chemical elements & isotopes (gold for example). The Erzion Model can explain many experiments in Cold Fusion & can predict many new experiments for its testing.

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Synthesis Of A Copper Like Compound From Nickel And Hydrogen

J. Dufour, D. Murat, X. Dufour and J. Foos
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Various phenomenon have been observed, when hydrogen isotopes are contacted with metals or submitted to the action of an electrical discharge. Among them, most striking are the following:

-the law of energy conservation is violated (a system releases more energy to than it receives from the outside). This has been called "excess energy" and was observed for instance in the electrolysis of heavy water with palladium electrodes (Fleischmann and Pons), and in the electrolysis of light water with plasma at a tungsten cathode (Mizuno).

-elements with an abnormal isotopic composition are synthesized in the system during the experiment. (Iwamura).

-nuclear radiations are emitted during and after the experiment (Savvatimova).

Given the very low level of "reaction products" appearing in the experiment, when compared to the level of "excess energy" observed, these phenomenon have been ascribed to a special kind of nuclear reactions (Cold Fusion-CF-, Low Energy Nuclear Reactions-LENR-). These reactions would emit several orders of magnitude less radiations than expected from the "excess energy" or the amount of "reaction products" observed.

From an operational point of view, these reactions (if true) are very difficult to trigger. A macroscopic effect (sizeable excess energy) is seldom achieved. This might be the consequence of a relatively high level of energy required for those unknown reactions to occur (5 to 10 eV). Such levels of activation energies are indeed found in metal lattices or in gaseous plasmas. These reactions usually result in the apparition of reaction products in trace amount and/or the emission of nuclear radiations, without measurable "excess energy". It has nevertheless been thought that the microscopic features of these products could well provide guidance for better controlling the macroscopic effect (excess energy).Use has been made of 2 techniques for measuring the trace amounts of the products formed in selected experiments:

-ICP-OES, based on the properties of the outermost electronic layers of the trace element produced.

-ICP-MS, based on the atomic mass of this element.

Experiments have been run with nickel that was contacted with hydrogen or deuterium. Both analytical techniques used revealed the appearance of copper. The amount formed was found significantly higher with ICP-OES than with ICP-MS. Similar approach, where palladium is contacted with hydrogen and deuterium is on-going. Corresponding results will be discussed.

A possible interpretation of the discrepancies observed between the 2 analytical techniques used, will be given. The consequences of the conjecture used to design the experimental scheme used will be summarized. They could explain, at a microscopic level, most of the features of the CF-LENR field.

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Roles of Approximate Symmetry and Finite Size in the Quantum Electrodynamics of Condensed Matter Nuclear Science

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Basic ideas about how resonant electromagnetic interactions (EMI's) can take place in finite solids are reviewed. These ideas not only provide a basis for conventional, electron energy band theory (which explains charge and heat transport in solids), but they also explain how through finite size effects, it is possible to create many of the kinds of effects envisioned by Giuliano Preparata. In particular, the boundary of a lattice is never known, prior to some form of measurement. Giuliano Preparata implicitly recognized this fact and suggested boundary effects could be quite important. He even recognized that forms of broken gauge symmetry implicitly could play an important role in the underlying dynamics (although he did not use this language, possibly because he did not know that formalism, based on this kind of phenomenon, exists). Unfortunately, he adopted a semi-classical model that superficially appeared to be too simple, and he used a non-standard language, that included new, unknown terminology (for example, "trapped photons", and the "Plasma's of Cold Fusion"). In fact, a known phenomenon, initially identified by Felix Bloch, commonly referred to as a "Bloch Oscillation," does approach the kind of very low frequency, plasma oscillation, suggested by Giuliano Preparata. When the additional possibility of allowing an ordered lattice to accelerate is taken into account, a form of Galilean invariance with respect to rigid translations can take place, provided, collisions are actually stifled. Within this kind of environment, within a frame that is stationary with respect to the center-of-mass of the lattice, forms of resonant coupling can take place, in which, the lattice, rigidly moves, without altering the separations of any of the particles within the lattice, and electromagnetic radiation can propagate in an elastic fashion, through a generalized form of Bragg Scattering. Within this context, the resulting semi-classical picture is strikingly similar to the intuitive picture suggested by Giuliano Preparata. One important difference is that the underlying limit, in which collisions are stifled, provides a new way for tunnelling to take place. In particular, through a variant of "Zener tunnelling" (involving ions in ion band states, as opposed to electrons, in electron band states) can take place. In this kind of situation, momentum, effectively, can become stored through a resonant condition, in which the total momentum of the lattice grows as a function of time, and the requirement that it is necessary for deuterons (d's) to overcome a static Coulomb barrier at a single point, for d+d fusion to take place, is replaced by a time-dependent QED barrier that depends on the magnitude of the potential, coherent variations in momentum that are allowed to take place, at many locations, simultaneously. Eventually, when the momentum is large enough, cooperative forms of nuclear reactions can take place. The underlying formalism occurs as a semi-classical limit, of the many-body problem, in which collisions are suppressed. The theory predicts that the orientation of the external fields in the SPAWAR protocol has direct bearing on the emission of high-energy particles. The quantum electrodynamics of finite size PdD lattices also implies that nano-scale particles, of a particular size, provide an optimal environment for initiating LENR in the PdD system.

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The Search for Nuclear Particles in the Pd-D Co-deposition Experiment*

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Abstract:

One of the earliest derivative experiments of the original Fleischman-Pons electrochemical experiment [1-3] was that of Szpak et al [4-5]. Instead of electrolytically loading with deuterium a bulk sample of Pd, they chose to deposit bulk metal palladium on a conductive substrate in a D_2O solution. This allowed deuterium atoms to evolve simultaneously on the surface of (and load into) the Pd film after the appropriate cell potential reached during the Pd deposition. The standard electrochemical D loading continued after the dissolved Pd was completely deposited on the cathode. Because of the small Pd particle size loading commenced quickly and, at least locally, to a high value. The small cathode assembly allowed easy measurement of temperature excursions, if not quantitative heat generation.

Recent work, by Boss et al [6-7] has concentrated on using solid state nuclear track detectors (SSNTD, specifically CR-39) to search for evidence of nuclear particles. In most of these experiments the CR-39 was immersed in the electrolyte, which makes the interpretation of the tracks potentially ambiguous because of the possibility of chemical damage. However, different interpretations of results presented have concluded that the data argue for the generation of alpha particles, protons, and/or neutrons. We have chosen to reproduce one version of these recent experiments using CR-39 immersed and separated from the electrolyte with a 6 µm thick piece of Mylar® film. A 60 µm thick piece of polyethylene, used as a protective cover during handling, was occasionally allowed to remain on the film to facilitate thermalization of possible product neutrons.

In addition to the presence of CR-39 in all experiments we have used a simple BF_3 ionization-type neutron detector to collect total neutron count versus time data near the operating cells. We will also report on experiments where a silicon surface barrier detector was used to measure the alpha energy spectrum an operating cell, also operated in time-resolved mode. For completeness, a NaI-based gamma spectrometer was operated in time resolved mode during cell operation.

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New Energy Times Archives

Overview of Polyneutron Theory

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Abstract

I suggest that neutron clusters of sufficient size are bound and stable against strong decay; and that they can react with ordinary nuclei by transferring neutrons to them, accepting neutrons from them, and binding with them to form composite nuclei. Implications of this enlarged scope of low temperature nuclear physics are outlined, including a chain reaction with nuclear fuel ^{2}H that produces energy, ^{4}He, ^{3}H, and a wide range of nuclear transmutations. Natural explanations emerge for these and other nuclear phenomena for which evidence has been accumulating over the past two decades.

Radiation Produced by Electrolysis

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Abstract

Electrolysis of ordinary water has previously been shown to produce particle tracks in CR39 detector chips placed beyond the boundary of the cell (R.A. Oriani and J. C. Fisher, Proc. 11th Int. Conf. Cold Fusion p295, World Scientific 2004). This phenomenon is confirmed and explored in more detail. Radioactivity does not come directly from the cell, but indirectly from secondary sources in the air. Radiation intensity declines with distance from the cell. The intensity is larger for electrolysis of heavy water, suggesting that deuterium is a fuel for the reaction within the cell. The particle whose decay is responsible for the radiation remains to be identified.

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Cluster Reactions in LENRs

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A distinctive array of nuclear reaction products was observed previously in the "Patterson" flowing packed-bed type electrolytic cell experiments using multi-layer thin films of metals on mm-size plastic beads [1]. The swimming electron layer and a new magic number theory were proposed to explain this. More recently these theories have been expanded into a "cluster" model to explain a wider range of transmutation experiments [2]. The cluster model is consistent with certain measurements of energetic charged-particle emission during thin film electrolysis, with observations suggesting localized reactions and also with x-ray production during plasma bombardment experiments [3-6]. The cluster reaction concept and supporting experimental data will be discussed in this presentation. In addition to explaining transmutations, if understood and optimized, cluster reactions could lead to an important new power source based on LENR.

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X-ray Emission from Pulse Loaded Pd-D

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A high-current discharge apparatus with a unique pulsed power supply has been constructed to demonstrate intense "ion-cluster induced" x-ray emission in the 1-2 keV range. Such emission is associated with ion implantation rather than normal electron Bremsstrahlung x-rays. This new type of emission was observed during glow discharge operation with a solid-state x-ray detector. Typical conditions were: cathode/anode separation of ~4.0 mm, at a voltage of 0.4-0.8 kV, 0.1-5.0 torr and 0.2-2.0 ms pulsed current at ~2 A. The x-rays observed (≥0.6 keV) originate at the Pd cathode and thus cannot be explained by electron Bremsstrahlung radiation which would originate at the anode. A theory to explain the result assumes formation of a DD-e cluster state in dislocation loop regions of the Pd target during ion bombardment. These clusters form the upper state for the x-ray emission.

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Specific phenomena during deuterium absorption in palladium, using SuperWave modulated loading

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Abstract for poster presentation

We examine the effect of various impurity inclusions in Pd on its structural rearrangement in the processes of annealing and deuterium absorption during loading using SuperWave modulated current. We found that silicon-containing inclusions (typical sort of inclusion in Pd) lead to a local metal melting and secondary crystallization during the annealing.
As well an effect of local palladium secondary crystallization was found after electrolysis localized in the area of non-conducting inclusions in the metal.

We studied an increasing of the concentration of point and linear defects (potential deuterium traps). The origination of these defects is due, in particular, to disorientation of newly formed crystals of α- and β-phases. The mentioned processes promote the intensification of deuterium absorption and, consequently, stimulate the process of excess heat release.
In addition, micro-heterogeneity in palladium increases due to the effect of deuterium electro-migration during electrolysis.

Summarizing all above mentioned, the concept of local active areas, where low-temperature nuclear processes can be initiated, seems quite explicable.

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Update on Experimental Results at Coolescence, LLC

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Abstract for poster presentation

During the past year work has continued studying the behavior of palladium in a deuterium glow discharge. A second generation flow calorimeter has been built with a sensitivity of 20 mW or 1% of input power. Loading behavior of Pd has been characterized in DC and pulsed DC discharges. To date no excess heat has been observed during glow discharge experiments.

The following observations have been made during glow discharge loading runs:

- No high loading (D/Pd < .7)
- No bulk loading at higher temperatures (T > 80 deg C)
- Loading rate proportional to current (J < 100mA/cm2)
- 5-10 D's loaded for each D+ of ion current (Faradaic Efficiency 5-10)
- High D flux during pulsed discharge (.01 sccm/cm2 per mA of glow)
- Instantaneous loading rate insensitive to temperature, voltage, and pressure
- GD causes damage to Pd (sputtering)

A new experiment has been designed to reproduce the gas flow results first reported by X. Z. Li in ICCF-9[1]. An apparatus similar to that described by Li in ICCF-10[2] is used. Deuterium gas is allowed to diffuse through a 100 um Pd foil as the temperature is increased from 120 to 170 deg C, then back to 120 deg C. No results are available at this time as this experiment is still in progress.

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From Cold Fusion to Condensed Matter Nuclear Science*

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Abstract

Imprinted indelibly into our individual and collective consciousness, the name "cold fusion" appears to have originated with Jones and Rafelski [1-3]. These authors invoked the phrase "cold nuclear fusion" to describe muon catalyzed pairwise d-d fusion[1] and later argued in 1989 that this effect was responsible for low level neutron generation in condensed matter reactions[4]. Although the evidence for heat effects in palladium deuteride was clear at that time [5] and ultimately determined to be sound [6], direct evidence of commensurate fusion product creation was slow in coming [7 and see reviews 6,8,9]. To this date no evidence has been accumulated of reactant consumption in d-d heat production, and the measured product distributions, $^{4}He >> {}^{3}H >> n°$, cannot be associated plausibly with two body fusion effects.

The phrase "Condensed Matter Nuclear Science" or CMNS was crafted[2] to extend the reference topic area and accommodate increasing evidence of nuclear products not consonant with orthodox fusion or fission reactions. This broadening in emphasis was both rational and necessary to accommodate new information. Nevertheless this change has defocused attention from the original claim of PdD nuclear-level heat energy (and possibly helium) production [5] that has led to two unforeseen consequences that are largely negative, at least in the short term. These are:

(i) the parameter space of excess heat production has been insufficiently well studied and understood to institute a fully replicable experiment;
(ii) the practical utility of metal deuteride heat production is not yet well defined in it's limits or even application.

A program instituted by Energetics[3] is seeking to help redress these two deficiencies in CMNS studies by controlling the palladium metallurgy, surface morphology and particularly the loading and excitation waveform(s) of electrolytic cathodes. A program recently completed at SRI was successful in replicating experiments performed initially by Energetics scientists in Omer, Israel, pursuing the theoretical concepts of Dardik [10 – 12]. A second, independent replication attempt was mounted and successfully completed at ENEA, Frascati[4]; these combined results form the basis of a joint publication from the three laboratories [13]. Results of the work at SRI and ENEA will be discussed in the context of the replicability and practically of CMNS heat effects.

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1 Other reactions are possible, including p-d and d-t. The idea of muon catalyzed fusion itself is due to Sakharov and Frank and was first observed experimentally by Alvarez in 1957.

2 This phrase and acronym CMNS was coined purposefully at the meeting of the International Advisory Committee of ICCF-9, in Beijing chaired by Professor X. Z. Li on May 22, 2002.

3 Energetics LLC, Califon, New Jersey, USA.

4 In the laboratory of Dr. V. Violante at ENEA, Frascati, Italy.

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Changes in surface layer impurities of Pd due to heat and/or hydrogen-permeation treatments and their influence on hydrogen permeability

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The deuterium gas permeation method through Pd has attracted increasing attention. Iwamura et al.[1] has employed the D2 gas permeation method in Pd/CaO multi-layer system and has claimed that the nuclear transmutation they have observed is highly reproducible. Arata and Zhang[2] have developed a device for excess heat production in which Pd nano- particles are exposed to D2 gas through a Pd wall, and have claimed that the reliability of heat production has greatly been improved compared to their previous method in which Pd particles are loaded with deuterium by the electro- chemical method. Therefore, the behavior of deuterium flow in Pd seems to be a key factor in the condensed matter nuclear phenomena. The flow rate of hydrogen through Pd is greatly affected by the surface state. In this paper, we have studied the correlation between the surface layer impurity elements and the flow rate of D2 through Pd. The surface layer impurity elements have been found to change with D2 gas permeation as well as with heat treatments.

Pd foils 50 μm thick were heated in air or in vacuum at temperatures in the range 573-1273K, and the foils were subjected to D2 gas permeation at 343K. X-ray photoelectron spectroscopy (XPS) was used to examine the changes in surface layer elements for samples before and after D2 permeation. The most remarkable changes were seen for S: (1) Annealing in vacuum resulted in a considerable segregation of S on the surface, and the sample showed a poor D2 permeability. (2) Only a small amount of S was observed for samples annealed in air at higher temperatures, and the sample showed a good initial permeability. (3) A good permeability observed for the samples annealed in air deteriorated with increasing period of D2 permeation. For the sample after the long-period -D2 permeation, a significant amount of S was observed, suggesting a surface segregation of S during the D2 gas permeation treatment at 343K.

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New Energy Times Archives

Transmuation In Tungsten Irradiated By Low Energy Deuterium Ions

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Two series analyses of W and Ta after Deuterium Glow Discharge experiments were carrying out by Thermoionization mass-spectrometry (TIMS). First set–"right away"- foil was analyzed every 15 minutes after experiment immediately («Finnigan» MAT -262 TIMS). Second set - foils were analyzed ~ 3-5 months after experiments. Compare data of initial mass specters and mass specters after deuterium bombardment presented in Tables l and 2. Main isotopes changes in different experiments with W and Ta foils for various time intervals were investigated in detail for mass range 166-210. The increasing of the separate isotopes with masses smaller than tungsten isotopes masses by factor 5 – 1000 was observed. Temperature of analyze was ~ 1800oC.

Table 1.**Tungsten, irradiated by deuterium ions at glow discharge and analyzed by tims (cps) *****

Time* Mass	84*	101*	137*	1062*	1073*	1133*	1150*	**
168	-	-	40	30	60	**2000**	30	10 ±10
170	-	-	40	55	50	**1600**	**100**	5 ±5
171	-	-	60	**95**	**100**	**100**	70	5 ±5
172	-	-	70	**100**	**100**	**200**	**100**	0
173	-	-	80	75	70	**300**	**100**	15 ±15
174	-	-	30	55	60	**200**	**100**	5 ±5
175	-	-	40	55	70	40	85	5 ±5
176	-	-	40	55	40	95	75	5 ±5
177	-	-	40	55	40	10	**100**	10 ±10
180	-	**70**	10	45	100	20	30	25 ±5
181	-	**100**	10	30	40	50	-	5 ±5

*Minutes after experiment;
**initial W
*** First set of W experiments (counts per second)
The Table demonstrates that decay goes on after having the experiment stopped

Table 2. Tungsten after deuterium bombardment, analyzed by TIMS (CPS) (set 2)

# exper	#1817				#1820					#1821	Initial
Date	16.3.7	16.3.7	19.3.7	20.3.07	21.4.7	21.4.7	23.4.7	14.5.7	14.05.07	20.3.7	****
Mass	*	*	*	*	**	**	**	***	***	***	
168		0			**235**	**200**	75		**130**		30±10
169		25			**475**	**500**	85		**243**		30±10
170		70			**600**	**600**			**243**		30±10
171	40	70	40	45	**950**	**950**	150	140	**1670**	25	35±10
172	80	80	55	55	**5000**	**6000**	700	15	40	65	20±10
173	**400**	**400**	**300**	**300**	**200**	**200**	50	40	**488**	**200**	25±10
174	45	50	25	30	**1600**	**1615**	230	8	0	46	15±10
175	125	170	75	80	15		15	35	300	70	20±5
176*	8	8	8	8	30		15	50	0		20±5
177	8	8	8	0	30		40	130	35		8±1
178	15	8	0	8	50		**19500**	20	30		8±1
179	0	8	0	8	70		60	**220**	**100**		30±10
180	25	15	8	0			80	**480**	**320**		20±5
181			0	120			40	**1000**			30±5

Time after experiment:
*- 3 months; **- 4 months;
***-5 months.
****-average CPS of initial spectra for all moths.

Conclusion:

1. The isotopes with masses 169, 170, 171, 178, 180, 181 (less than W and Ta isotopes) after deuterium Glow Discharge were found in W and Ta initial matters by TIMS.
2. The isotopic changes continue to occur at least 3 - 5 months after Glow Discharge exposure. The observed increase of the separate isotopes with masses less Tungsten and Tantalum isotopes were by a factor 5 – 1000 times.
3. The comparison of mass spectra with gamma spectra allows to suppose the exist of next isotopes : ${}^{169}_{70}Yb$; ${}^{170}_{72}Hf$; ${}^{171m}_{70}Yb$; ${}^{172}_{72}Hf$; ${}^{178}_{70}Yb$; ${}^{180}_{70}Yb$; ${}^{180m}_{72}Hf$.

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A Review of Experimental studies about Hydrogen over-loading in Palladium wires (H/Pd $\geq$ 1)

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Abstract

Many hundred of systematic tests have been performed in order to achieve very high concentration of Hydrogen into Palladium wires.

The electrodes (cathode in central position: Pd wires 50 or 100 μm tick and anode: Pt wires 0.5 mm tick) were placed in a coaxial geometry into a small cylinder electrolytic cell.

A peculiar study has been performed in order to optimise the electrolytic solution based on H_2O (400 cm^3) + HCl (50 ÷ 200 μM) and small amounts (tenth of μM) of one of these alkaline elements: **Li, Na, K, Ca** or **Sr**; furthermore, very small amount (hundreds of nM) of **$HgCl_2$** has been added to the solution. **The addition of Mercury has been crucial to achieve very high and stable H/Pd loading.**

To increase the reproducibility of the over-loading a peculiar loading protocol based on high / low (or OFF/ON) cathodic current cycles has been tested successfully.

The H/Pd loading ratios have been estimated by the on-line measurement of the normalised wire resistance (R/Ro).

Loading results are quite satisfactory: **H/Pd ≥ 0.97** (R/Ro ≤ 1.30; input electrolytic power: 7V, 5mA) are typically reached and sometimes **H/Pd ≥ 1** (R/Ro ≅ 1.15; input power: 11V, 2.5mA) has also been achieved. **The reproducibility of the results is quite satisfactory.**

Studies are in progress in order to optimise the composition of the electrolyte and substitute Deuterium instead of Hydrogen onto the solution.

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Research into Low Energy Nuclear Reactions in Electric Discharge Systems Experiments with Hydrogen / Deuterium Loaded Metals Cathodes

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Abstract

The experimental investigation of heat and high-energy production resulting from nuclear processes proceeding in the cathode solid medium in the electric discharge systems is presented. The Excess Heat power was registered in experiments with High-Voltage Electrolysis (up to 1000 V) and high-current Glow Discharge. The production of impurity nuclides (nuclear ash) with atomic masses less than and more than that of the cathode material was recorded.

The X-ray emission was registered during the Glow Discharge operation and after the Glow Discharge current switch off. Presumably the observed X-ray emission proceeds as a result of deactivation of the long-lived excited energetic states in the cathode solid medium. These excited energetic states (0.5 – 10.0 keV) formed in the cathode solid medium trigger LENR (Low Energy Nuclear Reactions) which lead to production of Excess Heat power and nuclear ash.

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Selective Resonant Tunnelling Coulomb Barrier by Confined Charged Particles in Lattice Well*

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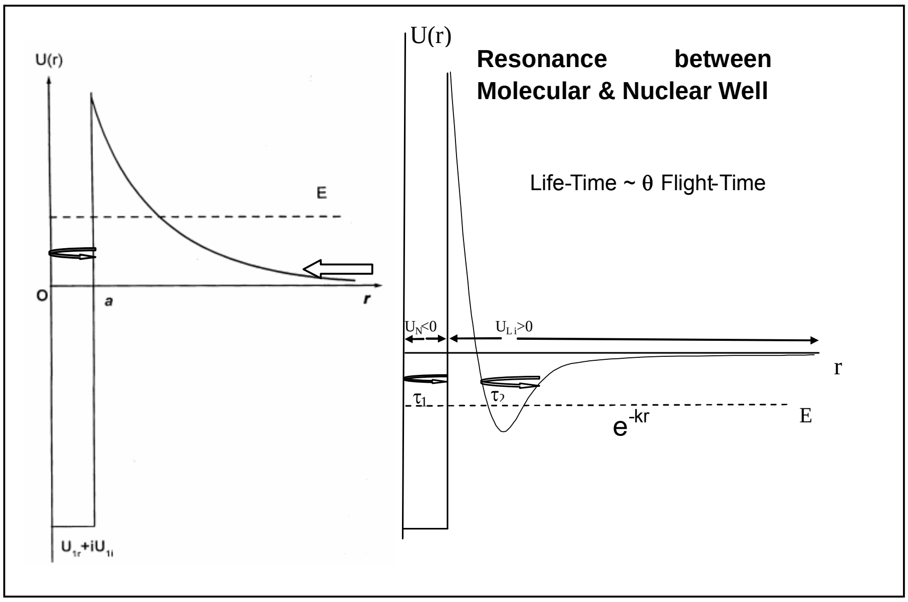
Selective resonant tunnelling model has led to a formula for beam-target interactions (left plot):

$$\sigma_r = \frac{\pi}{k^2}\frac{(-4W_i)}{W_r^2 + (W_i - 1)^2}$$

which has been successful in explaining 3 puzzles in "cold fusion" proposed by Huizenga; in calculating 3 major hot fusion cross-sections; in expecting the 3-deuteron fusion reactions; in anticipating the correlation between anomalous deuterium flux and "excess heat". Now selective resonant tunnelling model is applied to the case of a pair of confined deuterons (right plot)



It is shown that the tunnelling current through Coulomb barrier depends on 4 parameters: the Gamow penetration factor ($1/\theta^2$); the lifetime of $^4He^*$(τ_N); the flight-time in nuclear well (τ_1); and the flight-time in lattice well (τ_2).

$$J = -\frac{\tau_N}{\theta^2\tau_1\tau_2 + \tau_N^2}$$

It is clearly shown that the tunnelling current must have a peak because it approaches zero at both $\tau_N \to 0$ and $\tau_N \to \infty$. The peak value is:

$$J_{\max} = -1/(2\theta\sqrt{\tau_1\tau_2}) .$$

This agrees with the previous derivation in 1996: $J_{\max} \propto 1/\theta$. It agrees with the "heat after death" data; with the new beam-target experiments at low energy in Europe; and predicts the possible power density in the future reactor based on the condensed matter nuclear science.

*This work is supported by Natural Science foundation of China(#10475045), and many thanks to the Fulvio Frisone Foundation.

New Energy Times Archives

Gas-Loading Experiment with Pumping inside Pd Tube*

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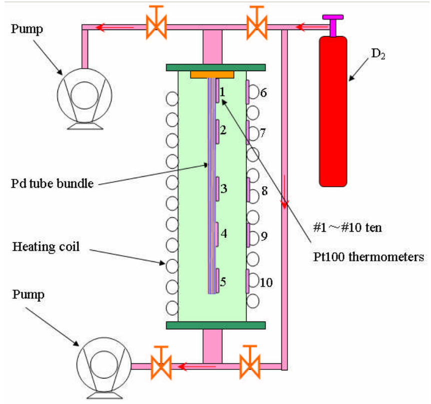
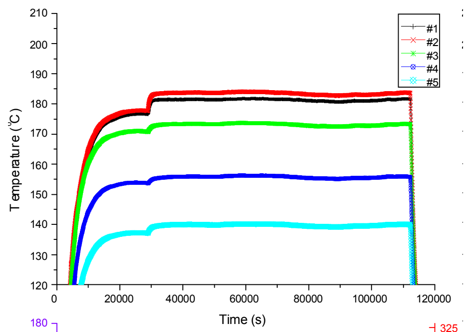
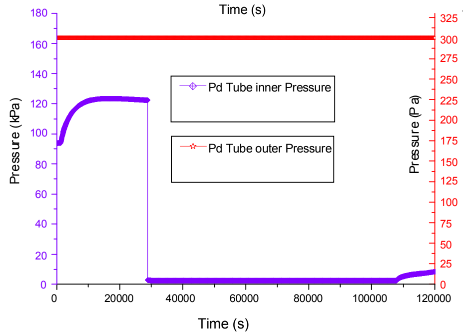
Gas-loading experiment instead of electrolysis started early in 1989 at Tsinghua University, because we started detection of energetic charged particles using CR-39 instead of detection of neutrons which was not the necessary products of nuclear reaction between two positively charged nuclei. The "heat-after-death" experiments in 1992 encouraged us to continue the gas-loading experiment for "excess heat". Flanagan and Oats (1972) paper showed the good reproducibility of high loading in terms of gas-loading; hence, we studied the loading behavior of long-thin Pd wire in high temperature and low D_2 pressure instead of low temperature and high D_2 pressure. This led to the discovery of "pumping effect" which was first presented in Asti Workshop (1999). Unfortunately, that Asti Workshop failed to publish its proceedings, and this "pumping effect" was published later in ICCF-9 (2002) in combination with 2 sequential work:[1]: (1)Correlation between anomalous D_2 flux and heat flow using high-precision calorimeter; (2)Confirmation of "pumping effect" using infrared camera. This resulted the collaboration with Dr. Glenn Schmidt in IREA at University of New Mexico in 2003. Thanks to Prof. Biberian, in 2004 we became aware of the Fralick's memorandum for his early gas-loading experiment, and it led to the collaboration with INFICON in 2005 using high resolution QMS. During ICCF-12 (2005) Arata and Zhang presented their gas-loading experiments using DS-cathode instead of electrolysis. They worked at the temperature zone (140^{o}C~150^{o}C), which just coincided with our early work in 2002 for correlation between anomalous D_2 flux and heat flow. In order to build a self-sustaining reactor in condensed matter nuclear science, we have to increase the surface area of Pd, and improve the thermal insulation. A bundle of long-thin Pd tubes were the core element in this new apparatus (upper plot). To avoid any confusion due to the coefficient of heat conductivity, we pumped the D_2 inside the Pd tube instead of pumping outside the Pd tube. The results are positive, clear and reproducible (lower 2 plots). It agrees with the selective resonant tunnelling theory as well.







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[1]Xing Z. Li, Bin Liu etc., "Pumping Effect"-Reproducible Excess Heat in a Gas-Loading D/Pd System-, Proceedings of ICCF9, Beijing, May 19-22, 2002.

*This work is supported by Natural Science foundation of China (#10475045).

New Energy Times Archives

ToF-SIMS Analysis on the Surface Layer of Pd and Pd-Y Alloy Permeated by Deuterium Flux*

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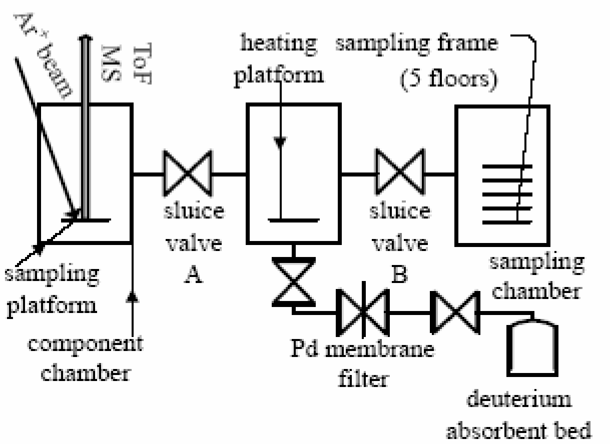
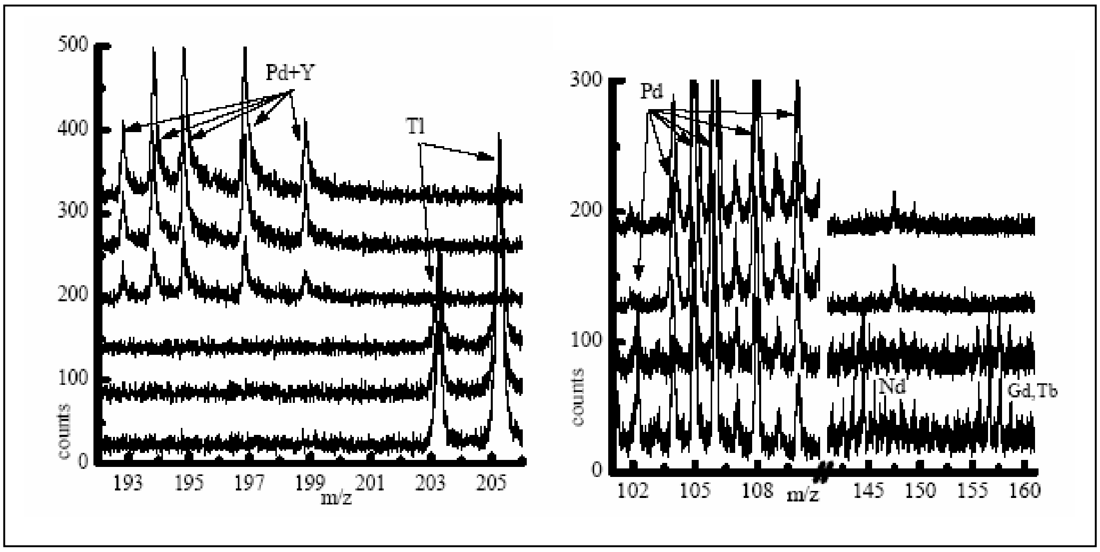
A Time-of-flight Secondary Ion Mass Spectrometer at State Key Laboratory. of Surface Physics. and Chemistry was used to find the new elements on the surface of Pd metal and Pd-Y alloy. The schematics below shows that deuterium permeation and SIMS analysis might be carried out in a high vacuum system on line to avoid any contamination, and the background analysis confirmed its validity as well



Preliminary analysis showed that there were rare earth elements Gd,Tb,Nd on the surface layer of Pd after D_2 permeation, and there was rare earth element Tl on some points of the surface layer of Pd-Y alloy after D_2 permeation. In contrast to Iwamura's experiments, the temperature of samples may reach 400^{o}C, and no multiple-layer surface coating here.



*This work is supported by Natural Science foundation of China (#10475045).

New Energy Times Archives

Calculation of the bound states of the magnetic monopole and the small nuclear system

Tetsuo Sawada (RIMM)

It is well-known that the magnetic monopole accompanies the super-strong magnetic Coulomb field, and the magnetic counterpart of the "fine structure constant" is as large as $*e^2/\hbar c = 137.04\ D^2/4$ where D=1 and D=2 for Dirac and Schwinger monopole respectively. The nucleons have the small magnetic moments $\kappa_{tot}(e/2m)\vec{\sigma}$ where m is the proton mass and $\vec{\sigma}$ are the Pauli matrices of the nucleons, and κ_{tot} = 2.8 and -1.9 respectively for proton and neutron. Therefore the Hamiltonian of the nucleon in the magnetic Coulomb field produced by a monopole fixed at the origin becomes

$$H_{m-N} = (1/2M)(-i\hbar\vec{\nabla} - Ze\vec{A})^2 - \kappa_{tot}(D/4m)(\hat{r}\cdot\vec{\sigma}/r^2)F(r)$$

in which the charge quantization condition *e e = D/2 is used. F(r) comes from the nucleon form factor and its form is $F(r) = 1-(1+ar+a^2r^2/2)\exp[-ar]$ with $a = 6.04\mu_\pi$. The vector potential $\vec{A}$ must be chosen in such a way that its rotation becomes the magnetic Coulomb field: $\vec{\nabla}\times\vec{A} = {*e}\,\hat{r}/r^2$. In the Hamiltonian, Z=1 and 0 for the proton and the neutron respectively.

It is straightforward to extend the above 1-nucleon Hamiltonian to A-nucleon Hamiltonian $H_A = \sum_i H^{(i)}_{m-N} + \sum_{i>j} V_{i,j}$, where $V_{i,j}$ is the known nuclear potential between i-th and j-th nucleons. Once the Hamiltonian is known, from the quantum theory we can determine the ground state and can trace the time development of the wave function by solving the time dependent Schrödinger equation $i\hbar\partial_t\Psi = H_A\Psi$. For A=1 we can solve the equation exactly. However for larger A, the simulation of the equation is inevitable, and the necessary computing time increases rapidly with A. So we shall consider only the small nuclear system: $A \leq 4$. Even in such a small system, we can expect to see the novel feature of the monopole and nuclear system. For example, in the zero incident energy reaction of $d + d \rightarrow {}^4He$, the fixed magnetic monopole starts to gather the surrounding deuterons and to form the bound state, in which the direction of the magnetic moment of the deuteron orients outward. When the two deuterons are trapped, they fuse to become tightly bound nucleus ${}^4He$ by flipping the spin , which is caused by the spin-flip term of the nuclear potential. Since the spin-0 charged particle such as ${}^4He$ cannot form the bound state with the monopole, the α-particle is emitted and there remains a fresh monopole and it again start to gather the deuterons. In this way the cycle of the nuclear fusion reaction closes. The extension of the nuclear physics to include the magnetic monopole as an additional ingredient is fruitful, since it can serve to convince the nuclear physicist of the reality of the nuclear cold fusion theoretically.

New Energy Times Archives

Hypothesis Of A Double Barrier Regarding The D-D Interaction In A Pd Lattice: A Possible Explanation Of Cold Fusion Experiment Failures

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Abstract

During the past 15 years, disputable experimental evidence has built up for low energy nuclear reaction phenomena (LERN) in specialized heavy hydrogen systems [1-4]. Actually we can not say that a new branch of science is beginning. In spite of experimental contributions, the real problem is that the theoretical statements of LERN are not known. In this work we analyze the deuteron-deuteron reactions within palladium lattice by means of the coherence theory of nuclear and condensed matter [5] and, using this general theoretical framework accepted from "cold fusion scientists", will show the low occurrence probability of fusion phenomena. In fact in the coherence approach, the *D-D* potential exhibits a double barrier features and in this way the *D-D* fusion is hampered.

New Energy Times Archives

Accelerated Deactivation of Reactor Cs-137 Isotope In Growing Biological Cells

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The problem of transmutation of stable and active isotopes in biological systems is one of most mysterious in a modern physics. The hypothesis about the possibility of nuclear transmutation of chemical elements and their isotopes in physical, biological and geological systems with low energy of relative movement of interacting nuclei has been frequently discussed during the last decades. Interest toward this issue grew after systematic study of the phenomenon of cold nuclear fusion (CNF) based on dd-reactions in solid bodies has begun.

In our opinion, there are no reasons to consider the process of transformation of isotopes and elements biological transmutation and separate it from the general physical concept of transmutation as a process of transformation of isotopes, governed by the laws of physics. We believe that all the observed isotopic effects (in case they are real and supported by adequate and reliable measurements) can be characterized as the “regular” process of transmutation of isotopes and elements, which occurs in biological systems, and the efficacy of which is determined precisely by the specifics of such systems.

In the work the process of direct controlled deactivation of highly active water mixture of selected different long-lived active isotopes in growing microbiological cultures has been studied. The process was connected with transmutation of long-lived active nuclei to non-radioactive isotopes during growth and metabolism of special microbiological MCT ("microbial catalyst-transmutator"). The MCT is the special granules that include: concentrated biomass of metabolically active microorganisms, sources of carbon and energy, phosphorus, nitrogen, etc., and gluing substances that keep all components in the form of granules stable in water solutions for a long period of time at any external conditions.

The base of the MCT is microbe syntrophin associations of thousands different microorganism kinds that are in the state of complete symbiosis. These microorganisms appertain to different physiological groups that represent practically the whole variety of the microbe metabolism and relevantly all kinds of microbe accumulation mechanisms. The state of complete symbiosis of the syntrophin associations results on the possibility of maximal adaptation of the microorganisms’ association to any external conditions change. The mechanism of nuclear transmutation in growing biological system is described in [1].

The research has been carried out on the basis of the same distilled water that contained reactor isotope Cs^{137}. The cultures were grown at the temperature 25^0 C. Activity of all closed flasks has been measured every 7 days by amplitude Ge detector.

The results of controlled influence on gamma-radioactivity of different isotopes in different biochemical compositions are reported. The accelerated deactivation of Cs^{137} isotope was observed! We have observed speeded up decay of Cs^{137} isotope in all experiments with MCT and with the presence of different additional salts during more 100 days. In control experiment (flask with active water) the law of decay was "usual" and the life-time was about 30 years.

The most speeded up decay of Cs^{137} isotope with $\tau^* \approx 310$ days (accelerated by 35 times) was observed at the presence of Ca salt. At the presence of abnormal (redundant) quantity of potassium in the nutritious media the process of cesium transmutation becomes very weak and life-time of decay was about 10 years.

1. Vysotskii V.I., Kornilova A.A. Nuclear fusion and transmutation of isotopes in biological systems, Moscow, "MIR" Publishing House, 2003, 302 p.

New Energy Times Archives

Multiple Resonance Scattering

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Abstract

The previously proposed Multiple Resonance Scattering (MRS) theory [1] is elaborated. In addition of predicting a radiationless fusion of two deuterium nuclei into a ^{4}He-nucleus in its ground state, the MRS theory is also shown to be in agreement with the experimental results concerning the transmutations of heavier nuclei. Changes in the isotopic abundances due to the transmutation processes are predicted both in the metal deuterides and hydrides. New experiments are proposed to verify the MRS theory. Moreover, the nuclear active environment is discussed.

1. T. Toimela, "Effective Potential in the Deuterium Plasma and Multiple Resonance Scattering", PROC ICCF11, p. 622, Marseilles, France.

New Energy Times Archives

2. Some consideration on the PdH_x relative resistance versus x

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Considerable investigations of palladium-hydrogen (PdH_x) system, as to define the hydrogen content (stoichiometric atomic ratio x) and transport properties in PdH_x have been carried out.
In the last 10 years several independent research groups used diverse ways to load Pd achieving significantly high stoichiometric value x.
Experimental method and results showing the PdH_x relative resistance $\mathcal{R}=R/R_o$ as a function of stoichiometry x will be discussed. Same results suggest that the stoichiometry x calculated by the $\mathcal{R} = \mathcal{R}(x,T)$ could be under estimated.
A remark on the α, β and γ phase transition in PdH_x will be considered.

$PdH(D,T)_x$ system: Are excess of enthalpy and superconductivity two concurrent phenomena affected by stoichiometry x ?

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Evidence of superconductivity and excess enthalpy in $PdH(D,T)_x$ system has been found in many experiments in the last 18 years. Both these phenomena are functional of the stoichiometry x. Increasing stoichiometry x, the enthalpy excess increases as well as the critical temperature of the $PdH(D,T)_x$ system.
At room temperature, the enthalpy excess is observed when a threshold stoichiometry x=0.9 is reached and then it seems to disappear in time while the stoichiometry increases. Probably this is due to the increasing of superconducting critical temperature up to room temperature where the superconductivity sets the $PdH(D,T)_x$ system in a very low energy state that could inhibit the excess enthalpy production. A stoichiometry window for the excess enthalpy phenomena will be proposed and discussed.

New Energy Times Archives

Analysis of Winthrop Williams's CR-39 detector after SPAWAR/Galileo type electrolysis experiment #2

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Using automated track reading facility PAVICOM we have carried out detailed manual analysis of W. Williams's #2 CR-39 detector subjected to Galileo/SPAWAR type of electrolysis experiment in UCB [1]. The detector was attached to the wire cathode (without using a mylar protective filter) during the Pd deposition experiment in Deuterium containing electrolyte.
In spite of enormous pit density at the contact area between the cathode wire and CR-39 detector, the entire data extracted during #2 Winthrop detector analysis do not show any reasonable signature of real nuclear tracks. The main features of the pits (from the front side attached to the cathode wire) that force us to come to this conclusion are follow:
-High density overlapping pits (we usually call this a "ground beef") near the scratch from the cathode wire ($N > 10^8$ cm^{-2}) at the front side facing the cathode. During etch in depth these pits loose their contrast and smooth circular shape (which is a signature of nuclear particles). The last factor indicates that these pits are shallow. At the same time, no pits (above the standard Background) were detected at the opposite side of the #2 CR-39 detector.
-The individual analyzed pits show three groups of diameters: D < 4 μm, D > 12 μm and 4 μm < D < 12 μm at etch time equivalent to t = 7 hr. The first two groups, according to our calibrations, cannot be ascribed to proton and alpha particles. The group with D < 4 μm is totally disappeared after 14 hr etch, indicating shallow surface defects. The group of pits with D > 12 μm also cannot be ascribed to heavy nuclear particles (Li^6 or heavier ions) because contrary to heavy ions these pits demonstrate very slow dynamics of their diameter growths vs. etch time.
-Almost no elliptic shape pits were found among the both overlapping and individual tracks, suggesting absence of the projectile particles with oblique incidence. This is not really possible if the source of the particles (e.g. cathode wire) is attached to the CR-39 surface.
-The group of pits with appropriate initial diameter (4 μm < D < 12 μm after ~ 7 hr of etch in 6M NaOH at t =70 C) consistent with protons and alpha tracks at etch time t = 7 hr do not demonstrate track etch rate required for those nuclear particles. The etch rate (inside the "track") for these pits is 2-10 times lower than that required for nuclear particles with the same initial track diameter. This indicates that radiation destruction of CR-39 material inside the pits is significantly less than that from the nuclear particles.
-The similar high density pits of low and medium diameter range can be successfully simulated by mechanical stress indicating massive defect generation at the surface of the CR-39 detector with attached wire. It was also found that irradiation of Landauer CR-39 detector with corona discharge in air during 5 min and then etching in standard conditions during t = 7 hr leads to formation of pits of various diameter. These pits (including overlapping) are very similar to that appeared at the surface of the #2 detector (with diameters in the range 2-20 micron) obtained after SPAWAR electrolysis and etched then during 7 hr.
The application of magnetic/electric field to the detector during Pd deposition experiment [2] would only enhance the charged defects (or sparks) generation to intensify pit formation.
We thank W. Williams and E. Greenspan providing us access to this detector, as well as Steve Krivit, supporting this work.

[1] W. Williams, Presentation at March 2007 APS Meeting. (Bull Am. Phys. Soc., 2007).
[2] P.A. Mosier-Boss, S. Szpak, & F.E. Gordon, Production of High Energy Particles Using the Pd/D Co-Deposition Process, Presentation at March 2007 APS Meeting, Denver, Co.

New Energy Times Archives

Analysis of the CR-39 detectors from SRI's SPAWAR/Galileo type electrolysis experiments #7 and #5. Signature of possible neutron emission

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During April – June , 2007 we carried out detailed analysis of the Landauer CR-39 detector (exposed to the cathode wire during SRI's #BE013-7 (#7) Pd deposition experiment [1]) at three different removed depths using three consecutive etching times, of approximately 7, 14 and 21 hours in 6M-NaOH at t = 70 °C at $v_b \approx 1.3$ μm/hr. We compared the results with that of the blank CR-39 and the proton recoil tracks from a Cf-252 neutron source. The readings were performed manually using the "PAVICOM" track reading facility in Lebedev Physics Institute, Russian Academy of Sciences, Moscow, Russia. The #7 detector was separated from the cathode and electrolyte by a sheet of 6 μm mylar protecting the CR-39 surface from mechanical stress and electrostatic (spark discharge) damage during electrolysis.

We read the tracks from the #7 detector's and the blank's front face (facing the cathode) and rear face (facing the cell wall). The area read on the Foreground #7 detector was S=1.0 cm^2 on each side. For the blank detector (background) a small piece of CR-39 with a readable area of S = 0.25 cm^2 was cut from the Foreground detector before electrolysis. The blank detector contained a total of 3 track/0.5 cm^2 (from both sides) in the track diameter range of interest (4.0< d< 8.0 μm, t = 7 hr etch). This number is typical for the blank Landauer RadTrack detectors (N = 6±4 track/cm^2 seen in more than 100 measurements with fresh detectors). Hence, we concluded that the blank detector had not been irradiated by neutrons in airport security facilities. This observation allowed us to use our Background data obtained with Landauer detectors, in order to increase Background statistics used for comparison to that read from the Foreground #7 detector.

The entire data set obtained from the analysis of the #7 CR-39 detector, including 1) track reading within three removed depths (8.7, 18 and 27 μm), 2) comparison of Foreground #7 track densities and distributions of their diameters with similar parameters of the Background, 3) the neutron calibration, as well as 4) the CR-39 efficiency estimate with respect to Cf-252 neutrons, present preliminary evidence for fast neutron emission. The neutron energy is estimated to be in the range of $E_n \sim 2.2 – 2.5$ MeV with a rate of $I_n \sim 1$-3 n/s accounting for the 4π solid angle during the PdD_x deposition electrolysis run #7 at SRI [1].

The #5 CR-39 detector used in SRI BE010-5 PdD_x deposition electrolysis experiment had a 60 μm polyethylene film adhered to both faces while immersed in the electrolyte and in contact with the cathode. This detector showed controversial results. The front face was found to be covered with high density pits (defects) making it almost impossible to distinguish real nuclear tracks from chemical attack. However the rear face of #5 detector shows proton recoil tracks similar to those found on both faces of the # 7 CR-39 (with a track density 50 -70% of that of #7). The data obtained from the analysis of detector #5 allow us to conclude that a weak neutron emission from the cathode took place during electrolysis, in addition to some mechanical and electric discharge damage to the front face of the detector.

In order to provide confirmation for neutron emission in SRI experiments, the additional high efficiency measurements with other type of neutron detector would be desirable.

[1] F. Tanzella, M. McKubre, SRI Presentation at March 2007 APS meeting

New Energy Times Archives

Microscopic characterization of palladium electrodes for cold fusion experiments

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Abstract

Recent results [1] highlighted that material science is one of the more critical issues in condensed matter nuclear science. In the last years, the experimental results have given a clear indication that a relevant role within this task is played by the material properties of the cathodes.
In order to improve the characterization of the materials an approach, based on the atomic force microscopy is proposed in this paper.

The preliminary study is mainly oriented to identify, by means of the AFM results, parameters suitable for a screening of the materials.

[1] V. Violante, F. Sarto, E.Castagna, C. Sibilia, M.Bertolotti, R. Li Voti, G.Leahu, M. McKubre, F. Tanzella, K.Grabowski, G.Hubler, D. Knies, T. Zilov, and I. Dardik, "Calorimetric Results of ENEA Cooperative Experiments", Proceedings of the *13th International Conference on Condensed Matter Nuclear Science (ICCF13)*, Dagomys, Sochi, Russia June 25 - July 1, 2007

New Energy Times Archives

Joint Scientific Advances in Condensed Matter Nuclear Science

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Abstract

A joint effort by ENEA , SRI, Energetics, NRL and University of Rome “La Sapienza” attained of a remarkable level of reproducibility, both in high loading of palladium with deuterium and excess of power production during calorimetric experiments. The excess of heat was observed with up to 70% of reproducibility with a signal well above the measurement uncertainty.

The wide scientific work carried out in optimizing the palladium electrodes and the accuracy of the calorimetric study have been the reason for success.

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High temperature experiments, by differential reactor, on Deuterium absorbed by HSA Pd_black or γAl_2O_3-Pd-$Sr(NO_3)_2$ nanopowder.

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Abstract

Using the differential reactor, able to withstand high temperatures (350°C) and pressures (100bar), developed at Frascati National Laboratory of INFN since May 2007, they were studied Pd_black of High Surface Area (from Engelhard→Aldrich) and a new compound, based on nano-porous γAl_2O_3 filled with soluble salts of Pd and Sr (called nAlPdSr), before and after Deuterium absorption. Such last material was fully developed and prepared at INFN-LNF.
In proper experimental conditions were detected anomalous excess temperatures and (as a consequence) heat both with Pd_black and the new composite nAlPdSr.
In the case of Pd_black, using 4.8g of material, temperature increases by 13.5°C at a temperature of 280°C and at pressure of about 80 bar, corresponding to about 550mW of excess power.
After several cycling from high to room temperatures, under pressurised D_2, the anomalous temperature value decreased from 13.5°C to about 4°C. Under ^{4}He, there were no anomalous effects. The total time of experimentation was 34 days.
Using nAlPdSr, 9.7g of material (Pd=1.3g), were detected (at 290°C, 80bar) about 7-9°C, (corresponding to about 350mW of power) of anomalous temperature gain. The effect was stable even after several cycling from 290 to 25°C. The total time of experimentation was 30 days.
In comparison with Pd_black, the nAlPdSr compound showed better results because: it was stable against thermal cycling, had a specific gain (W/g of active material) over 2.5 times larger, can withstand temperatures as large as 350°C. *The last parameter is very important for view of technological applications.*
Because experimental constraints of our apparatus, we can not study effects at temperatures greater then 350°C. Anyway, in all the range of temperature studied (starting from about 120°C) the anomalous effect has a positive feedback, i.e. the temperature gain increases increasing the operating temperature.
We will also show results obtained by analysis with SEM (scanning electron microscope) and ICP-MS (inductively coupled plasma-mass spectroscopy).
Some isotopic anomalies were found with Pd_black after Deuterium absorption.

New Energy Times Archives

Gamma Emission In Tungsten During And After Deuterium Glow Discharge

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Gamma emission before, during and after of Deuterium Glow Discharge (DGD) experiments with refractory metals (W, Ta) was measured.

5 series of the gamma emission measurements using gamma/x ray CdTe XR 100T detector were carry out: 1- during DGD experiments outside of double quartz walls; 2 - after DGD experiments outside of double quartz walls; 3 - W foils after DGD experiments placed near Be window (~1mm) of gamma/x ray CdTe detector; 4 - W foils before experiments and 5 - background.

Intensity of gamma emission for the different foils depended of exposure dose, current density and other experimental conditions. Reproducibility of gamma/x ray spectra for closed conditions (for short time intervals) in these spectra was shown. Compare of energy peaks in gamma spectra of tungsten and tantalum after GDG showed the repeatability of energy peaks in spectra of different exposed foils during and after GDG experiments. Series of the main isotopes peaks were compared by two different methods (Gamma spectrometry and mass spectrometry).

W, after 1817,keV	W, after 1820,keV	W after 1818keV	Ta after 1824keV	Isotope	Eγ keV	Half-life	Decay mode	Mass
13±1	14.1	14,1	13,3	$^{180}Yb_{70}$	13,9	2,4m	β-	180
19±1	19,89	19,06	19±11	^{171m}Yb	19,39	5,25ms	IT	171
	20,7	20,71	20,7±1	$^{169}Yb_{70}$	20,75	32d	ε	169
22,5±1	23,19	23,19	23,2	$^{172}Hf_{72}$	23,4	1,87 y	ε	172
24±1	24	24.02	24,84	$^{172}Hf_{72}$	23,93	1,87 y	ε	172
42±1	42,18	42,36	42,18	$^{178}Yb_{70}$	42,4	74m	β-	178
42±1	43	43,1	43.01	$^{169}Yb_{70}$	42,76	32d	ε	169
45±	45,1	44,46	46,31	$^{170}Hf_{72}$	44,52	16 h	$\varepsilon+\beta^+$	170
50±1	51.2	50,44	51	$^{169}Yb_{70}$	51,1	32d	ε	169
54±1	54,57	55,40	53,73	$^{170}Hf_{72}$	55,2	16 h	$\varepsilon+\beta^+$	170
57±1	58,7	57,05	57,88	$^{180m}Hf_{72}$	57.555	5.5h	IT	180m
60±1	60,5	60,35	60,5±0,5	$^{172}Hf_{72}$	60,65	1.87 y	ε	172
63±1	63	62,83	63,5±0,5	$^{169}Yb_{70}$	63,12	32d	ε	169
67±1	68	66,96	67,79	$^{172}Hf_{72}$	67,3	1,87 y	ε	172
91±1	91±1	91,74	91	$^{172}Hf_{72}$	91,3	1,87 y	ε	172
100±1	99	100,82	99	$^{170}Hf_{72}$	99,93	16,01h	$\varepsilon+\beta^+$	170
111±1	113,3	113,2	113,2	$^{170}Hf_{72}$	113,9	16,01h	$\varepsilon+\beta^+$	170
115±1	114	114,03	114,03	$^{172}Hf_{72}$	114,06	1,87 y	ε	172
115±1	115	115,7	115,6	$^{170}Hf_{72}$	115,95	16,01h	$\varepsilon+\beta^+$	170
115±1		116,51	117	$^{172}Hf_{72}$	116,1	1,87 y	ε	172
119±1	119	118,99	119	$^{172}Hf_{72}$	119	1,87 y	ε	172
129±1	129	127,25	127.5	$^{172}Hf_{72}$	127,9	1,87 y	ε	172
133±1	132	132,2	132,7	$^{170}Hf_{72}$	132,2	16,01h	$\varepsilon+\beta^+$	170
139±1	138,5	138,8	138	$^{170}Hf_{72}$	139,2	16,01h	$\varepsilon+\beta^+$	170

Conclusion

1. Gamma emission after stopping of deuterium glow discharge experiment is continuing.
2. The comparison of gamma spectrometry and thermo-ionization mass-spectrometry (TIMS) data allow to suppose the peaks of next isotopes : 169Yb70; 171m Yb70; 172Hf72; 178Yb70; 180Yb70 ; 180mHf72; 170Hf72.
3. Correlation of TIMS and gamma spectrometry is the main result of the investigation.

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Hydrogen Generation by Cold Fusion Process in Hydro Machinery

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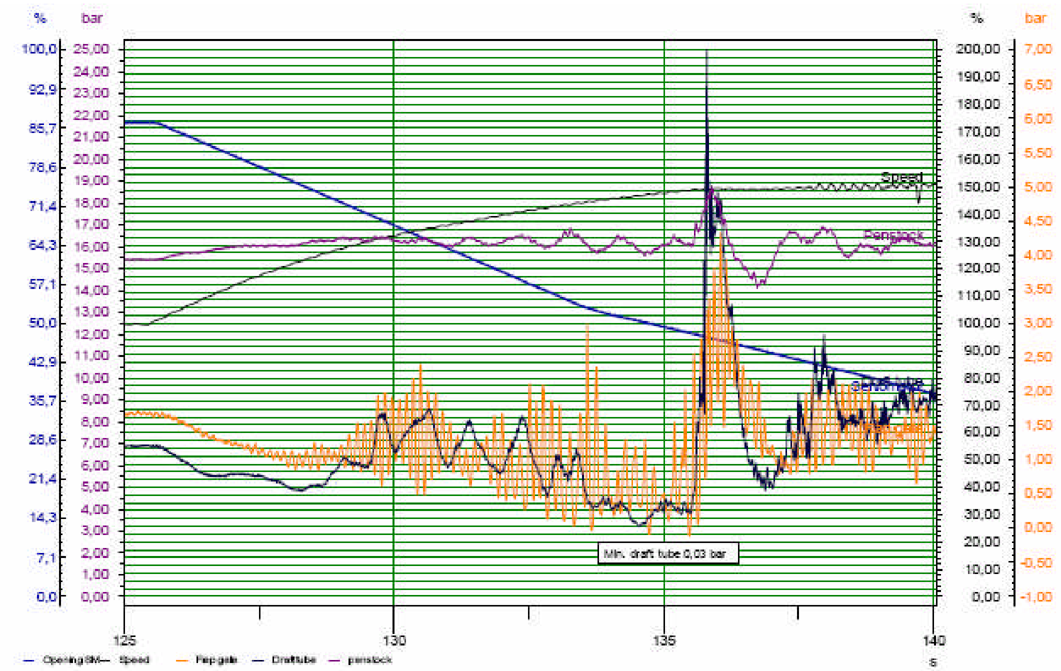
Abstract

The purpose of present paper is to study the process of Plasma formation in hydro machinery when a hydro turbine operates at various conditions and load rejection.
The investigation on several turbines of various hydro power plants reveals that cold fusion process in hydro machinery generates hydrogen. The hypothesis concerning the participation of alkaline metals in river water and the atomic nuclei of the runner blade material in the formation of hydrogen are considered. Some atoms of alkaline metal, the remaining substances in river, and runner turbine surface are destroyed by cavitaion or erosion.   It is possible to assume hydrogen, deuterium, helium, and tritium atoms that are formed (based on Dr. Mizuno and Dr. Kanarev theories) diffuse into cavitation bubbles. Low frequency oscillatory excitation with Francis turbine usually results from periodic flow variations in the draft tube. In the special case, resonance occurs with the conduit system. The dominate frequency of the pressure fluctuations under partial load is in the range 25 to 35 percent of the rotational frequency.
Cavitation coefficients are important to specify numbers and size of fission fragments when bubbles collapse.The energy focusing at collapse tends to emit in the ultraviolet and depends strongly on the type of gas, small amounts of trace noble gases or other impurities can dramatically change the amount of light emission, which is also affected by small changes in other operating parameters (mainly forcing pressure, gas, concentration, and fluid temperature). The vortex intensity is a driving parameter of the luminescence emission.
The plasma is generated during the collapse of the bubble; thus, the quantity of burnt hydrogen determines the volume of generating hydrogen and the impact force caused by hydrogen explosion (noise). There are five main notions, which can determine hydrogen and plasma process: (1) turbine power effect, (2) shock pressure, (3) crack on turbine parts,(4) impacts effects and (5) the lift of rotating parts. The frequency of the excitation lies in a range from 0.786 to 1.095 Hz. Hydro turbine can act as a reactor for cold fusion

Fig .1 - Pressure wave caused by hydrogen explosion in hydro power plant



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The Galileo Project: What Worked, What Didn't

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The Galileo Project was initiated by New Energy Institute to facilitate replication of the co-deposition experiment developed by the San Diego SPAWAR Systems Center group, as reported in New Energy Times, Nov. 10, 2006. The project was the first coordinated widespread replication effort of a low energy nuclear reaction experiment in the 18-year history of the field historically known as cold fusion.

The project was named for the pioneering spirit of all the condensed matter nuclear science researchers, who have had the courage to "look through the telescope" at unconventional science.

The project began shortly after Frank Gordon and Pamela Mosier-Boss presented data and demonstrated with an optical microscope the results of their groups' experiments on Aug. 2, 2006, in Washington, D.C., at the 2006 Naval Science & Technology Partnership conference hosted by the National Defense Industrial Association and the Office of Naval Research.

The objective of Phase 1 of the Galileo Project was "to perform a close replication of the SPAWAR experiment, keeping as close as possible to the original parameters."

By September, two "alpha" teams, one at the University of California, Berkeley, and another, a joint effort of SRI International and Stanford University, began their replication efforts. By December, six other "beta" teams joined the project.

The first experiments by the alpha teams produced null results as a result of a materials incompatibility. This issue was resolved before the start of most of the beta groups' experiments. Highly reproducible and highly consistent though not unambiguous results were produced and reported to other team members through January and February 2007. The Phase 1 objective was completed and accomplished by the end of February. Scientific results have been, and will be presented by the individual research teams in conferences and journal publications.

This paper will discuss many of the detailed logistics, issues, and lessons learned from this project. A related paper will discuss the specific issues and concepts of CR-39 analysis.

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Excess Heat Production during D2 Diffusion through Palladium

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Abstract

Continuing our work on diffusion of deuterium gas through palladium, we have partly reproduced our previous results announced at ICCF13. Deuterium gas at a pressure of 9 atmospheres diffuses through the walls of a 10 cm long, 2 mm in outer diameter and 200 µm thick walls palladium tube closed at one end. The tube was oxidized in air at 500 °C for two hours and filled with palladium powder (Goodfellow 80-180 nm). The palladium tube is heated by a resistor and the energy produced is determined by mass flow calorimetry without any calibration. Excess heat up to 500 mW with an input power of 2 Watts for heating the tube has been measured at a temperature of 66 °C. Attempts to increase the temperature failed due to a leak in the palladium tube.

We propose that the nuclear reaction responsible of the excess heat is between a deuteron ion traveling through the palladium wall, and an adsorbed deuterium atom at the external surface of the tube.

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Field Assisted Electroplating

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As part of a senior class project at UCSD, experiments on field assisted electroplating were conducted for both copper and Pd/D electrodeposition. In the copper electrodeposition experiments, the effects of external fields and pH on the plating process, the surface morphology, and the electroplating efficiency were examined. It was found that pH had no effect on the plating efficiency. When Cu is plated out onto a Ag cathode from a 0.5 M copper sulfate solution in the absence of an external field, the resulting metal deposit is smooth, Figure 1a. However, electroplating in a magnetic field resulted in a metal deposit that had a rougher surface with pits and valleys, Figure 1b. No effect on the surface morphology of the Cu deposit was observed when electroplating was conducted in the presence of an external electric field.

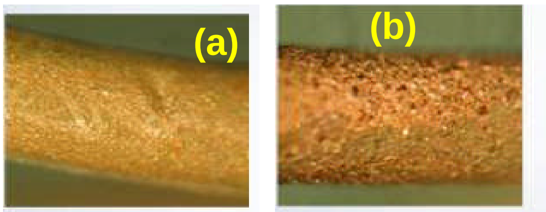

Figure 1. Morphology of Cu electrodeposited from 0.5 M $CuSO_4$ in the (a) absence and (b) presence of an external magnetic field. The magnetic field within the cell is about 2,500 Gauss.

In the Pd/D electrodeposition experiments, Pd was plated out onto a Ag cathode from a $PdCl_2$-LiCl-D_2O solution. The cathode was in contact with a CR-39 solid state nuclear track detector. When traversing a plastic material such as CR-39, charged particles create along their ionization track a region that is more sensitive to chemical etching than the rest of the bulk. After treatment with an etching agent, tracks remain as holes or pits which can be seen with the aid of an optical microscope. The size, depth of penetration, and shape of these tracks provides information about the mass, charge, energy and direction of motion of the particles.[1] The Pd/D co-deposition experiments were conducted in the presence of both external electric and magnetic fields. At the end of the experiments, the CR-39 detetors were etched in 6.5 N NaOH at 70 °C for 7 hr. Microscopic examination of the CR-39 detectors show the presence of pits. These pits occurred in areas where the cathode had been in contact with the CR-39 detector. Figure 2a shows an image of the pits obtained at 200 × magnification. Dark pits are observed. When focusing deeper inside these black pits, bright spots are observed that are due to the bottom tip of the conical track.[2] The optical contrast, shape, and bright spot in the center of the pit are used to differentiate between real particle tracks (which tend to be dark) from false events (which are often lighter in appearance and irregular in shape).[3,4] In Figure 2a mottled areas in the plastic are observed. The mottled areas show no contrast. The shapes are irregular. These features are consistent with chemical damage. In Figure 2a, an arrow indicates what appears to be a triple pit. Figure 2b shows an image of this triple pit at magnification 1000×. Possible explanations for the formation of a triple track are (i) that it is due to overlapping single tracks or (ii) it is the result of reactions that emit three particles of similar mass and energy. Focusing inside the triple pit to examine the bottom of the pit, Figure 2c, it appears that the individual lobes of the triple track are splitting apart. This favors explanation (ii) as the source of this triple pit. Such triple pits have been shown to form when CR-39 is bombarded with energetic neutrons.[5] The main constituent of CR-39 is ^{12}C (32% by weight). A neutron can briefly form a metastable ^{13}C then shatter into three alpha particles and the residuals of the reaction can be viewed in the CR-39 detector as a three-prong star similar to those shown in Figure 2b.[5] The deuterated water used in these experiments does contain tritium and there is prior evidence that tritium production in these cells does occur[6]. One possible source of neutrons energetic enough to shatter carbon atoms is tritium-deuterium fusion.

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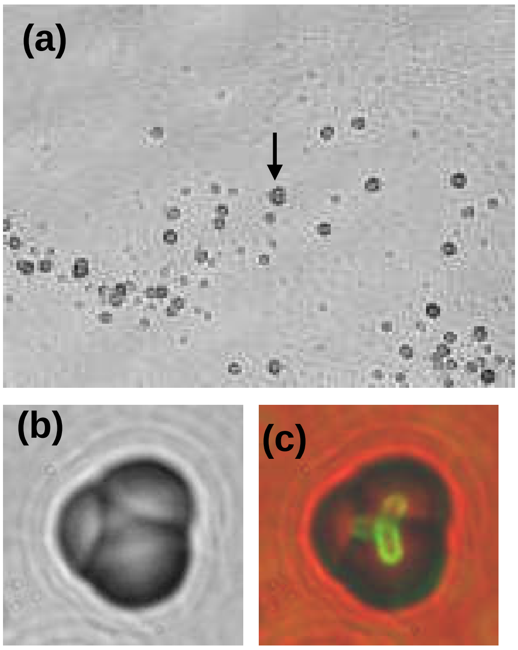

Figure 2. (a) 200× magnification of a cloudy area observed where the Ag/Pd cathode was in contact with the CR-39 detector during an external magnetic field experiment. Arrow indicates a "triple" pit. Images of the triple pit obtained at 1000X magnification where (b) the focus is on the surface of the CR-39 detector and (c) the image is an overlay of two images taken at two different focal lengths (top and bottom of pit)

Acknowledgments

The students would like to thank Dr. Jan Talbot of UCSD and Dr. Pam Boss of SPAWAR Systems Center for their help and encouragement in conducting these experiments. They would also like to thank the members of the Galileo Project team for support and New Energy Institute for providing supplies.

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Concepts of CR-39 Analysis: Lessons Learned From the Galileo Project

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Various methods, some better than others, have been used to distinguish energetic charged particle emissions from non-nuclear artifacts. This paper will review briefly what the author calls two dimensional, two dimensional plus, and three dimensional CR-39 analysis. CR-39 is a plastic polymer developed by Columbia Chemical Co. Inc. and named for Columbia Resin, presumably the 39th formula tested by the developers. It was developed as an alternative material to glass for use in corrective lenses. CR-39 possesses unique characteristics that make it ideal for the detection of nuclear particles.

CR-39 has been used for many decades in high energy physics, particularly in inertial confinement (laser) fusion research. It has been used to assist low energy nuclear reaction diagnostics since the early 1990s by Wang[1], Karabut[2], Li[3], and, later, by Roussetski[4,5,6], Lipson [7,8] and Oriani and Fisher[9]. Roussetski, Lipson, Oriani and Fisher all claim unambiguous evidence of charged and/or neutral particles in their LENR experiments, as have Szpak, Gordon, Boss and Forsley in theirs[10].

CR-39 must be used and analyzed with rigor in LENR experiments, particularly when the CR-39 detector is immersed in an electrolytic solution. CR-39 was never designed for such applications, and a careful study of the issues surrounding this application is required. Characteristics of the three methods of analysis - 2D, 2D+ and 3D - are reviewed.

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Anomalous heat generation by surface oxidized Pd wires in a Hydrogen atmosphere.

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Abstract

Thin Pd wires (diam. 50 micrometers) surface oxidized through joule heating have been loaded in a Hydrogen atmosphere at pressures in the range 1 - 10 bar. The atomic ratio H/Pd reached in the experimental conditions has been evaluated through its relationship with the electrical resistivity of Hydrogen loaded Pd. It was found that the loading rate of the surface oxidized Pd wires is exceptionally higher than with the untreated ones (full loading in a few minutes as compared with several hours). It was also observed that surface treated wires with H/Pd Pd ≥ 0.75, do not lose Hydrogen even when joule heated at temperatures up to about 150 °C in a Hydrogen atmosphere. When the wire temperature exceeds 150 °C (applied power = 12.4 w) there is an anomalous heat generation (about 3.5 w).

During an experimental cycle, comprising feeding the wire with stepwise increasing power values each for 500-600 seconds, followed by a period of zero power, it was observed that when the power was cut off after the period of powering with 14 w, the wire spontaneously heated for about 70 seconds releasing an estimated 1650 ± 160 j, corresponding to 3940 ± 400 kcal per mole Pd. Peak power was $\simeq$ 16 w. *The wire resistance spontaneously reached a value R/Ro = 2.40 and then slowly dropped to the original value at room temperature of 1.8.*

In a second experimental cycle with the same wire similar phenomena have been observed although of lower intensity but lasting over 3000 seconds. After a 16 w powering for 500 seconds, the power was cut off. Again the wire heated spontaneously releasing an anomalous heat of 3600 ± 360 j, corresponding to some 13200 ± 130 kcal per mole Pd. The peak power was $\simeq$ 3 w. *The wire resistance increased spontaneously up to R/Ro = 2.01 and then slowly decreased down to 1.9.*

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How the process changes from d +d → t +p (and ^{3}He +n) to d + d → ^{4}He

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In the low energy limit of the d + d reaction in vacuum, it is well-known that the final states t + p and ^{3}He +n occur with nearly the same probability, and $^4He + \gamma$ occurs with very small branching ratio. These experimental facts are understood well simply by the energy and the momentum conservations plus the isotopic invariance. In general, "two body → one body" reaction such as d + d→ ^4He is forbidden, because the two conservation laws are not compatible when the energy production Q of the reaction is positive. We may recognize the incompatibility in the following way: if we see the reaction in the centre of mass system, the momentum $\vec{q}$ of the particle of the final state must be zero from the momentum conservation. On the other hand, the energy conservation requires $Q = q^2 / 2M_f$, where M_f is the mass of the final particle, and q^2 cannot be zero. Therefore this process cannot proceed in vacuum.

However we know in the problem of the potential scattering that the amplitude $f(\vec{q})$ of the momentum transfer $\vec{q}$ is the Fourier transformation of the potential:

$$f(\vec{q}) = -(2m/4\pi\hbar^2)\int V(r')\exp[i\,\vec{q}\cdot\vec{r}']\,d^3r'$$

, and the probability of the momentum transfer is $|f|^2$. Therefore if the reaction proceeds under the influence of the external potential, which can absorb the momentum, the reaction such as d + d→ ^4He is not forbidden. In particular, for the case of the ^4He production, since Q=23.9MeV and $M_f c^2$=3727.MeV, the momentum transfer becomes cq=422.MeV, and which corresponds to Δr=0.47 fm. estimated from the uncertainty relation. Therefore the size or spread of the required external potential must be fm.-size, in order to do the job to receive such large momentum $\vec{q}$.

There is an additional restriction on the type of the external potential. Let us remember that there are only three types of external fields to which a nucleus can respond. They are (1) the electric field, (2) the magnetic field and (3) the pionic field. Our task is to select the candidate of the catalyst particle of the nuclear fusion of zero incident energy, which is the source particles of the external fields mentioned above. In addition to speed up the reaction, the catalyst particle must have the properties that it attracts the fuel particles and repels the product particles. From these criteria, the cases (1) and (3) are excluded. It is true that large negative charge can attract nuclei, however it attracts product particle ^{4}He as well as the smaller fuel nucleus such as d. Moreover the electron cloud cannot become smaller than its Compton wave length, which is 386fm, and so its Coulomb field is not suitable for our external field to absorb large momentum transfer $\vec{q}$. The pion field, whose source is another nucleus, is not adequate to regard as the external field, moreover it does not behave oppositely to the fuel nuclei and the product ^{4}He. On the other hand, case (2), whose source is the magnetic monopole, satisfies all the necessary requirements. It attracts the fuel nuclei such as p, n, d, t and ^{3}He when the magnetic moments of the nuclei orient properly, on the other hand, it is known that it expels the spin-0 charged particle such as ^{4}He (Tamm's solution).

It is remarkable that small amount of information, that the reaction d+d→^{4}He exists, can narrow down the candidate of the catalyst. It is worthwhile to investigate the monopole plus a few nucleon system, by solving the Schrödinger equation in the external magnetic Coulomb field exactly or by simulating the equation. The solutions of the monopole plus one-nucleon system (A=1) are known for long time. The ground states are the "hedgehog" solutions and the orbital sizes are several fm.. The monopole-deuteron system (A=2) has been studied, and the report is given in the separate talk of this workshop. By using the variational calculation, the binding energy of the deuteron and Dirac magnetic monopole (D=1) is estimated, it turns out to be around 2 MeV. Therefore if we remember that the binding energy of the deuteron itself is 2.2MeV, the lowest energy level of the monopole-p-n system is around E= - 4.2 MeV, in which the level E=0 is chosen when all the particles separate infinitely. (A=4) states in the magnetic Coulomb field are most interesting, since they involve

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$|^{4}He >$ as well as |d ,d >, |t, p> and $|^{3}$He,n>. When we start from the ground state of d-d-monopole system, whose level is E= - 8.4 MeV, the state goes back and forth among these four states. If we remember the binding energies of t, ^{3}He and ^{4}He are 8.4, 7.7 and 28.3 MeV respectively, the thresholds of the continuous spectra are E=-4.4, -8.4, -7.7 and -28.3 MeV respectively for |d ,d >, |t, p> , $|^{3}$He,n> and $|^{4}$He >. If we start from the ground state of |d,d>, in which two deuterons are trapped by the magnetic monopole, whose energy level is E=-8.4 MeV, the only open channel is $|^{4}$He > . So contrary to the reaction in vacuum, the final state t+p or ^{3}He+n cannot occur energetically.

Next thing to consider is how the magnetic monopole can gather two deuterons notwithstanding the repulsive (electric) Coulomb force between deuterons. It is the competition between the Coulomb repulsion and the attractive force between the magnetic moments of deuterons and the magnetic monopole. From the WKB calculation, the penetration factor P of the second deuteron to the (d +monopole) system is $P = 6.2 \times 10^{-9}$, whereas in vacuum P of the d +d is forbiddingly small: $P = 5.3 \times 10^{-106}$.

Finally a short comment on the non-reproducibility of the cold nuclear fusion. It is the general belief of scientists that the fundamental law of Nature must be independent of time and position, in fact the Lagrangian or the Hamiltonian does not involve $\vec{x}$ and t explicitly. This does not necessarily mean a reaction proceeds on demand. As an example, let us consider the case of "one-particle catalyst", in which rare particle plays the roll of catalyst. The reaction proceeds only when the catalyst particle comes into and stops in the domain of reaction. The reproducibility of the ordinary sense does not exist, all what we can expect is to observe the correlation between the existence of the catalyst particle and the reaction to proceed by measuring the excess heat for example.

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The 7 Framework Programme for Research and Development 2007-2013. How to prepare a successful proposal

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The Framework Programmes (FPs) http://cordis.europa.eu/fp7/ have been the main financial tools through which the European Union supports research and development activities covering almost all scientific disciplines. The FP is proposed by the European Commission and adopted by Council and the European Parliament following a co-decision procedure and has been implemented since 1984.

The **Seventh Framework Programme (FP7)** is the current programme and will run for seven years, from 2007 to 2013, and will be the successor to the previous FP6, which ran until the end of 2006. The FP7 is central to achieving the Lisbon strategic goal of Europe becoming the most competitive and dynamic knowledge-based economy in the world. The triangle of knowledge - education, research and innovation - is a principal tool for achieving this goal.

SEVENTH FRAMEWORK PROGRAMME

The FP7 is designed to build, on the achievements of its predecessor, the creation of the **European Research Area** http://ec.europa.eu/research/era/index_en.html and carry it further towards the development of the knowledge economy and society in Europe.

The FP7 is organised in four specific programmes, corresponding to four major objectives of European research policy:

• "Cooperation": on collaborative research, with more than EUR 32 billion;
• "Ideas": which includes the establishment of a European Research Council, that would receive EUR 7.5 billion;
• "Capacities": dealing with potential research capacities of EU small and medium-sized enterprises, with approximately EUR 4.2 billion; and
• "People": for human resources, receiving around EUR 5 billion.

The specific programme **'Cooperation'** supports all types of research activities carried out by different research bodies in trans-national cooperation and aims to gain or consolidate leadership in key scientific and technology areas. It will be devoted to supporting cooperation between universities, industry, research centres and public authorities throughout the EU and beyond.

The Cooperation programme will be sub-divided into ten distinct themes. Each theme will be operationally autonomous but will aim to maintain coherence within the Cooperation Programme and allowing for joint activities cutting across different themes.

One of the most important is the **Energy Theme**, with the focus placed on renewable energy sources and a significant lowering of CO2 emissions. The budget dedicated to these actions will be of EUR 2.3 billion for 7 years.

The general objective of this research Theme is to adapting the current fossil-fuel based energy system into a **more sustainable** one, less dependent of imported fuels, based on a **diverse mix** of energy sources and carriers, with particular attention being paid to lower and **non-CO2** emitting energy technologies, combined with enhanced energy efficiency and conservation, to address the pressing challenges of security of supply and climate change, whilst increasing the competitiveness of Europe's industries.

To support actions, which are primarily **implemented on the basis of calls for proposals**, one of the main funding schemes is the **Collaborative project**, support for research projects carried out by consortia with participants from different countries, aiming at developing new knowledge, new technology, products, demonstration activities or common resources for research. The size, scope and internal organisation of projects can vary from field to field and from topic to topic. Projects can range from small or medium-scale focused research actions to large scale integrating projects for achieving a defined objective. Projects should also target special groups such as SMEs and other smaller actors.

New Energy Times Archives

Analysis of Nuclear Particles from Independent Replications Using the SPAWAR Co-Deposition TGP Protocol and CR-39 Track Detectors

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Etch pits in CR-39 track detector plastic were observed by multiple laboratories performing SPAWAR type co-deposition of Pd from D2O LiCl PDCl2 solution on precious metal cathodes. Etch pits were found, after etching several hours in NaOH at 55 – 70 degrees C., on both the front side (in contact with the cathode wire) and on the backside of the CR-39 detectors. In some cases, where Pt and Au cathodes were used, the track density on the backside of the detectors was highly correlated with wire locations on the front side seeming to rule out spurious chemical attack as their cause. Previously reported work also demonstrated a greatly reduced number of tracks in either "dry" systems with the CR-39 protected from contact with the electrolyte, or in "wet" protected systems with polyethylene barriers covering the electrolyte-immersed CR-39.

There are a number of caveats with regards to analyzing CR-39 used with in situ, or “wet”, electrolytic experiments where morphological surface changes are observed, and focusing and microscope track sensitivity, as well as other factors, affect track and pit identification. However, these factors cause a gross under-reporting of, rather than overestimating, the number tracks. Still, the automated track scanning system utilized was not designed for the high track density observed. Future work will focus on calibrating the system for either smaller, less etched tracks or for fully etched, but overlapping tracks, as has often been observed in this work.

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Why do condensed matter nuclear reactions occur?

Personal experience – personal insight

By V. Filimonov

Why low energy nuclear reactions occur whereas no state of condensed matter is able to provide neither high-energy excitation of reacting agents nor effective screening of their electric charge needed for noted reactions implementation?

Our first idea in the field was so called "synergetic activation" which is, in fact, multi-quantum excitation of hydrogen isotope atom under condition of self-organization in dynamical system. Dynamical behavior of systems under study can provide the situation of multi-quantum excitation up to partial energies E_n enough for Coulomb barriers overcoming by hydrogen isotopes' nuclei above the background E_0, conserving solid state of the crystalline matrix unchanged. Contrary to common delusion, the multi-step excitation yields much higher probability of reaching energy level needed for nuclear event than the one-step one:

$$P^n = \prod_{i=1}^{n} p_i = \prod_{i=1}^{n} \exp\left(-\frac{E_i}{E_{i-1}}\right) = \left(\frac{E_i}{E_{i-1}}\right)^{-\gamma} \quad >> \quad \exp\left(-\frac{E_n}{E_0}\right) \equiv P^1$$

where P^n is a multi-quantum excitation probability from E_0 level to E_n one under permanent energy loading condition, $\mathbf{P^1}$ is a one-quantum excitation probability from E_0 level to E_n one, γ is a degree factor (γ = 1.. 3) depending on the energy structure of the matrix.

Evident experimental mean for providing such a dynamics is implementation of multi-step excitation of hydrogen isotopes' nuclei within spatiotemporal limits of a detonation wave of explosion. That was guessed by us at 1994 and then we succeeded to carry out some preliminary experiments at 1997. Similar method was applied by R. Monti for a nuclear waste transmutation.

Another experimental mean is implementation of the stationary process of self-organization under the through hydrogen isotopes' transport in metals within and around the top of the Me-H (Me-D) system hydride (deuteride) phases separation region. According to this approach we carried out the heavy water electrolysis experiments without an over-saturation of metal cathodes by deuterium but with the latter intense transition through the former. Experiments made using not Pd but Nb cathodes (1993-1997) exhibited either a significant excess heat (approx. 4x as related to an electrical energy input) or a moderate but measurable neutron emission (up to 2x as related to a natural neutron background) (held at 1995 in Dubna) dependent on the electrolysis condition. Nevertheless, most of us are still in a captivity of wrong ideas taking a semblance as a reality, namely an idea of the deuterium overloading necessity for an intense LENR of D-D fusion proceeding in a crystalline lattice. Having no scientific basis but notorious "evidence", this idea was experimentally disproven by the author more than ten years ago.

Our idea on the "neutrino-driven nuclear reactions" appeared (2000-2001) as a result of analysis of a wide circle of non-conventional phenomena both within and outside the CMNS area. It can explain both the D-D fusion and transmutation of conventionally "stable" nuclides, and also a suppression of high-energy emissions and unstable nuclides yields. It can be a link between various theories of CMNS/LENR, mainly within Coulomb barrier suppressing version. It does not contradict to many CMNS theories of "screening" and "catalysis" but helps them avoiding evident quantitative limitations. This idea allows an experimental implementation and a practical realization. It suggest certain experimental means either of driving a natural flux of low energy neutrinos or the latter generation in the condition of experiment (this version is less probable). We have not yet succeeded to prove this idea experimentally and do not know of its experimental verification by other researchers but are aware of further theoretical development of it, namely of our central idea on the electron-neutrino pair formation in atom and its main role in CMNS/LENR.

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ICCF14 10-15 August 2008, Hyatt Regency, Washington, DC
Current Thoughts on the Program

Michael Melich

Abstract

ICCF14 will be held in Washington, DC 10-15 August 2007 in the Hyatt Regency Hotel near Capitol Hill, the Washington, DC Mall where the Smithsonian Institution has its primary museums, and with access via the Metro to the greater Washington, DC area. Dr. David Nagel is the Chairman of the Conference and Michael Melich has been appointed Program Chair and Co-Chairman of the Conference. The proceedings of ICCF14 will be published in early 2009 just as the 20th Anniversary of the announcement by Fleischmann and Pons. Our current plans envision the preparation and publication of a series of Cold Fusion Country Histories that will document, country-by-country, the progress of the research over the past twenty years. These histories will be in the language of each country and should be completed prior to ICCF14. These will form the basis of sessions at ICCF14 showing the scientific foundation of the field. We are hoping to bring to Washington, DC many of the original researchers, some who may no longer be active, to participate in scientific discussions about their "Prefatory" work. It was their work that has brought us the solid foundation for the scientific development of the extraordinary effects on nuclear processes that hydrogen-in-metals demonstrate under the special conditions identified by Fleischmann and Pons. The sessions at ICCF14 on the scientific work in the various countries, when added to the translated histories, will be edited into a series of books in English to be published in 2009. These books will provide the scientific community the organized material to let the field grow. What has come before is but a preface to what will be presented at ICCF14 and that in turn will be the prologue for an expanding level of research in Condensed Matter Nuclear Science.

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