

TOWARDS THE EXIT FROM THE (energetic) MIDDLE AGES

Ch. Stremmenos *

When it comes to energy, the first thing to consider is how little we know about it. It is defined as the ability to produce work, but beyond that, we are not able to describe all the relevant substantive aspects. We know that energy can take many forms (kinetic, thermal, chemical, biochemical, nuclear, electromagnetic, etc.). We also know that it is a fundamental quality, and a physical entity (... and maybe METAPHYSICAL ...) of the Universe. And we know that energy and matter are closely linked and interchangeable to a certain extent (as expressed by Einstein's most famous equation $E=mc^2$)

We are also quite sure that the law of conservation of energy is real. In other words, energy is neither created nor destroyed, but only transformed. Thus, the set of methods of use are constituted by systems that convert one form of energy into another that is for our most useful needs (eg thermal engines that generate mechanical work or electricity which in turn is available for a very high number of applications,). Now, we also know that quantum vacuum contains an enormous amount of energy in a primitive state. This huge amount of energy, calculated mathematically amounts to 10^{113} joules per cubic meter that to realize this magnitude, we will refer to the phrase of the great physicist, award .Nobel Richard Feynman who finishing his tea, to say in front of the empty cup, to his disciples "There is enough energy in the space of this empty cup to evaporate all the oceans of our PLANET ...!"

If we see the universe as a closed system, energy is constantly circulating. First, it flows from the quantum vacuum to matter (with mechanisms predictable from quantum mechanics and partly experimentally confirmed). Then, it is converted from one form to another as has already been mentioned, creating work and useful interactions and finally spreading back to the quantum vacuum.

Symbolism in Greek mythology, highlights the fundamental contribution of "energy" in the evolution and growth of human society and the development of civilization, but also prophetically revealed that "In every good elements of evil coexist!" οὐδὲν καλὸν ἀμιγῆς κακοῦ " . . .

The ancient Greeks, while not knowing what we have already said about energy and its aberrations, intuitively created the myth of the conflict of Zeus with Titana Prometheus, (..INCATENATED BY JUPITER..!).

Not so much because Prometheus gave mankind fire (energy ...!), .. but the Head of the Gods, not only provided for the use of this great physical potential by man, to warm up and learn to cook, but it also provided for abuse, with improper uses (wars, canons, ecological disasters, atomic bombs, etc.) ... and it is historically proven ... that ... Zeus had his reasons ...!

From the titan Prometheus Until the middle of the last century, humanity drew the energy from the periphery of ATOM (electrons) and not from its nucleus. The combustion of wood and fossils (coal oil, methane, etc.) is the chemical way of producing

energy mainly thermal. Note that this chemical energy, contained in the periphery of the atom, turns out to be at least one million times smaller than the energy contained in the nucleus of the same element.

Only to the stars and to the sun that the appropriate natural conditions exist (high gravitational force), this nuclear energy is produced which by radiation is exploited on earth in different ways (synthesis of chlorophyll, wind and hydroelectric energy, photoelectric, fossil fuel deposits, etc.) .)

At the end of the Second World War, with the prediction of Einstein ($E = m.C^2$), the man extracted energy from the nuclear tank .. but .. to kill other human beings ... (Hiroshima and Nagasaki) ... !!

Fermi has mitigated this □ curse sviluppp, developing a technology that has allowed the peaceful use of nuclear energy, obtained through the fission of the atomic nucleus, resulting however with time, not without many problems. ... (Chernobyl, Fukushima, radioactive waste, etc.)

The staff of the scientists of the time, has privileged with priority, the research on the aspects of high power density of nuclear energy, richly financed for war purposes (atomic bomb). And so the SIENZA and the evolutionary process of scientific development have been put in the background and in particular the extraction of low-power nuclear energy very useful for humanity. Historically a serious lack of science has been created the knowledge gap created by this unnatural leap has interrupted the normal and gradual evolution of science that had begun with the discovery and study of radioactivity by M. Curie, who it constituted the link / bridge between chemistry and nuclear physics, that is the science between the periphery and the nucleus of the atom.

JUPITER (if I was still alive ...!), He would not hesitate to chained □alla Prometheus□, these scientists, together with the warlords, but he would have ... sent to Tartarus forever ... reasons of competition, ... the instrumental orientation of research in the field of high energy, constitutes the challenge to the exclusive use of lightning! But, as we have already said, apart from the jokes, it has created a serious deficit cognitive in the field of science□ to the detriment of the good of humanity In the limelight now, starting from 1989 with the work of the pioneers Fleischmann and Pons, appears a new possibility, more friendly to the environment and mankind ...! :

It could fight the CLIMATE CHANGE ON THE PLANET, and create the ability to draw on the energy reserve contained in the atomic nucleus, through cold fusion (Cold Fusion or LENR, Low Energy Nuclear Reaction) that would potentially solve the numerous economic problems of our Global Society , ... now ,, in CRISIS ...

The question of "cold fusion" or "solid-state nuclear reactions" has not only been affirmed in the consciousness of those who have worked and who continue to work in the field today (as myself), but in the impartial global public opinion. , despite the deafening silence of the media ... and the strong (subtle) reactions of the energy interests and the unjustifiable indifference at the level of the governments ..!

DESPITE this hostile or not very encouraging situation, independent research group of scientists from three historic European universities (Royal Institute of Technology, Stockholm, Sweden, University of Bologna, Italy, University of Uppsala, Sweden) announced on 6 October 2014 the results of the faithful repetition of experiments, with Rossi-Focardi technology, E-CAT.

«Observation of abundant heat production from a reactor device»

([Http://www.elforsk.se/Global/Omv%C3%A4rld_system/filer/LuganoReportSubmit.pdf](http://www.elforsk.se/Global/Omv%C3%A4rld_system/filer/LuganoReportSubmit.pdf)). Rif. Bibl.

This group of scientists have therefore independently CONFIRMED the ROSSI-FOCARDI E-CAT technology

□ Succidentally: Quantitative evaluations on the experiment, DURATION 32 days □.

In a hydrogen atmosphere, from 1 gram of nickel of natural isotope composition, and 0.11 grams of lithium 7, 1.5 MWh (megawatt hours) of thermal energy are produced. Apart from my personal interest and passionately insistent work, I would say, cultivated continuously since the early 90s, with the motive of ... ΦΥΣΕΙ ΤΟΥ ΕΙΔΕΝΑΙ ΟΡΕΓΕΤΑΙ ΑΝΘΡΩΠΟΣ, said by Aristotle (i.e., there is the human nature thirsty for knowledge)..... On this I am not going to expand further now. Who would have any informative interest in this regard, can consult the website ([www.ChristosStremmenos](http://www.ChristosStremmenos.com)),

However, all over the world today, the research work on Cold Fusion or LENR, continues to develop in several universities, scientific institutions and companies (Airbus, NASA, Mitsubishi, Nissan, Cherokee etc.), confirming the above results and perhaps better, p. es. the University of Moscow Prof. Parkhomov, MIT Team USA Martin Fleischmann Memorial project, in Japan Mitsubishi who coordinates research in different Japanese Universities, as well as in China (government agency), India, Italy (ENEA) etc .

To avoid further exhaustion to the public, I will summarize in the following points (in my opinion) the current state of cold fusion:

- Cold fusion, is experimentally made undeniable. These are nuclear phenomena, for two main reasons: The energy that accompanies the phenomenon, is orders of magnitude greater than any chemical energy that involves the same substances and nuclear transmutations always observed.)
- NOT EC YET, CONVINCING THEORETICAL INTERPRETATION.
- The efficiency of the phenomenon is not completely controlled: (thermal instability, with deviation at high temperatures and relatively uncertain reproducibility).
- No dangerous radioactivity occurs, both during reactor operation and in residues (ashes) of reactions. (At least at the current level of energy efficiency, judged to be very satisfactory ..) ..

- Energy efficiency, surpasses any other energy source and is comparable to the efficiency of conventional nuclear fission reactions, but without dangerous radiation and the problem disposal of radioactive waste.
- It seems that the most profitable system for the moment, is that observed and studied by PIANTELLI, FOCARDI and HABEL (absorption of hydrogen in nickel), then perfected technologically by ROSSI-FOCARDI with the introduction of an appropriate catalyst in the E-cat system .. I add that the speaker, in the early 90s together with his colleague P. CAMMAROTA, replicating FF experiments both on Pd-Deuterium and on Ni-hydrogen, we found that nuclear transmutations took place only on the metal surface. So for enhancing the efficiency of the phenomenon we have crushed the lamellar samples, making them powders, with grain size, nano / micrometer. (work published in April 1999 on Chemistry and Industry)

This preparation was adopted by researchers all over the world including Rossi and Focardi, but also by Piantelli who insisted on rejecting my suggestions on ...!

BRIEF DESCRIPTION

(Some theoretical approaches on "cold fusion")

There are two obstacles to the prevailing science today, for the understanding and therefore the acceptance, of the cold fusion (LENR) among the atomic nuclei of all the chemical elements:

- **The first obstacle, is the positive charge in the nucleus, in all the elements of the periodic system. Hence the nucleus is repulsed electrostatically with each other and they can not approach critical distances, where the very strong attractive nuclear forces prevail, (of very short range of action) that would allow the nuclei to merge In other words, the radius of repulsive interaction is larger than the beam of attractive interaction, between the nuclei. This spatial gap takes the name of BARRIER OF Coulomb .**
- **The second obstacle to understanding results from the impossibility of reaching the thermodynamic conditions (very high temperatures of millions or billions of degrees centigrade) to overcome this BARRIER and get to the thermonuclear fusion, the less possible it would be the cold fusion (LENR) that occurs a few hundred degrees Celsius ..? ..**

EPPUR SI MUOVE .. Galileo insisted ..! ... We will then return to this topic of the overcoming of the BARRIER after exposing the description and the theoretical interpretation (in my opinion, ..), of some significant experiments ..

The first concerns the relatively recent relationship of the two Swedish scientists, Rickard Lundin and Hans Lidgren with the title Nuclear Spallation and Neutron Capture induced by Ponderomotive Wave Forcing. (Nuclear spallation and neutron suppression induced by ponderomotive force waves)

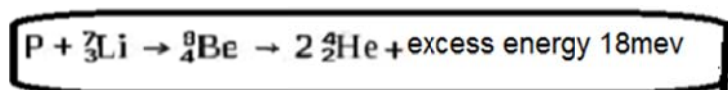
- The above-mentioned high-profile researchers and members of the Swedish Academy, speakers of the Nobel Prize in Physics and Chemistry, commented Verbatim: "This report demonstrates, theoretically and experimentally, that nuclear power production can be housed in reactors rather small, operating at modest temperatures ($\approx 900-2000$ ° C), and producing sustainable power in the order of 1 to 10 kW, with a minimum fuel consumption (a few grams a year). (...) The high power output, delivered by a small amount of fuel, shows that it is a nuclear process with great potential. Properly used the process could become an unlimited and sustainable source of energy.

... In a few words it is not a new physics, but a little known physical effect that describes the interaction of matter with electromagnetic fields, creating Miller's ubiquonderomotive forces. This would be the key to explaining the release of energy and isotopic changes occurring in the LENR. The basic idea is that the ponderomotive forces at resonance frequencies tear neutrons to elements such as deuterium and lithium, and that these neutrons are then captured, for example, by nickel, resulting in the release of energy, as required by the already known physical laws "....

- This eventuality, while interpreting the change of the isotopic composition to each of the elements (modifying by transfer, the number of neutrons), does not interpret the formation of new elements eg as the nickel forms the copper and zinc and other elements observed with insistence even in my recent experiments, which would require proton transfer with (positive charge) and thus overcoming the "Coulomb barrier" ?? ..!

Six months before, it was published on <http://arxiv.org/ftp/arxiv/papers/1504/1504.01261.pdf> the theoretical approach of Cook and Andrea Rossi, concerning the mechanism and the sequence of nuclear reactions occurred and verified with success, as we have already mentioned, by the group of independent scientists who have also chemically analyzed all the elements in the reaction ash. (Table 1: Transmutations at the Onset and Conclusion of the E-Cat Test [1], (Natural Abundance Absolute Isotope at Onset at Conclusion): CONSULT ... <http://arxiv.org/> ...

The basic hypothesis of COOK and ROSSI has been to adopt for E-cat, the known and acetate nuclear reaction from 1937 between hydrogen and lithium that prefigures the evolutionary sequence of reactions in the system, according to the following stages:



- The first stage concerns each pair of hydrogen-lithium atoms: These atoms merge into one another exothermically, overcoming the Coulomb electrostatic barrier and transmuting into beryllium-eight, highly excited (unstable).
- In the second stage the excited beryllium undergoes exothermic fission by splitting into two helium-four atoms (the so-called alpha radiations), which, absorbed by the reactor walls, contribute globally to the yield of high thermal energy, without the presence of ionizing radiations.

This version, while it is justified by the experimental results of the significant decrement of the isotope, lithium –sett as (tab.1), raises many questions in parallel:

- What is the role of nickel (which builds the base element) in the process ..?
- How to justify the copper nickel transmissions, etc. that presuppose parallel overlaps of the Coulombian barrier?
- Overall, which types of DECADITION occur in the system ..?

It would seem that by combining the aforementioned two approaches of Cook-Rossi and Lundin -Lidgren, it would be possible to give a partial answer to the aforementioned questions !!.

However, to close the argument on some of the theoretical approaches regarding "cold fusion" or LENR, but also other energy modalities that support "OUTLET FROM THE MIDDLE AGES", we can not ignore the work of Randell Mills and his Tim.

Randell Mills, based on his public statements, also supported by a large number of international patents and demos in qualified environments, is today (regardless of the combined theory), the proponent of the most productive systems of non-polluting energy, both thermal and electrical .

Do not take this technology, because it is fiercely challenged on its theoretical basis by the vast majority of the scientific community.

The hypothesis of R.Mills, is based on a well-known classical electrodynamic phenomenon, called **INDUCTIVE RESONANCE** between two macroscopic circuits. These are two □matasse□ of insulated wire, and if one is supplied with alternating current, the other one also receives at distance, electricity from the first.

Mills transferred this phenomenon on an atomic scale, hypothesizing that in the atom of hydrogen with its electron in a circular orbit around its nucleus, the energy circulation similar to that of the first □matassa□ is simulated on a microscopic level, with the possibility of transfer of this into an appropriate surrounding area which would constitute the other 2nd □matassa□ resonant by induction. However, if the hydrogen atom were at the lowest energy state (Bohr, Schrödinger, etc.), it could not resonate with the surrounding environment

Randell Mills, argues that Bohr's fundamental state (with the main quantum number $n = 1$), is not the lowest energy state for hydrogen. The lowest energy according to Mills, is reached, if we assume transitions with fractional quantum numbers $n = 1/2, 1/3, 1/4, \dots \dots 1 / 137$ (lower limit) In other words it supports, that the hydrogen transitions in states defined by fractional quantum numbers, produce (..one tantum.!) abundant energy, in the form of photons and heat. This energy (forcibly torn by catalytic route from the HYDROGEN is then transferred to its contour) ... !. The final situation therefore, would be the irreversible formation of a mini-atom called "HYDRINO", composed of dark matter (matter, not emitting more photons).

CONCLUSIONS AND "AB INITIO" CONSIDERATIONS

We would also be worth mentioning other THEORETICAL approaches related to different successful experimental techniques:

I limit myself to the previous three cases, taken in (approximate ...) consideration, because in these we see a common feature that would be: THE DETERMINING ROLE OF THE □ CONTOUR □ AT THE INTERACTIVE ATOMS, IN PRIMIS AT THE HYDROGENIC ATOM.

This "COUNTER" can be of type;

- □gabbie□, Materials with interactions, static and dynamics (crystal lattice)
- □gabbie□, Intangible composed of electromagnetic fields oscillating and interacting by resonance (Electrodynamics -Quantistics)
- Prohibitive electrostatic barriers (Coulomb Barrier)
- Magnetic fields (bordering, plasmas)

The difficulty of formulating a unifying THEORY, of the complex interactive case study, mentioned above, is therefore clear.

However, with friends and colleagues, we try to define the quantitative parameter that defines the influence of □ CONTORNO □ which will then give indications on the design of appropriate experiments that, above all, energy efficiency, have also theoretical bases not questionable

"Correlation coefficient"

As in classical thermodynamics, the "coefficient" or formula of van der Waals corrects the behavior of real gases compared to that of ideal gases, so in quantum mechanics the "correlation coefficient" describes the degree of modification that a system undergoes by its interactive contour (perturbing). It assumes values from zero to one, where "zero" indicates an unperturbed system, (therefore zero

interactions-ideal state) and "one", system that undergoes the maximum possible interaction from its immediate contour.

Let's see now (eg for Ni-H), how specifically the "correlation coefficient", "acts" on the Coulomb barrier in the two borderline cases:

In the first case, the Coulomb barrier behaves according to the classical laws of electrostatics that require enormous energy values to overcome it, eg in the case of the hydrogen atom (thermonuclear fusion).

In the second case, on the other hand, where the "correlation coefficient" assumes all the values between zero and one which means that the system undergoes more or less strong interactions from its boundary, the barrier becomes more or less penetrable, or as we say in jargon more or less transparent. Thus with this approach, the penetration of the Coulomb barrier around the Ni nucleus would be interpreted, from the proton of the hydrogen confined in the octahedral cage of the crystalline lattice of the first element (cold fusion in the Ni).

Concluding optimistically, THE ENERGETIC OUTPUT FROM THE MIDDLE AGES, nevertheless seems « ANTE PORTAS » in relatively little time, due to the intense ferment in international research, and the urgent need for clean and low-cost energy, to save the planet from change climate and the economy, from the global crisis.

EPILOGUE

«ANTE PORTAS» Basically, I refer in particular to the research line of Ni / H by Focardi Habel, Piantelli (Nuovo Cimento, January 1994, Volume 107), later evolved with the E-cat (Energy Catalyzer) by Andrea Rossi. This reference is an experience lived by the writer, because I was doing the same period. autonomously research parallel to the same theme, but in atypical collaboration with Sergio Focardi and Andrea Rossi.

The subsequent successes confirmed by third parties (p, eg Lugano) and the technological innovation E-cat.sk, realized by Rossi, has recently been put to public demonstration commercial successfully on 31-1-19 to the USA. This demonstration highlighted the considerable increase of the thermal energy produced, and of its high density reached, also opened an excellent perspective of the photovoltaic exploitation of the light emitted by E-cat.sk ... !!

As has already been mentioned, Rende Mills and his group have also adopted photovoltaic technology in the field of its research to produce electricity, but it seems not to have had satisfactory results, but plenty of problems.

In my opinion these are two different processes with emitting sources in a different spectral profile.

Subjectively I think, with irreversible optimism that the recent decision by A. ROSSI (... congratulating his diacronically always persistent INTUITION!), To develop sensitive and appropriate photovoltaic elements to the spectral range of light emission of its Ecat.sk reactor. In fact, watching the video of the demo of 31-1-19, it was visually different (colder ..) from the natural sun. However, the careful analysis of the diagrams confirmed it to me and I thought that Andrea Rossi is more advantaged than at least 4-5 years, compared to Reandel Mills who uses commercial photovoltaic elements, specifically sensitive to a solar spectrum filtered by the OZONE and then with UV strongly attenuated

IN THE FIRST STAGE OF THE NEW ENERGY ERA, in all likelihood we can say that:

The E-CATsk, is the first device that produces ENERGY ENTROPIC (thermal), with the established short-term hope, to produce ENERGY LESS ENTROPIC (electricity) ...

.....

***BIOGRAPHICAL NOTE:**

Christos STREMMENOS is a retired Professor of the Department of Physical and Inorganic Chemistry of the Faculty of Industrial Chemistry in the University of Bologna. He has served as Ambassador of Greece in Italy (1982-1987), and has been awarded the title of "Cavaliere di Gran Croce al Merito" of the Italian Republic. In the University of Bologna, as well as in the Polytechnic of Athens (National Technical University of Athens) he has taught Molecular Spectroscopy, Applied Spectroscopy and Photochemistry. His research work, from the beginning of his academic career until the assumption of his duties as Greek Ambassador, was in the field of spectroscopy of both solid and liquid crystals and he studied their static and dynamic structure by employing quantum mechanics criteria. After his mission at the Embassy of Greece in Rome was completed, he tried to reproduce the Fleischmann-Pons Experiment, however he did achieve reliable results and thus he started to work in the field of nuclear reactions between nickel and hydrogen or deuterium.