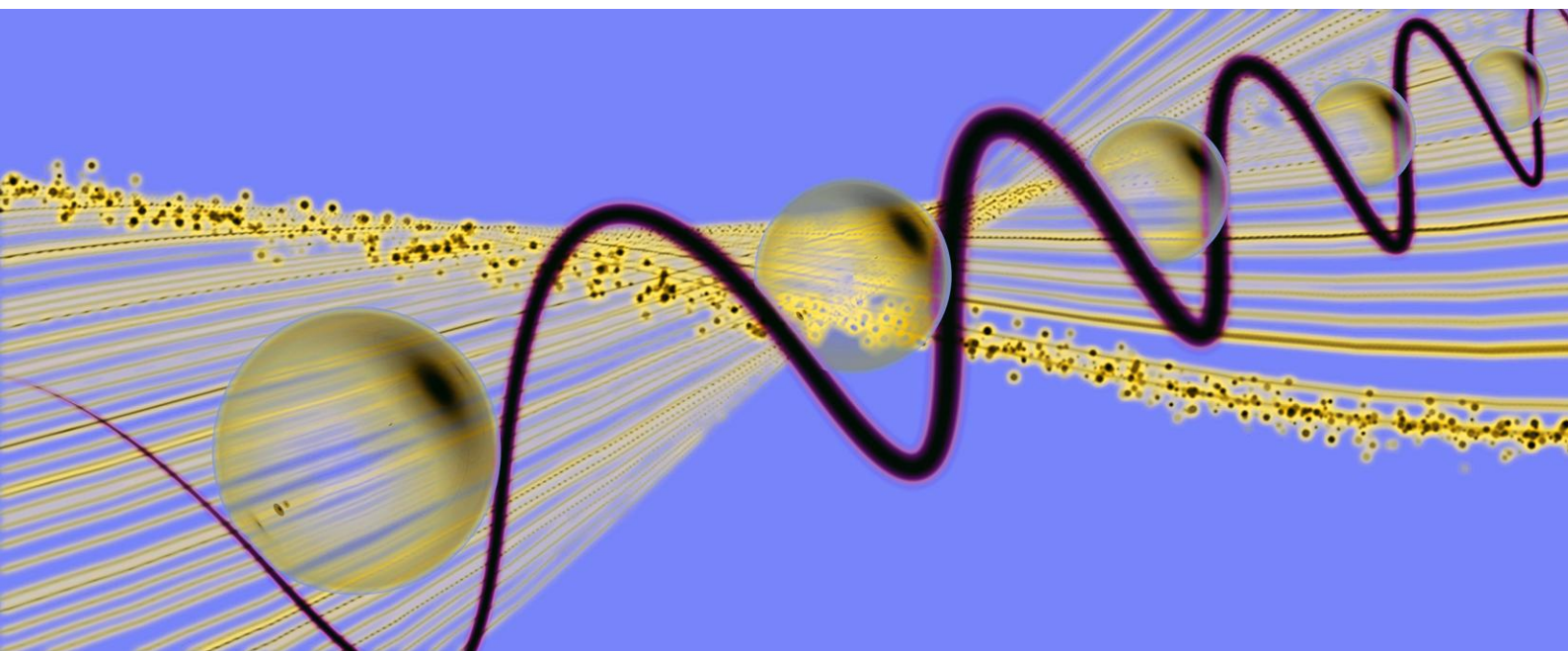


Fusion at home!

A device that will provide unlimited energy at minimal cost is the planet's energy dream

By Anastasios Kafantaris, "To Vima" newspaper, Athens, Greece

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Greece in crisis seems hopelessly like Pandora's box: myriad evils and only one good - hope - came to light. The ultimate tragedy is that we proved unable to keep in our hands even this hope and turned it away to the ends of Earth. What are we talking about? The topic is the hottest secret in the planet, an inexhaustible source of energy. The "cold fusion" which, as you've been told a year ago (www.tovima.gr/science/article/?aid=430840), had many chances to be achieved in Greece by Defkalion Green Technologies SA (DGT). Now, after several trials and external examiner testimonies, "To Vima" visited their lab and saw the energy getting sextupled at the output! But no one else in our country is to "see the miracle" happening: the very next day Defkalion picked up their gear and flew to Vancouver, Canada. They've had enough of waiting this soulless state to provide them with a framework of operation... It's worth reading the rest of this story, not just to set the anathema but because it could also be the prologue of a new chapter in the history of mankind!

The alchemy of “Devil's copper”

In 1751, the German baron Axel Frederik Cronstedt was searching in a mine to find copper. He found a new metal instead, which in fury he named «**kupfernickel**», meaning "Devil's copper". This is the white metal known today as nickel, which is abundant in our country.

Much later, and while nickel was taking its place in the industrial revolution with its various applications, some strange phenomena of unexpected **transmutation** started being reported from scientific laboratories. Specifically, in the July 1905 issue of the journal *The Physical Review*, the British chemist Clarence Skinner wrote: *"While making an experimental study of the cathode fall of various metals in helium it was observed that no matter how carefully the gas was purified the hydrogen radiation, tested spectroscopically, persistently appeared in the cathode glow..."* His remark was followed by dozens of other similar reports, to the extent that Caltech's Professor Robert Millikan said, shortly after he was awarded the 1923 Nobel in Physics, that the subject of nuclear transmutations during electric discharges was *"one of the supremely interesting problems of modern physics."* In 1926, professors Fritz Paneth and K. Peters determined that palladium was what provoked transmutation of hydrogen into helium during their experiments at room temperature.

During the following years, the scientific world seemed to have lost interest in searching the issue more in depth and... I was quite surprised listening - almost a century later – from DGT's CTO, John Hadjichristos, that *"we are not talking about nuclear energy but chemical energy derived from transmutation."*

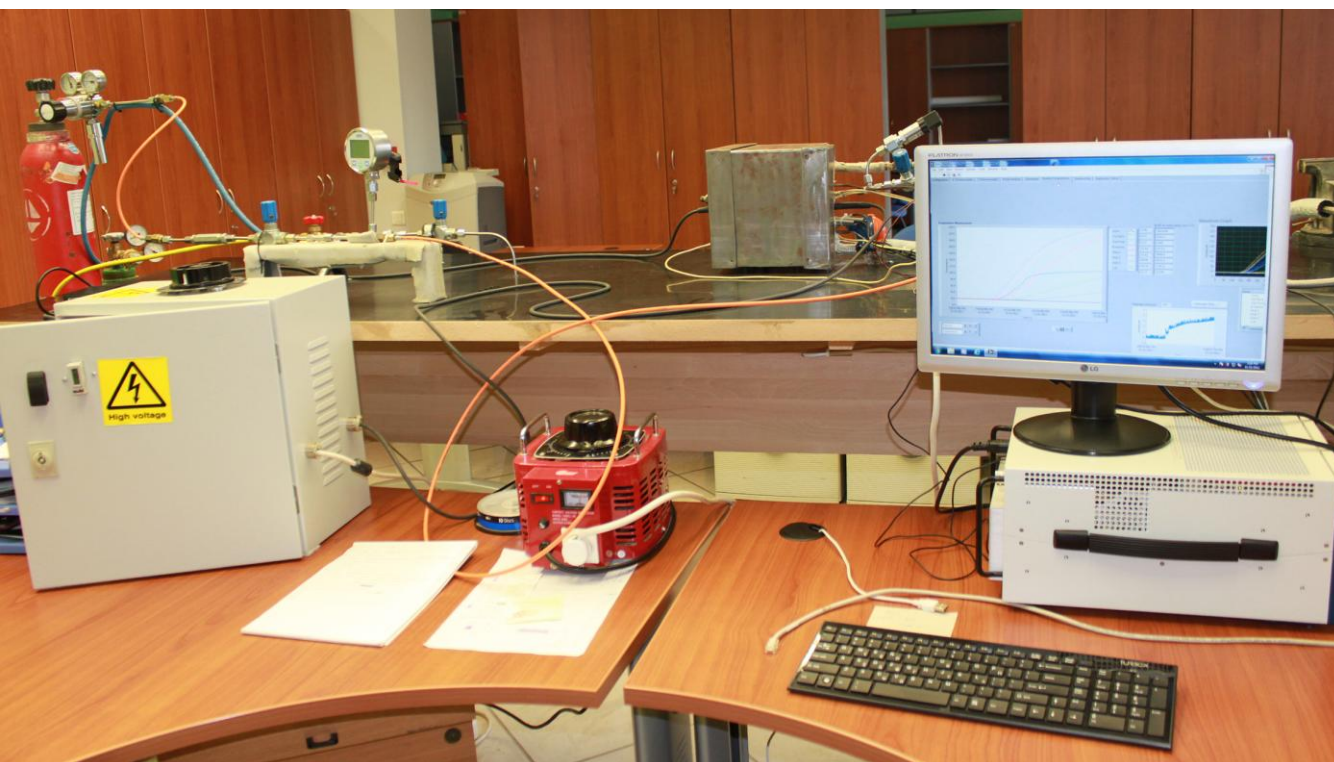
"So, what you do and how you got there?" I asked him. He replied that they arrived at this solution by "reductio ad absurdum": The Italian chemist Andrea Rossi had spotted the phenomenon of nickel fusion with hydrogen but failed to control and stabilize the recreating process, not understanding in depth how it emerged. This deficiency and his entrepreneurial slippage to offer the U.S. company Ampenergo resale rights in Canada led to last summer's "divorce" between DGT and Andrea Rossi's company Leonardo Corp. Since then, *"having read all the bibliography of low energy nuclear reactions (LENR)"*, said Mr. Hadjichristos, *"we decided we had **to try what no one else had thought of**. Finally, we came up with an entirely new method, which allows the fusion of hydrogen with nickel under perfectly controlled conditions"*.

We were there when it happened!

That his words were of substance I verified myself, to the extent that my knowledge as an engineer permits, when the experiment was replicated for our eyes. A plasma generating device heated nano-powder of nickel at 500 degrees Celsius, leading to alterations in the structure of nickel isotopes. Then, three catalysts were imported in the reaction chamber and a separation of the compressed diatomic hydrogen to

monoatomic hydrogen followed. During the next phase, the monoatomic hydrogen got polarized and the orbit of the single electron was elongated. Emission of gamma radiation occurred, followed by absorption of this radiation and conversion to heat.

Since the beginning of the heat production no further heating of the nickel powder was needed - something not happening in Rossi's process - and the ongoing reaction could last for months. It was sufficient to introduce argon to maintain the interior of the chamber at the correct pressure. Noteworthy is also that **turning off** the system occurs **instantly**, by simply turning off the hydrogen supply, in contrast to the hours long sequence required by the Rossi process. The final reaction product is photons in the infrared range, i.e. heat.



DGT's lab: Hydrogen supply and plasma generator (left), power regulator and Hyperion single core reactor (center) and measurement software (right).

The energy output I witnessed in this experiment was six times the input. *"Is this the most you can get?"* I asked Mr. Hadjichristos. *"We have obtained even **14 times the input energy**",* he replied, *"but we do not risk insisting until we are sure that our ceramic insulators can handle it".*

"How much nickel is required for fuel?" I asked again. *"The **three grams of powder** we put in on June 16th sufficed for runs till today (21 November) with the same performance, as you can see",* answered disarmingly Alexander Xanthoulis. *"All you need is **two liters of hydrogen per six months**",* he added.

The external testimony

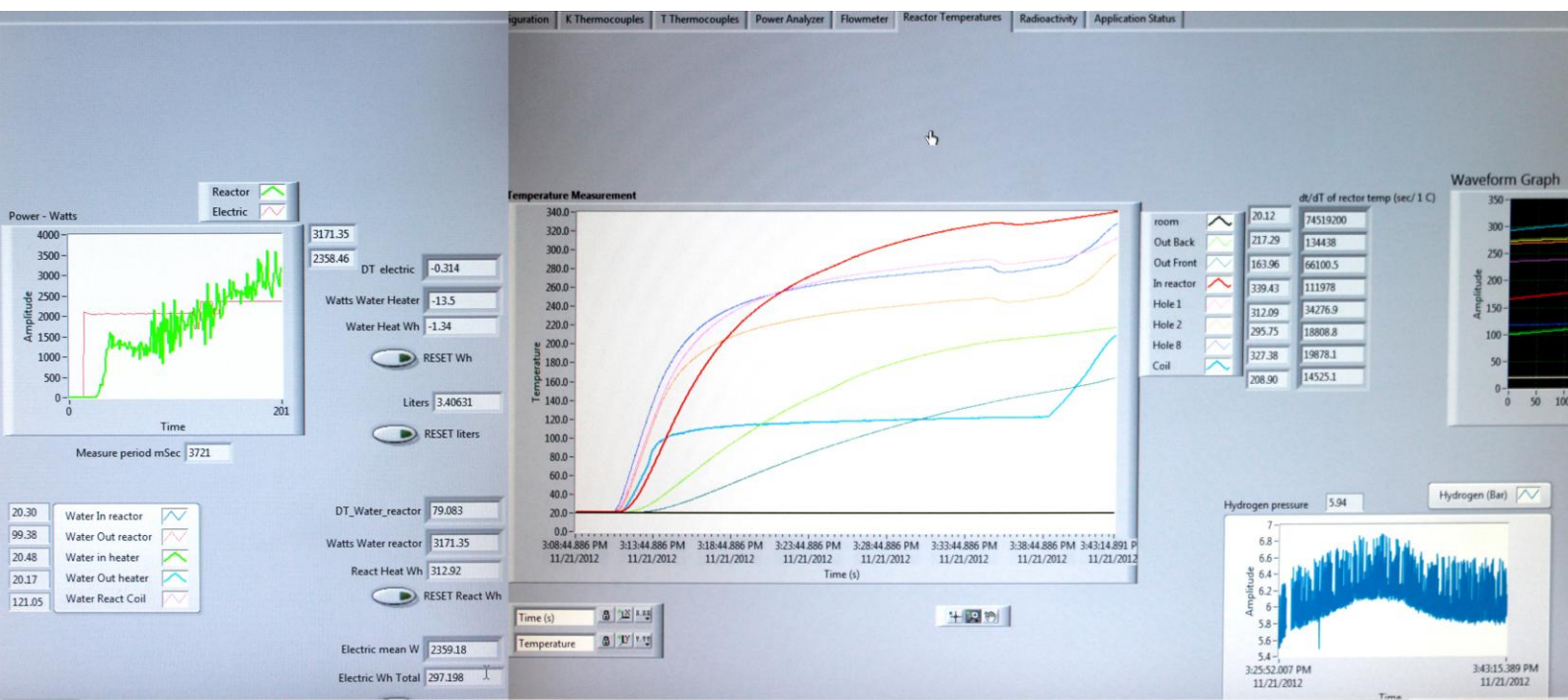
On October 19th 2012, DGT posted on their website (www.defkalion-energy.com/forum/viewtopic.php?f=17&t=4143) a test report assessing the Hyperion single reactor kernel operation, by an independent observer. As discovered and published by *Forbes* on October 20th (www.forbes.com/sites/markgibbs/2012/10/20/cold-fusion-gets-a-little-more-real), the "third eye" was a **NASA employee** for the last thirty years, **Michael A. Nelson**. He claimed that he had conducted the trial only for the non-profit New Energy Foundation (www.infinite-energy.com) and not for NASA. This is formally correct, but we know from the past Rossi episodes that both the U.S. space agency and the research center of the U.S. Navy watch closely the developments in this area.

I read the transcript of the trial and saw that Nelson confirmed the excess energy in the output to be **three times the input** energy - not the six times I saw myself. But he also noted one of the three catalysts DGT kept secret: Potassium carbonate. I thought that the other two might be barium and strontium, but it was just my wild guess.

"So... are you attempting superconductivity in non-frozen conditions?", I asked John Hadjichristos. "Exactly", he replied smiling. "We have **superconductivity conditions at 340 degrees Celsius!** We play with the nickel crystals' geometry via the plasma reactor", he added enigmatically. "But then... you are working with magnetic monopoles!" I reacted instinctively. "You have studied a lot," he said affirmatively, but then remained silent.

"Tell me just this, if you want: Is your invention related to this year's Nobel in Physics?" He looked at me intensely, till he finally replied: "From the 247 researchers in the field globally, it was on you to spell the question".

Experiment screenshots from the test conducted for our newspaper.



Cold fusion's Trojan Horse

This year's Nobel in Physics was presented in our newspaper (www.tovima.gr/science/article/?aid=479302) and you can read there that Serge Haroche was awarded the 2012 Nobel in Physics for making photonic traps to capture Rydberg molecules. What these molecules are you can read in Wikipedia: "**A Rydberg molecule** is an electronically excited species.(...) Particularly for highly electronically excited molecular systems, the ionic core interaction with an excited electron can take on the general aspects of the interaction between the proton and the electron in the hydrogen atom. In highly stimulated molecular systems, the ionic interaction of the core with an excited electron can obtain the characteristics of the interaction between the proton and the electron to the hydrogen atom".

Combining the above with the "elongation of the electron's orbit" that takes place in the chamber of the DGT's reactor leads us to the conclusion that when the elliptically moving electron reaches minimum distance from the proton it "masquerades it instantaneously" into neutron. Why would they want that to happen?



A historical document: The first five reactors DGT made in Greece (upper left the first one, lower right the latest one).

An answer comes from the definition of the key term **Coulomb Barrier**: It is the energy barrier of electrostatic interaction that two nuclei need to overcome in order to reach sufficiently close to occur a nuclear reaction. Theoretically, in order to overcome this barrier, nuclei must collide at high speeds. In practice, however, as discovered in 1928 by the Russian Georgiy Gamow, temperatures required to overcome the barrier can be smaller, due to quantum tunneling: In a limited range of

conditions - known as Gamow Window - nuclear fusion occurs without high speeds. Interestingly, precisely the absence of a Coulomb Barrier for neutron is what allowed James Chadwick to discover it, in 1932, and then to lead us to understanding the nuclear fission of uranium 235.

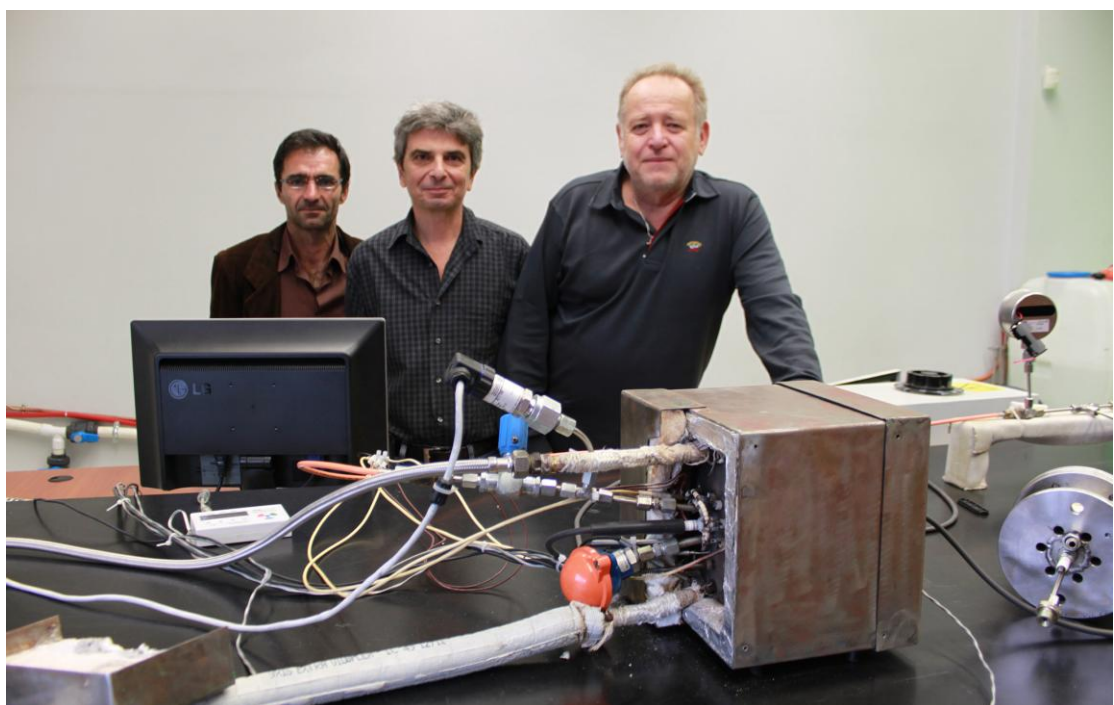
*"The whole thing", explained to me Alexander Xanthoulis, "was to break the Coulomb Barrier. To do that we had three ways: One was to use high-power lasers, as in ITER's case, to reproduce the Sun's conditions. It is an expensive method with minimum outcome. The second way was to excite the two molecules to "overcome the mountain" and meet each other. This is what Rossi attempted, but he could not control the excited molecules. The third way was the one we found: to **"make the mountain disappear"** for a very short time." We succeeded by disguising protons in neutrons via stimulation of nickel in Rydberg form. In this form the trajectory of the electron is elongated elliptically, so that at its "perihelion" the system appears as a neutron and not as "the mountain in-between". Thereafter, we cause fusion by applying magnetic fields and pressure".*

*"So... you crafted a Trojan Horse to take down the barrier!". "Yes, but equally important is what follows the fall: A **primary fusion** of nickel and hydrogen occurs, a transmutation that yields zinc and copper - a complete chain which we have measured. But a **nucleosynthesis** also occurs, a process like the one that we see in the Sun's crown. This nucleosynthesis is responsible for the absorption of the gamma radiation emitted during the first phase".*

"It sounds like Nature running on rails and someone moving keys to alter the lines and cause train collisions... But, what kind of control do you have in such a game? "

*"What we did was to change the way nickel and hydrogen get excited. The first who attempted to change the lines - Stanley Pons and Martin Fleischmann, in 1969 – tried it via electrolysis. Rossi and others who followed tried it via heat shocks. We achieved it with plasma, which allowed us to have **full control**, and no occurrence of uncontrolled chain reactions. And, think about that: the idea came from a **23 year old** researcher of our team!"*

Behind the experimental Hyperion, DGT's lab supervisor, CTO and CEO (right).



Such an explanation of the phenomenon is supported by Nelson's reference in "**Widom Larsen theory**" for the absorption of gamma radiation and conversion to heat. This theory of Northeastern University Professor Allen Widom and Lewis Larsen of Lattice Energy LLC describes exactly a mechanism to capture a lepton from neutron (<http://wltheory.com/>). If indeed this is the theoretical background of the transmutation that occurs in DGT's reactor we will not know for sure before the company files a patents application for the process of the main reaction. But this is to happen, for obvious reasons, only days before the first commercial release of the product and after they have filed the **six patents** they have developed for ceramic insulators and a plasma spark plug. And all that is not expected before **next summer**.

Why DGT left Greece

I discussed at length with DGT's CEO Alexander Xanthoulis, CTO John Hadjichristos and Marketing Director Symeon Tsalikoglou what happened and they packed up to leave Greece. They recounted all aspects of a **18-month waiting** to receive the state's minimum support, which would be accession of their research in the green technologies framework and a loan to complete the trials. All promises proved false, either due to incomprehension of their technology or "deliberate indifference" or even conflict of interest with current energy moguls in Greece. They told me names of those who directed the arduous litany they lived through but they insisted to keep them off the record. Only in an outburst Xanthoulis told me: *"Shortly after your last year's article the state services came to check upon an eponymous complaint that we manufacture illegal generators. After this was proven false, we asked who made the complaint and... automatically, the complaint was re-baptized anonymous"*.

I asked him whether the government had considered their case as a serious effort, in the first place. He answered: *"If our technology did not convince them, weren't they alarmed when we were visited by the director of the National Security of the United States (NSA) and the police blocked all streets in our area for his visit? Or, when Barroso (the President of the European Commission) asked to be briefed about our technology?"*

"Really," I asked, *"who was the first foreigner to pay you a visit and how many others followed?"*

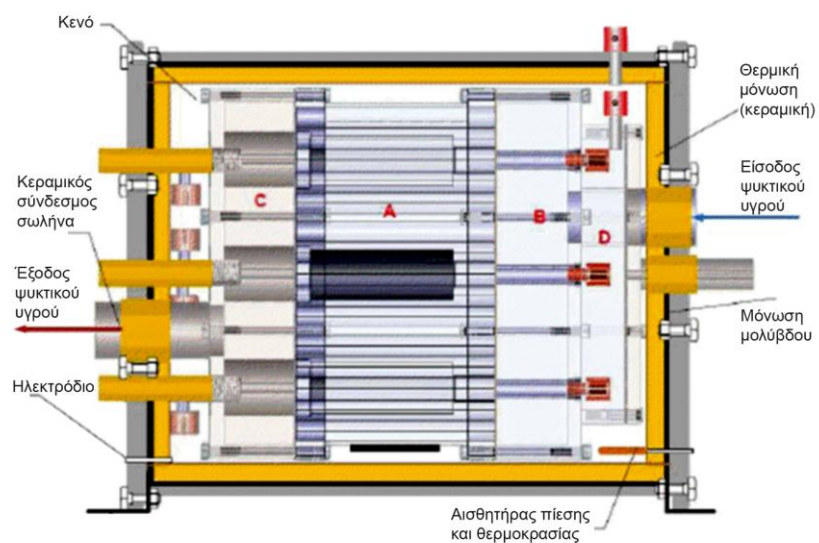
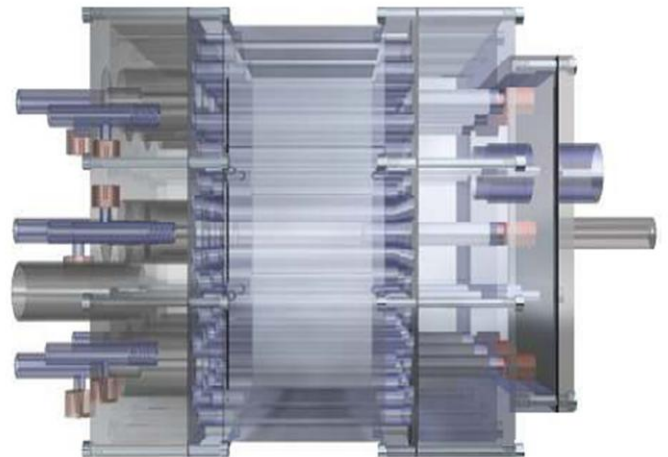
"First came the Chinese", Xanthoulis said, *"but they wanted all the pie for themselves. Then followed ... everyone: Almost all major industrial countries. The one who asked for less were the Turks, who put on the table a check of 100 million euros, asking only to move our headquarters to Turkey and declare that the technology be Turkish. They offered us the money just when we needed it the most, but our heart didn't let us accept the offer"*.

“Everybody dance now”

"So, now... why in Canada?", I asked.

*"Because in Greece none of the research institutes we addressed helped us," said Mr. Xanthoulis, "and on top of that a member of the Parliament asked whether we were to store... nuclear waste at the port of Kavala! In contrast, Canada accepted us **unconditionally**, sponsoring our research and giving us official certification that this is not a conventional nuclear technology. In addition they offer us free access to their national energy laboratories. However," he added, "our research team is moving to Canada only temporarily, until the stages of prototyping, testing, approval and initial production are finished. After less than three years we plan to return to our homeland. Besides, the overall plan of our company is to be multinational with **subsidiaries in all continents**. Our goal is to license manufacturing of our systems to others. We will only keep providing the input material, the specially shaped nickel **nano-powder**".*

The 3D model of 9core 45KW Hyperion for domestic use: Exterior, interior and parts' diagram.



Indeed, reading the company's business plan I saw that they have the prospect of an unobstructed preparation in Canada and a subsequent commercial success: For every dollar they

spend as a company in Canada, the provincial government of British Columbia adds three more. As for the outlook of their investment, with a cost of less than **5 euros per MWh** for their reactor vis a vis the 107 euros/MWh of the PV photovoltaics, DGT expects in 2017 to have a net profit of **19 billion euros**! They have already entered into preliminary license agreements with companies from **80 countries** and the biggest manufacturers of airplanes, cars, trains and ships in the world have already requested joint research and development of engines for their sectors.

"And the oil corporations?" I asked. "Won't they fight you?"

*The reply from Mr. Xanthoulis was: "If we had started this 10 years ago, we'd be **dead by now**. But now, as the vice president of Exxon told me himself, they do not see us as competition. Simply, as he put it, in two to three years' time they will make us an offer we will not be able to resist".*

I cross-checked this new approach of the oil multinationals with recent moves coming from Shell: through their *Shell GameChanger* program they appear to seek collaboration with researchers of cold fusion. Obviously, they value them far more than our own politicians.

"For us, the ordinary consumers of energy, what's the benefit?", I asked Xanthoulis. "By buying a half cubic meter box of 45 KW with 5,500 euros, you will forget the energy cost of your house", he replied.

What was left unanswered in my mind was how long DGT would keep their mission statement *"not to use our technology for military purposes"*. From what I learned in retrospect, one of their prospective licensees in Canada is asking to use such an energy source in ultralight unmanned planes (UAV). And then, I recalled one more crosstalk with DGT's CTO: *"If I suspect right", I had said, "your technology is not simply capsizing the energy economy of the planet but it even allows dreams of **interstellar travels**". His reply: "Why do you think NASA shows such an interest in us?"*

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