Yuri Bazhutov on Developing the Erzion Model

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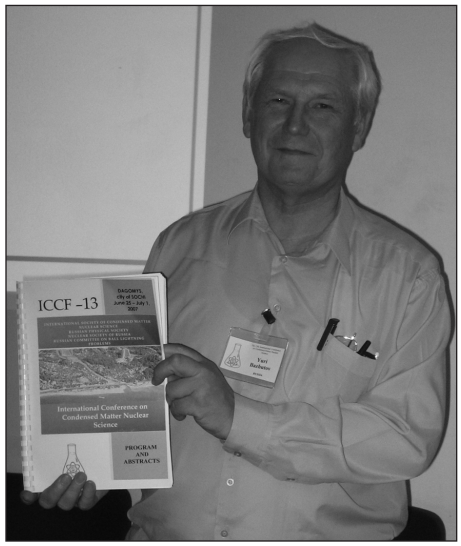
Dr. Yuri Bazhutov passed away on March 9, 2018. I had the privilege of interviewing Yuri at ICCF16 in Chennai, India in 2011, covering many topics but primarily his development of the Erzion model. The assistance of Olga Dmitriyeva, who sat in to translate from Russian to English when needed, was invaluable. ISCMNS Director Bill Collis, a champion of Bazhutov's Erzion model, also participated. I would like to thank Natalia Famina for her assistance with some translation issues and for being a liaison for the Russian cold fusion community.

Before Yuri began his work in "cold fusion" in 1989, he was already involved in pursuing what he called "anomalous physics." He said, "I was not interested in doing typical experiments." In the early 1970s, he did experiments involving neutrinos and cosmic rays at the Moscow State University Institute of Nuclear Physics.



Yuri Bazhutov was an organizer of ICCF13 in 2007, Sochi, Russia. (Photo courtesy of David Nagel.)

Of one of his earliest experiments, Yuri said: "My first experiments for my thesis were calculations using the Monte Carlo Method and a neutrino detector with the help of the programming language Algol. My experiment was connected with a research reactor at the Kurchatov Institute. During this experiment I reduced the energy loss of the neutrino by thirty orders of magnitude." Yuri did three experiments in this reactor, over a three-year period. He published two articles in science journals on the problem.

Yuri explained the genesis of the neutrino experiments as follows: "The first experimental measurements of neutrinos from the sun done in the U.S. (Davis *et al.*) did not have the expected results. The hypothesis was that those neutrinos were of a much smaller energy than expected. My advisor B.A. Khrenov proposed that somehow the neutrinos were being made in the sun (or absorbed in the sun) either by electrons, or protons. So the problem was to build separators to detect this hypothesis, and increase the sensitivity of the detectors so it could go beyond many orders of magnitude. So the sensitivity was increased by 10^{16}."

After a year of research, Yuri proposed "that a neutrino can not only interact with an electron but that it could interact with a proton too. I proposed an abnormal reaction of the solar neutrino with the proton and fulfilled the experiment and created an installation and fulfilled an experiment in the same reactor to find the source of the neutrino and check this idea. I received a small cross section which closed such problem."

During the interview, Bill Collis noted, "We now know that neutrinos do not interact with electrons, so your negative result was correct!"

From this work, Yuri and Khrenov began to formulate a theory of what they called the Erzion. The model essentially proposes that neutral catalytic particles transfer neutrons from one nucleus to another, bypassing the Coulomb barrier. When there is no Coulomb barrier, it is suggested that even heavy isotopes can be transmuted. That model fit brilliantly into later work done in what the Russians term "cold transmutation" or "cold nuclear fusion."

Yuri said: "These particles work in cold nuclear transmutation, or cold fusion, and can explain the problem Davis was working on. In the framework of the Erzion model, the sun's energy provided Erzion catalysis. Three persons thinking of this from traditional nuclear fusion! It is very interesting."

Bill Collis elaborated: "For many years, the theory has been that the sun does not produce enough neutrinos. But we know how bright it is so we know how many neutrinos it ought to be radiating. Yuri has said the solution is that the sun is producing 80% of its energy with his Erzion theory and 20% through nuclear fusion."

Yuri first published on the Erzion model in 1982 ("About One Opportunity of Second Shower Spectrum Interpretation Observed at Small Depth Underground," *Izvestiya Akad. Nauk USSR*, Ser. Phys., 46, 9, p. 2425). He noted, "To explain our abnormal muon cosmic ray spectrum, we proposed the existence of muon penetrating hadrons. New particles. Heavy hadrons. The physics community said 'This cannot be; hadrons are not penetrating.'"

Bill Collis praised, "Your brilliant idea is that hadrons are neutral and therefore penetrating and they all have a very high cross section, so nuclear reactions are much more probable."

Yuri said: "The first step in cosmic rays is the existence of muon penetrating hadrons. Very heavily penetrating. It is not the traditional model of elementary particles, and actually contradicts it. My thesis was delayed for years because of the opposition to such an idea. My boss told me I must find a theoretician who can explain these particles according to the standard of ordinary particles. 'We are not theoreticians,' he said. 'We are experimenters. We cannot give the explana-

tion for such a result! This publication will give us many problems.'"

Yuri found theorist Prof. G. Vereshkov of Rostov State University. Yuri said: "We tried different models in supersymmetry and our first publication was not excellent. In 1989, we published in the *Proceedings of Cosmic Rays Conference* (1989, Vol. 1, p. 101). Our best explanation of stable heavy hadrons was due to the mirror model."

Yuri explained, "It was the first mirror symmetry in the space of the charge. Dirac proposed it was in positive particles that exist similar negative particles, electron, positron, proton, antiproton, neutron, anti neutron…So these theories about the mirror world existed before and were used to explain how those heavier, more massive particles can penetrate our world. It happened that this theory could explain the Erzion."

Like any good theory, the Erzion model evolved over time. Yuri stated, "The experimental data on the existence of excitons is getting more and new results." He noted that after the Erzion theory was fully formulated, "All my life was devoted to experimental check of the existence of such particles in the framework of this mirror model." He said, "Before creating such model the experimental understanding was to search for such particles in the cosmic rays. It is important to know what model explains such particles because it was a very phenomenological understanding I had. The explanation helped me to better organize the experiment and get faster results. The effect of such a model was for cold nuclear transmutation...The Fleischmann-Pons effect appears in 1989 and at that time I participated in the creation of the Russian Physical Society under the leadership of Sergei Kapitsa…We had a revolution in Russian science at that time…"

At the time of the interview in 2011, Yuri was introducing a new idea, negatively charged Erzions plus positive tritons. Collis notes, "The idea that an energetic solar neutrino could transmute protons to neutrons is remotely possible. Yuri posited that negative Erzions interacting with either protons or deuterons could do the job possibly 30 orders of magnitude faster (if they exist)." Collis noted, "No theory predicts neutrons from protons other than Yuri's Erzion model. But Piantelli claimed to measure 10^4 neutrons per second in the Ni/H system and was awarded the Truffle Prize at Asti in 1995. At that time, many thought it impossible!"

Collis explains Yuri's newer perspective as follows: "Because you have a negative heavy Erzion orbiting around a triton, and because they are very small, they behave like a neutral particle. So it becomes very penetrating and can do all sorts of new transmutations."

Today, Collis adds, "According to Yuri, the negative Erzion is beta stable and its half-life is unknown. In my opinion, it probably only has a minor role to play (perhaps due to this short half-life) because otherwise we would see lethal hot fusion products as we do with muon catalyzed fusion. So the real core of Erzion theory regards the interaction of the other two neutral and stable Erzions, $\ni_N$ and $\ni^0$. These two hypothetical species differ from one another by exactly one neutron and can catalyze the transfer of a neutron from one isotope to another. Curiously, very few of the possible reactions produce any ionizing radiation. And further, the reactions are all very probable because they conserve momentum and there is no Coulomb barrier. Yuri solved major theoretical obstacles with one simple, elegant explanation."

Yuri Bazhutov was a unique and irreplaceable figure in the cold fusion community. He was a scientist of great original thinking and creativity. Even more so, he was the kind of warm, kind, welcoming and outgoing person who managed to unite people from all countries and support community. His leadership and organizing of meetings in Russia were instrumental in fostering communication and exchange in ongoing LENR work throughout the world.

Personally, I will never forget his warm smile and the feeling of joyful welcome he exuded. ICCF13 in Russia, which Igor Goryachev and Yuri Bazhutov co-chaired, ended on the night of his 60th birthday with a massive full moon shining over the sea. It was not an accident. It was a celebration of what he and his community had created. Salut, Yuri!

Many of Yuri Bazhutov's papers are available online at:

http://www.iscmns.org/idxjcmns.htm
http://iscmns.org/library.htm