

APPLICATION

Research Prize

Sponsored by Göde Science Foundation, Germany

with the topic

Gravity Effects at Low Energy Nuclear Reactions (LENR)

Author

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1. Brief description of the project.

Abstract

The author suggests that both gravitation and Low Energy Nuclear Reactions (LENR) is a particular case of a wider scope of phenomena, which are, truly, one of the four fundamental interactions in Nature. Also, the author suggests that the carrier (agent) of this phenomena is a not-high energy neutrino (NNN).

In line with the objectives of the Göde Research Grant, and to confirm the above hypotheses, it is proposed to carry out two complementary experiments:

1) Adaptation of the known system for anomalous gravitational effects (AGE) with added LENR observation.

2) The system, suggested earlier by the project author for the LENR implementation, adaptation for additional AGE observation.

As a result, correlation between the two noted effects has to be stated.

1.1 The project ideology

The main idea of the project is suggestion on non-specific nature of gravity and its correlation with other phenomena. In line with this, it must be specified, why the standard insight on gravitation as the one of four fundamental interactions in Nature is not sufficient.¹ For one, the existence of specific gravity carriers was not proven. Moreover, the author suggests that the gravity concept being analogous to intra-nuclear interactions is questionable, because of the fact that particle exchange between gravitating masses at cosmic scale is a subject **to** temporal delaying.

The closest analog of the fourth fundamental interaction is the electromagnetic (EM) one. EM interaction is so variable, that one should talk about a complex of interactions united by their carrier. Versions of this interactions can be proper electrical and proper magnetic ones, resonant and not resonant, coherent and not coherent, wave and quantum, and even uni-quantum and multi-quantum... EM radiation manifests itself both in interaction with atomic nuclei and with living matter. An analog of gravitation in the above complex is a light pressure on the matter (discovered by P.N. Lebedev at the early twentieth century).

The author suggests that the truly fundamental interaction, including gravity as a particular case, must be as variable as EM interaction. Many experimental evidences support this. These phenomena exist in various Nature domains from the nuclear physics (anomalous nuclear phenomena ANF, low energy nuclear reactions LENR, etc.) [1-5, etc., etc.], up to condensed matter physics and chemistry (anomalous atomic-molecular, structural and thermodynamic phenomena) [6-11 etc., etc.], mechanics, planetary mechanics and astrophysics (anomalous astrophysical, gravitational and ponderomotor phenomena) [12-15, etc., etc.], biology [16-19 etc., etc.].

These various phenomena are united (similar to EM interactions complex) by the existence of hypothetical common carrier (agent), i.e. the radiation quantum having a null electric charge, a half-integer spin $s = \pm 1/2$, a mass close to null² and mainly resonant mode of its absorption by the matter. According to the project author's hypothesis, the agent's participation in so different phenomena is caused solely by its energy variation. Such agents cause all the listed phenomena, via structure change of matter at various levels of its organization – from nuclear one up to

¹ It is known that modern physical pattern of Universe is based on four so called fundamental interactions: strong, weak, electromagnetic and gravitation ones. The strong and weak interactions occur within atomic nuclei and their closest environment, while EM and gravitation ones define physical uniformity of larger objects from atoms up to the Universe itself. The carriers of EM and gravitation interactions supposed to be the quanta of electromagnetic radiation – photons, and hypothetical particles gravitons and gravitinos, correspondingly.

² According to some observations data, these hypothetical quanta move with super-light velocities and their masses to be expressed by imaginary values [12,13].

biological one – due to the same mechanism of initiation, namely, coupling of the quantum with electron in atom [20].

Wide variety of hypothetical particles was suggested earlier as elementary carriers of the noted phenomena. The author suggests, that the common carrier of those phenomena is known but is a poorly investigated particle, namely, a not-high energy neutrino (NNN). Assuming **that** it behaves in all the above interactions as a quantum of radiation, rather than as a particle, that would mean that it is either scattered elastically or absorbed resonantly [21].

The fact that gravitation is not a specific phenomenon but a particularly case of the truly fundamental interaction is already proven indirectly by the existence of gravitational anomalies, which are not explainable from the point of view of the Newton universal gravitation law (e.g., so-called Oregon Vortex), and successful “anti-gravitational” experiments.

1.2. Statement of the problem

It is possible to solve a problem of experimental observation of LENR and anomalous gravitational effects (AGE) correlation within *a priori* acceptance of the following assumptions:

- (i) gravitational interaction is caused by non-specific elementary carrier that can manifest itself in other interactions, too (it seems that this assumption is more **convenient** with “pushing” gravity [22, etc.] rather than with “pulling” one);
- (ii) LENR do exist in reality and are also caused by some elementary carrier but difficulty of the LENR reproduction is caused by the absence of control of such factors as noted carrier identity and flow density;
- (iii) Noted elementary carrier is the same in the cases (i) and (ii)^{3, 4}.

Within the above assumptions, the best candidate to the role of non-specific carrier of both phenomena under consideration among well known particles is, no doubt, neutrino – super-light electrically neutral particle having half-integer spin, that is formed after nuclear reactions of reverse β -decay (and/or its antipode – antineutrino, that is formed after direct β -decay).⁵

On one hand, according to common opinion, not-high energy neutrino (NNN) is a main constituent of so called “dark matter” forming latent mass of Universe. Therefore, it is thought to have a passive role in gravitation. Active role of NNN in gravitation is possible within “pushing” model of the latter [24].

On other hand, according to the author’s model of neutrino driven nuclear reactions (NDR) [25], NNN participates in β -decay not only as a product – at the “outlet”, but also as an initial substance – at the “inlet”. Consequently, its natural background flows define proceeding of the majority of conventional “spontaneous” nuclear processes. In this case, experimental ability of noted flows density variation in relation to natural background define possibility of proceeding and velocity of LENR.

Within the concept described above correlation between gravitation and LENR should be observed in the following way: (i) under the condition of NNN flow increased density both LENR and AGE can be implemented; (ii) under the condition of natural background of NNN flow density, neither LENR nor AGE can occur.

³ We don’t consider continual versions of gravitation deliberately, mainly because their experimental proof within the project seems impossible.

⁴ Worth noting the monograph [23], the author of which had in fact predicted the main idea of the project at the level of knowledge of 1880-ieth. The “kinetic theory of gravity” was described there that differs of Le Sage’s theory by the fact that, due to the [23] author, “ether particles” flows participate in gravity by the “pushing” mode, noted flows are directed to the centers of cosmic objects where they are supposedly “transformed to hydrogen atoms and then to atoms of more heavy elements”. Talking in modern terms, that old hypothesis first united gravity and transmutation.

⁵ It is traditionally considered that neutrino, especially NNN that can supposedly participate in the above interactions, interacts with matter poorly. This conclusion has been done on the basis of the β -decay irreversibility but really it is delusion the reason of which is methodology of conventional nuclear physics; the latter used to observe only radioactive products and processes that are accompanied by radiations, though hypothetical neutrino driven nuclear reactions (NDR) used to yield stable products in a process without radiation.

The author states that NNN variation can be done by focusing NNN via electromagnetic methods with circular polarization of EM wave [25,26]. Concerning NNN energy value, it will be defined according to the well known Plank's formula of the quantum energy value ε :

$$\varepsilon = n\hbar\omega$$

where n is dimensionless numerical factor, ω is the frequency equal to the frequency of circular polarized EM wave, which is used for focusing of NNN flow [26].

1.3 Setting up experiments

The experiments' design are partly modified versions of **systems proposed earlier** for observation of LENR phenomena (1.3.1), or AGE phenomena (1.3.2). Specifically, the goal of the first experiment is AGE observation in addition to LENR, and *vice versa*. The design of the 1.3.1 experiment is suggested entirely by the author of this project [30]. Regarding 1.3.2 experiment design, the project author has specific "know-how".

As an object (sample) of experiments, a well known radioactive sequence beginning from the ^{232}Th long-lived natural radioisotope, is selected. This selection is reasoned by the fact, that this sequence includes 12 radioisotopes undergone to different types decay (both α - and β - ones) with wide variety of half-decay times and energy yields. As the LENR conformities to natural laws concerning prevailing initiation of specified nuclear process aren't clear, such selection of the sample provides, in fact, 12 various objects for carrying out 12 experiments at once.

is suggested to implement investigation of the $^{232}\text{ThO}_2$ radioactive sequence nuclei transmutation, via γ -spectrometry using stationary equipment after finishing an active period of each experimental run. Additionally, it is suggested to carry out a sample γ -radiation monitoring during an active period of each experimental run (without spectrum analysis). In this case, control runs are necessary to distinguish false effects imitating γ -radiation increase above background level from the real **ones**. The control runs should be carried out under conditions of 1.3.1, 1.3.2 experiments but with absence of $^{232}\text{ThO}_2$ sample in experimental cell focus.

For the AGE registration both versions of experimental equipment to be supplied by the weight measure unit (WMU) – see fig.1. This unit consists of a sample holder, a saddle, a suspension and a strain transducer. The latter is a set of metallic film strain gauges, deposited onto a thin membrane of polycrystalline silicon and interconnected in the Witstone bridge circuit. The transducer temperature has to be stabilized by thermal insulator and shielded from environmental electromagnetic action by grounded metallic shield. After setting a sample into a holder, the bridge has to be balanced by resistance box. Then, its disbalance has to be recorded by a recording unit.

Finding a correlation between LENR and AGE will be done by calculation of the measured intensity of LENR dependence on recorded deviation of the sample weight vs. background.

1.3.1 To achieve an objective of the project in this experiment, it is suggested to use projected and constructed by the author "neutrino driven nuclear reactor" with WMU supplied. The design was presented at ICCF-11 (see fig.2). This reactor consists of high voltage pulse power supply, which provides short and energetic current pulses to a circular polarized EM inductor. The inductor plays a role of "neutrino lens". The sample with thorium dioxide $^{232}\text{ThO}_2$, distributed in light matrix (plastic or boracic-silica glass), has to be situated in the focus of this "lens". According to the author's opinion, the "neutrino lens" is able to focus NNN flow from space, magnifying immensely its density during current pulses pass through a circular polarized EM inductor. During experimental run the sample weight monitoring has to be implemented. It is suggested to stimulate the sample additionally with high voltage pulses, because of known positive role of pulse excitations in LENR phenomena.

To avoid electrical pulses interference on WMU, the elements of suspension have to be constructed of dielectric material. Also, idle runs have to be carried out during experiments – say, stimulating a sample with high voltage pulses without EM ones, or vice versa, or supplying both types of pulses to the sample holder in the absence of the sample in the holder.

1.3.2 Contrary to the previous one, this experiment is suggested to carry out using another authors' like installation. The intention is to use self made device constructed similar to John Searl's disk (a well known anti-gravitation system) [14]; i.e., the version constructed and investigated in Russia at the 90-ieth of last century [15]. This device represents an electromagnetic machine, which incorporates: 1) a stator being a ring permanent magnet, with an axial magnetization; and 2) a rotor consisting of many magnet rollers with an orientation parallel to the ring axe and able to both rotate around the axis of noted stator and roll about their longitudinal axes. Of note, angular velocities of rollers taken about their longitudinal axes are much higher than angular velocity of a rotor as a whole, taken about the axis of a rotor as a whole.

The author's version of the experimental device is of necessity simplified vs. the above described one (see fig.3). In particular, the following features are not included: air bearings; rollers rotation about their own axes; a stator magnet ring, the role of which is solely providing rollers "own" rotation. Instead of that, it is proposed to provide both higher angular velocities of a rotor rolling (up to $8 \cdot 10^3 \text{ min}^{-1}$ against $6 \cdot 10^2 \text{ min}^{-1}$ in the above system) and additional circular polarization of the rotor magnetic field. Similar to the 1.3.1 case, the sample with thorium dioxide $^{232}\text{ThO}_2$ distributed in light matrix has to be placed in the sample holder and suspended on WMU. The sample must be placed in the center of the rotor.

1.4 Expected results

1. LENR effects take place under experimental conditions in the 1.3.1, 1.3.2 systems. These effects to be identified by "cold" nuclear transmutation of heavy nuclides of the ^{232}Th radioactive series. This would be observed by deviation of radioactive decay rates about conventional values. Eventually, this should be revealed by the change of relative γ -activity of radioactive sequence members contained in the sample.
2. Simultaneously, the AGE, which are observable, measurable and reversible sample weight deviation about its initial value, should be observed in the above systems.
3. The first and the second effects values are in correlation with one another.
4. Thereby, it would confirm the author's hypothesis of the fact that gravitation is a particular case of the more fundamental interaction in Nature, and that an elementary carrier (agent) of this interaction is not-high energy neutrino (NNN).
5. It would also confirm the author's insight that noted NNN not only can initiate and drive a set of various phenomena, but can be manipulated using appropriate equipment.

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2 List of Figures

Fig.1 Weight Measuring Unit (WMU).

Fig.2 Circular Polarized Electromagnetic “Neutrino Lense” - Neutrino Driven Nuclear Reactor with WMU.

Fig.3 Circular Polarized Electromagnetic Rotor with WMU.

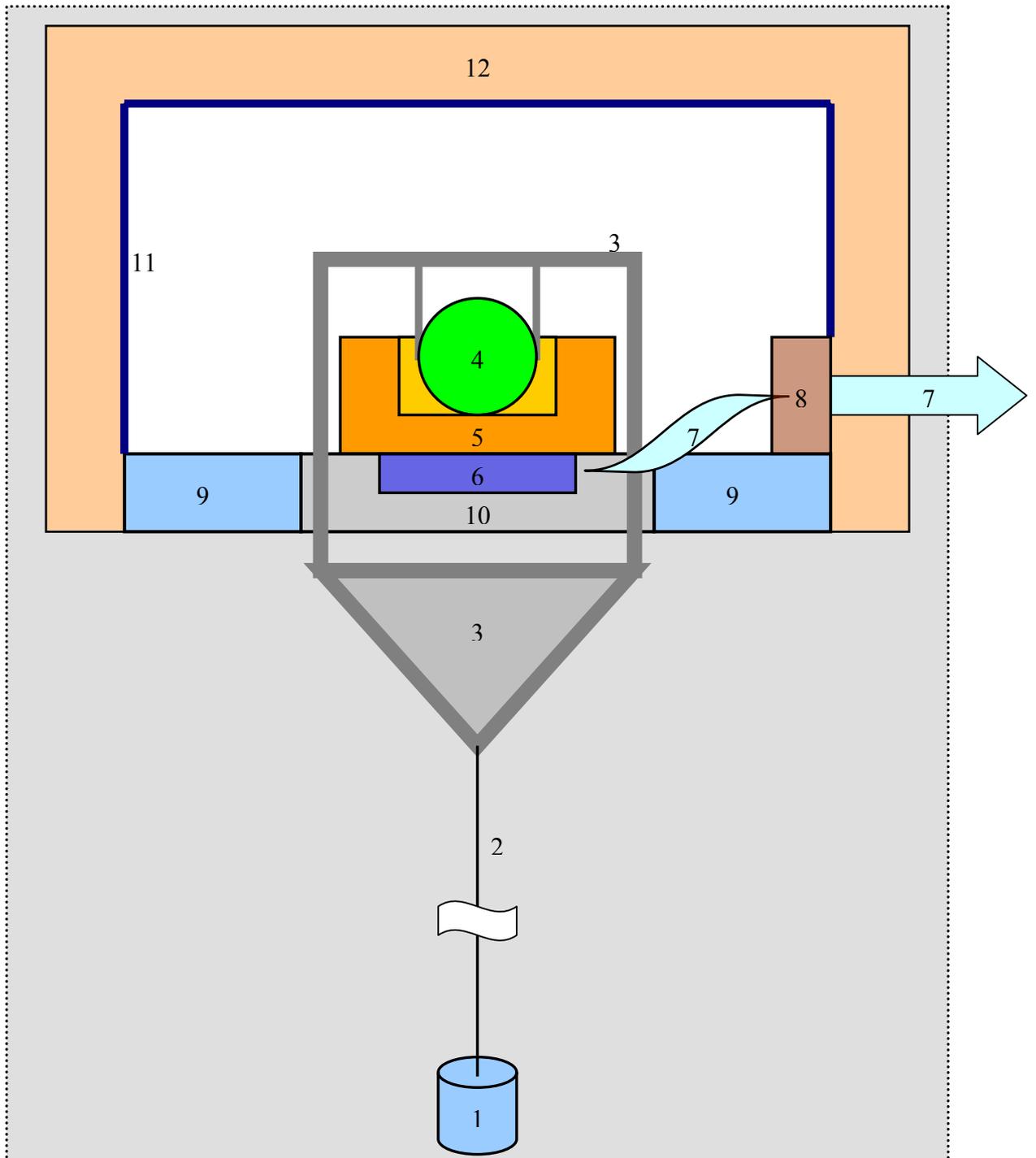
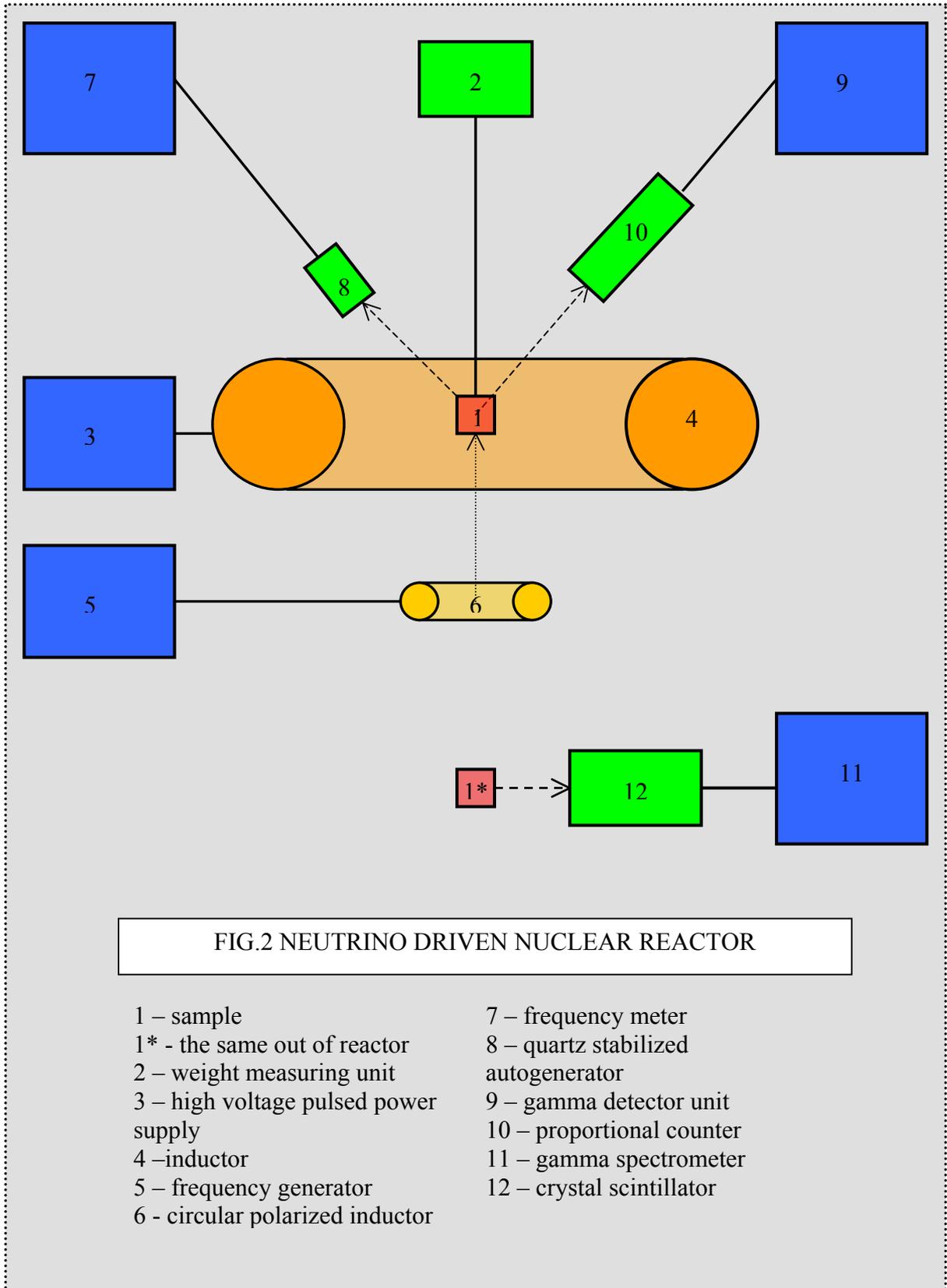


FIG.1 WEIGHT MEASURING UNIT

- | | |
|--------------------------------------|----------------------------|
| 1 – sample in sample holder | 7 – electrical cables |
| 2 – suspension needle | 8 – electrical connector |
| 3 – suspension frame | 9 – support plate |
| 4 – suspension support ball | 10 – gap in support plate |
| 5 – polycrystalline silicon membrane | 11 – metal grounded shield |
| 6 – metallic film strain gauges | 12 – thermal insulator |



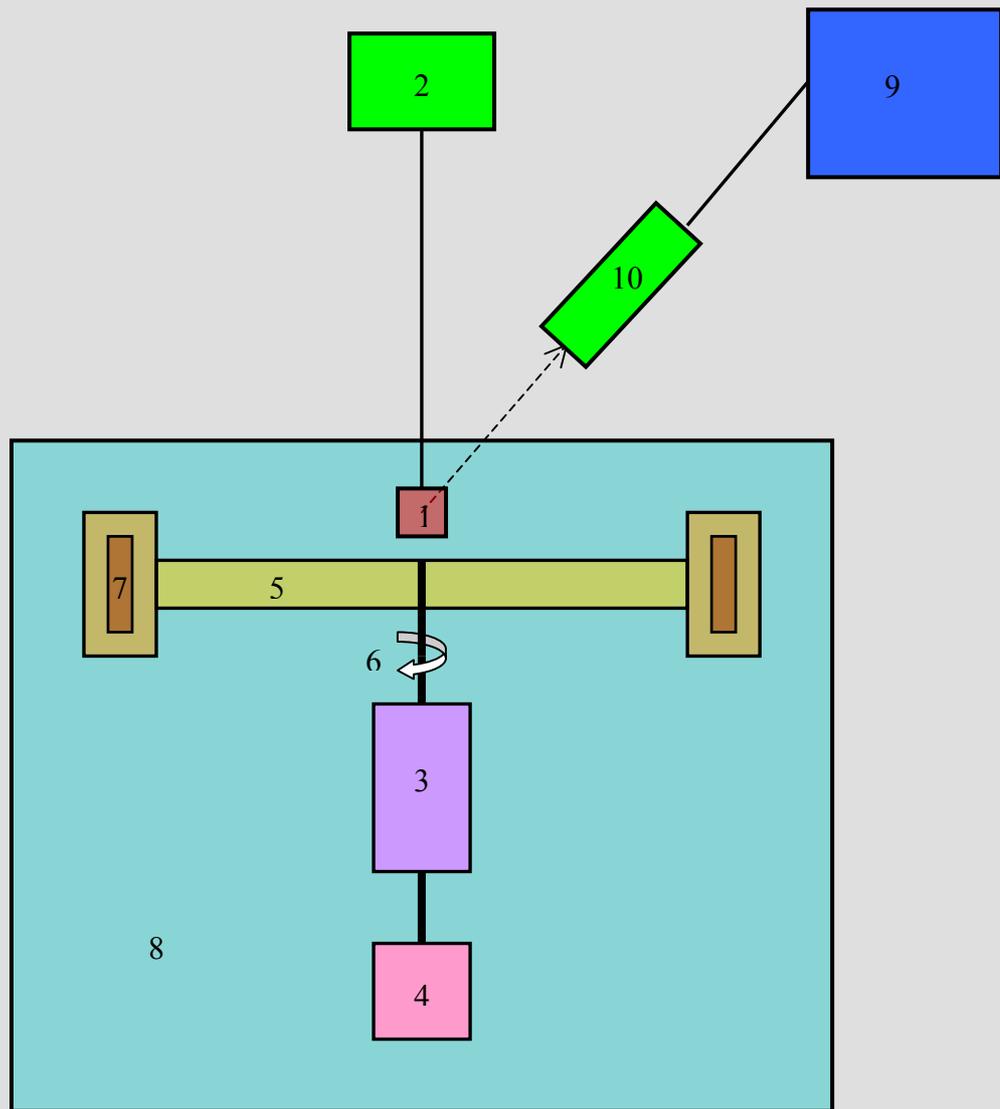


FIG. 3 CIRCULAR POLARIZED ELECTROMAGNETIC ROTOR

- | | |
|--|-------------------------------|
| 1 – sample | 6 – rotor axe |
| 2 – weight measuring unit | 7 – magnetic roller (section) |
| 3 – high angular velocity electric machine | 8 – centrifuge |
| 4 –tachometer | 9 – gamma detector unit |
| 5 – rotor (section) | 10 – proportional counter |

3 Curriculum Vitae

3.1 Personal Data

Marital status: married
Citizenship: Belarus
Date of Birth: 1951/08/23
Place of Birth: Pinsk, Brest region, Belarus

3.2 Aim

Application to Göde 2005 Research Prize

3.3 Education

Institution and Location	Degree and Field of Study	Date
All-Union State Courses on Inventions and Patent Rights, Minsk, Belarus	Patent Rights Expert	June 1986
Doctoral Studentship (Aspiranture), Physical Chemistry Chair, Belarussian State University, Minsk, Belarus	Ph.D. (Kand.Sci.) in Physical Chemistry	June 1985
English language training courses, Belarussian State University, Minsk, Belarus	Passing Kand. Sci. Minimum Exam	June 1974
Belarussian State University, Chemistry Department, Minsk, Belarus	(M.S.) Chemist, Teacher of Chemistry	June 1973

3.4 Professional Skills

3.4.1 Area of expertise

Condensed Matter Nuclear Science, stability and electrical conductivity of non-metallic materials, solid state sensors, physical chemistry and electrochemistry, ecologically clean energy production, radiometry and nuclear spectrometry, radioecology, heavy and viscous oil extraction methods investigation and development.

3.4.2 Scientific interests

Since 1989 till 1999 and since 2004 till now were concerned mainly with condensed matter nuclear science.

3.4.3 Computer literacy:

Familiarity with IBM PC compatible personal computers (user mode): Windows, MS Word, MS Excel, MS Power Point, MS Internet Explorer, MS Outlook Express, The Bat, Opera, Microcal Origin, Grapher, Netscape Navigator; MS DOS, Norton Commander, Norton Editor, ChiWriter, etc.

3.4.4 Working Experience

February 2005 till now – Leading researcher, Physical Chem. Chair, BSU.

December 2000 till November 2004 – Head of Laboratory, “BelGeo” Scientific Research Geological Enterprise, National Academy of Sciences, Belarus.

September 2000 to November 2000 – Leading researcher, “BelGeo” Scientific Research Geological Enterprise, National Academy of Science, Belarus.

January 2000 to September 2000 – Scientific Consultant, “Athamor” Scientific Industrial Enterprise.

April 1997 to December 1999 – Leading researcher, Laboratory of Physical Chem. of Solids, Institute for Physical Chemical Problems, BSU.

May 1995 to March 1997 – Leading researcher, Physical Chem. Chair, and Laboratory of Physical Chem. of Solids, Institute for Physical Chemical Problems, BSU.

1989 to May 1995 – Sci. associate, senior researcher and leading researcher in Laboratory of High-Temperature Reactions and Laboratory of Physical Chem. of Solids, Institute for Physical Chemical Problems, BSU.

1986 to 1989 – Sci. associate, Lab. of Analytical and Physical Chem., BSU.

1973 to 1975, 1979 to 1986 – Junior sci. associate, Physical Chem. Chair and Materials Science Problems Section, BSU.

1976 to 1978 – Post-graduate student, Physical Chem. Chair, BSU.

June 1973 – Graduated from Belarusian State University (BSU), Faculty of Chemistry.

3.4.5 Language Skills

English – with moderate ease, enough for all daily and professional needs.

3.4.6 Projects

2004 responsible performer of a project on heavy viscous petroleum extraction methods development funded by Natural Resources and Environment Ministry of Belarus.

2001 – 2003 responsible performer of a project on heavy viscous petroleum extraction methods investigation funded by Natural Resources and Environment Ministry of Belarus.

1995 scientific supervisor of research program (5 projects) on Anomalous Nuclear Phenomena in Solids funded by Education and Science Ministry of Belarus.

1994 – 1996 responsible performer of a project on catalytic oxidation of industrial exhausted gases funded by Belarus Scientific & Industrial Amalgamation on Powder Metallurgy.

1993 – 1996 scientific supervisor of project on synergetic activation of anomalous nuclear phenomena in solids within a grant of Belarus Fundamental Research Foundation.

1992 – 1994, 1997 – 1998 scientific supervisor of project on detonation of solids within a grant of Belarus Fundamental Research Foundation.

1991 – 1992 part time employed as an associate and a head of working group correspondingly performing a radiometric investigation of villages in Chernobyl accident wasted area (Zhlobin and Vetka regions, Belarus) under order and funding of Belarus Hydro-Meteorology Center.

1989 – 1990 responsible performer of project on solid state electrochemical sensors funded by Scientific & Industrial Amalgamation “Integral” (Minsk, Belarus).

1973 – 1989 worked as materials science researcher for Soviet space program under funding by Scientific & Industrial Amalgamation (at this time Rocket Space Complex) "Energiya" (Kaliningrad, Moscow region, Russia).

3.4.7 Honors And Awards

2004 – Member of International Society for Condensed Matter Nuclear Science.

2004 – Member of Coordination Council of Social Amalgamation “Foundation of Alternative Energy Production Development”,

2002 – Member of Commission for Coordination of Renewable Energy Sources Use at National Academy of Sciences of Belarus.

1995 – Associated Professor of Physics (Nuclear Physics Dept.) of Istituto per la Ricerca di Base (Institute of Basic Researches), Monteroduni, Molise Region, Italy.

1995 – Member of Editorial Review Board of "Cold Fusion" newsletter (Peterborough, New Hampshire, USA).

1994, 1995 – Scientific supervisor of Belarus Education and Science Ministry Research Program on Anomalous Nuclear Phenomena in Solids.

1994 – Member of Organizing Committee and Scientific Secretary of International Symposium on Cold Fusion and Advanced Energy Sources (Minsk, Belarus).

1993 – Member of Organizing Committee of International Scientific Practical Conference on Possibilities of Ecologically Clean Energy Production and Energy Conservation (Minsk, Belarus).

1993 – Individual Research Grant of George Soros Foundation.

1993 – Research Grant of Belarus Fundamental Research Foundation.

1992 – Research Grant of Belarus Fundamental Research Foundation.

1992 – A member of Coordination Council on Anomalous Nuclear Phenomena in Condensed Matter of Russian Academy of Sciences.

1985 – Ph.D. (Kand. Sci.) in Physical Chemistry from Belarus State University.

4 List of Some Relevant Publications

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2. V.A.Filimonov, "On the Mechanism of Cold Nuclear Fusion". Pisma v Zh.T.F., 16(1990) No 20, p.29 (in Russian).
3. V.A.Filimonov, "Cold Nuclear Fusion: Possibility in Principle and Paths to Implement". Zhurnal Tekhnicheskoi Fiziki, Vol. 62 (1992) No 6, p.219 (in Russian).
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15. V.A.Filimonov "Principles of Free Energy Generators Implementation" In: Proc. Ist Intern. Congr. for Demographic Problems of Belarus; Part 3, Energy Production Problems and Paths of Their Solution for Belarus People and Humanity Benefit. Minsk, Belarus, 17-20 March 1999, p.91-94 (in Russian).
16. V.A.Filimonov "Identification of Quantum of Torsion Radiation" In: Transactions of International Congress - 2000 "Fundamental Problems of Natural Sciences and Technique", St.-Petersburg, Russia, July 4-8, 2000 Vol.1, No1, p. 238-241; FMR (Physical Ideas in Russia) No 1 (2001) p.86-89 (in Russian).
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