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On the Issue of the Insolvency of the Magnetic Principle of Confinement of Thermonuclear Plasma

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As it is known, main efforts of international community to solve problem of controlled thermonuclear fusion are concentrated mainly in ITER project. Achievement of optimistic outcomes in this project is still very problematic, since namely experimental data show weakness of concept of holding high-temperature plasma by magnetic field. Effectiveness of magnetic field is limited only by heating plasma, but not by its retention in stable state, & at moment it is indisputable experimental fact. Due to impossibility of symmetric target compression & low efficiency of laser devices, projects of inertial synthesis are also unsuitable. In fact, the TAE Technologies project (tae.com) (as well as the Commonwealth Fusion Systems project, , cfs.energy) is not much different from the ITER project, since the same principle of plasma retention is used. The existing differences do not indicate a prototype of a thermonuclear reactor in any way. It's just a plasma heating device. It will take some time, and experimental confirmation of the inaccuracy of the stated goal will be received. These circumstances strongly specify need for additional research within framework of a project with a fundamentally new principle of plasma retention..It is this new principle of plasma retention in combination with the magnetic method of plasma heating that is described in.[1,2]

The strategy of implementing the proposed principle of plasma compression is proposed to be implemented at the MAGO installation developed at VNIIEF (Sarov, Russian Federation),[4]/ This installation is very suitable as a device for testing and researching the proposed principle of plasma compression.At the same time, the MAGO chamber cannot be a prototype of a thermonuclear reactor .Its use is necessary only to test the operability of the proposed method of plasma compression. The basis of the prototype of a thermonuclear reactor should be a pulsed high-current discharge with a capacitor bank, the main parameters of which

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just need to be clarified in advance in experiments with the MAGO camera.At the same time, one of the key factors is the optimal composition of the worker gas & corresponding volt-ampere features of discharge.

Outcomes of experiments with MAGO Chamber were openly discussed for the first time in 1992, at III Zababakhin Scientific Proceedings.[3,4] The conference was attended by the leading American scientists from Los Alamos National Laboratory (LANL).[3] As it turned out, theoretic research in the same direction within the programme Magnetized Target Fusion (MTF) was made in the USA practically simultaneously with the launch of the works with the MAGO. They decided to join the efforts of the two countries' researchers and in 1994 the VNIIEF and the LANL carried out first joint Russian-American experiments. In total, 8 experiments were performed within VNIIEF/LANL Agreement on the MAGO/MTF: two in the USA, the Anch-Canyon polygon of LANL, the other 6 experiments at the VNIIEF(Sarov). In the future, a number of more experiments were carried out, but stable states for the course of synthesis reactions could not be achieved. Funding for this direction was discontinued both in the USA and in Russia.As it is now clear, the reason for the failure was the suboptimal composition of the working gas (pure deuterium-tritium composition was used) and the corresponding volt-ampere characteristics. A characteristic feature of all studies with the magnetic principle of plasma compression are various variations of designs .but the composition of the working gas remains unchanged – pure deuterium-tritium plasma.At the same time, the proposed method of plasma compression requires composition of working gas with addition of gases of multicharged ions. It is on such compositions, by the way, that micropinches always arise, as a partial element of the implementation of the proposed principle of plasma compression.[5] It is pointless to count on the support of leading institutions in the field of thermonuclear fusion, they dismiss any attempts to break their monopoly from the threshold. In addition, the theoretical basis of the proposed method includes not only the concepts of plasma physics, but also such sections of physics as quantum mechanics and the relativistic theory of gravity.which, of course, complicates the examination. Judging by well-known projects, the situation in the USA is exactly the same. However, our results are published and, sooner or later, they will attract the attention of leading plasma physics laboratories.In experiments with registration of specific radiation of dense high-temperature plasma with admixture of polyatomic elements, both existence of micropinches & expansion of radiation lines unpredictable by electrodynamics are recorded.[5,6] But these outcomes are quite reliable with theoretical foundations of anticipated compression principle. Such outcomes are recorded especially intensively in experiments with Z-machine,.[7] (Sandia National Laboratories) & in spectra of characteristic learning of stars. Their correct interpretation is inevitable & it will definitely lead to developed ideas.[8,9]

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