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Analogy of Star Formation with the Formation of Plasma of Multicharged Ions Inpulsed High Current Discharges

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The notion of gravitational radiation as a radiation of the same level as the electromagnetic radiation is based on theoretically proved and experimentally confirmed fact of existence of stationary states of an electron in its gravitational field characterized by the gravitational constant K = 10^{42}G (G is the Newtonian gravitational constant) and unrecoverable space-time curvature Λ (S I Fisenko Journal of Physics: Conference Series, (Volume 1557), 012019, IOP Publishing doi:10.1088/1742-6596/1557/1/012019 (Title: On the issue of gravitational radiation and thermonuclear fusion), 2020). Such experimental facts include, in particular, data on the broadening of the characteristic emission spectra of many-electron atoms (Haines, M. G. *et al*. Viscous Heating at stagnation in Z-Pinches. PRL96, 075003-075008 (2006)). Such a broadening of the spectra can be caused only by an additional broadening mechanism, in particular, by the presence of excited states of the electrons in their own gravitational field. Another confirming fact is the new line in the X-ray emission spectrum from the observation of the MOS-camera of the XMM-Newton Observatory. (Bulbul, E. *et al*. Detection of An Unidentified Emission Line in the Stacked X-ray spectrum of Galaxy Clusters. *ArXiv* http://arxiv.org/abs/1402.2301 (2014)). This line, unlike other identified lines of electromagnetic radiation, cannot be attributed to any atomic transition. The energy spectrum of an electron in its own gravitational field and the energy spectra of many-electron atoms are such that the resonance of these spectra occurs. The result of this resonant interaction is the appearance, including new lines, electromagnetic transitions, not associated with atomic transitions.Gravitational radiation (as a result of transitions over stationary states of a particle in its own gravitational field) can be excited in a dense high-temperature plasma and amplified under certain conditions, but its amplification will lead to compression of the radiating system. Consequently, under conditions of amplification of gravitational radiation, there will not be observed gravitational radiation itself, but only the result of its action. The very fact of plasma compression by a radiated gravitational field can be used for thermonuclear fusion. In this case, the quantitative characteristics of the spectrum of gravitational radiation (as radiation of the same level with electromagnetic radiation) can be determined

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by the broadening of the spectrum of electromagnetic radiation.There is a definite analogy between the process of star formation and the formation of a pulsed high-current discharge in the plasma of multiply charged ions. But then it is possible to observe the features of the dynamics of the spectrum of characteristic radiation during the formation of stars. These features will include:

- Registration of electromagnetic radiation lines not associated with the atomic transitions in the energy range from a few keV to tens of keV,
- Adjusting according to the known mechanisms of broadening (a Doppler, radiation and impact widening) does not disclose the broadening of the registered portion of the emission spectrum of the micropinch,
- The difference in the number of spectral lines and the quantitative nature of their broadening as stars form.

This analogy is directly related to the problem of controlled thermonuclear fusion(Stanislav Fisenko. Gravitational radiation and nuclear fusion. Oriental Journal of Physical Sciences 2019; 4(1)http://www.orientjphysicalsciences.org/vol4no1/gravitational-radiation-and-nuclear-fusion/).

A typical example is the processes in the pulsed high current discharge implemented in the MAGO installation (Burenkov O M *et al* 2012 New Configuration of Experiments for MAGO Program XIV International Conference on Megagauss Magnetic Field Generation and Related Topics (14-19 October Maui, Havaii, USA),pp 95-99).

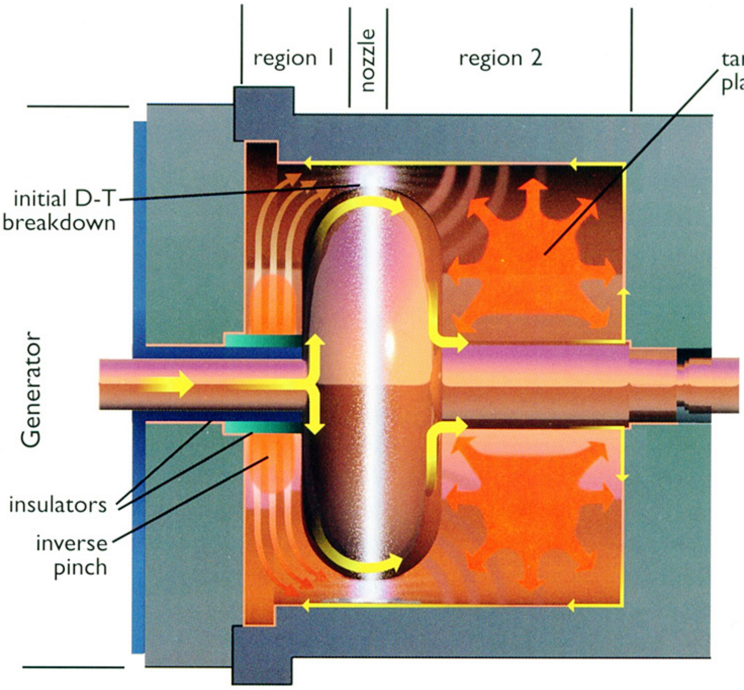

Fig.1: The physical scheme of preliminary production of thermonuclear plasma in MAGO chamber