

«Energy transformation in plasma oscillation process»

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Abstract

The objective is investigation of the phenomenon of energy transformation in low temperature gas plasma to search for a condition of maximum efficiency of the energy transformation from longitudinal plasma waves energy to electromagnetic waves energy if the current density oscillations are used as the method for plasma waves generation, and to design on this base high efficiency energy source.

Methodology and technical approach

Development of the thermonuclear research works to solve the energy problem was started about 30 years ago. The first results of neutron emission were detected about 20-25 years ago, but then it was claimed that it is a wrong data. The reason for the neutron emission was the powerful gamma radiation that is created as effect from plasma oscillation processes. Then main efforts of scientific workers were concentrated on the problem to get stable plasma state instead of the natural oscillating plasma process where the natural energy transformation is created in the resonance mode. Just the oscillation processes in plasma, by the author's proposal, should be used as main physical mechanism for power generation. There are no any nuclear reactions for this case if electromagnetic radiation is created with some calculated resonance frequency. The radiation can be used for heating process or for electromagnetic induction to get useful work in load.

The goal of the research is resonance electrodynamical system and main element of this system is low temperature plasma (gas discharge in low pressure hydrogen). The transformation of energy from longitudinal plasma oscillations into electromagnetic radiation is investigated by many authors, for example, Dr. Alexandrov [1, p.353]. Since the frequency of plasma electromagnetic radiation is about twice frequency of longitudinal plasma oscillations, the system can be designed just for resonance mode of power generation.

The analogy of this research direction is Dr. Paulo Correa's work, USA [2]. In 1996 this group proved the idea by means of testing for 5 kW system. But their technical descriptions are not connected with the theory of resonance energy transformation that is necessary for creation of powerful and compact systems.

In Russia the research work was made by Alexander V. Chernetsky's group, Moscow [3]. The power level of 500 kW was obtained in 1986 and it was claimed over-unity ratio for output-to-input power. The difference between Chernetsky's system and the author's proposals is independent electromagnetic circuit for excitation of the longitudinal plasma waves and resonance electromagnetic circuit of output power extraction.

Energy inflow into the system, as Alexander V. Chernetsky demonstrated, is result of interaction with physical vacuum where the virtual electron-positron pairs are created and annihilated. If the pair was involved in energy exchange with real electron of the plasma, energy of the electron-positron pair was changed and the pair can not be annihilated. So, the "vacuum structurization and ordering of vacuum takes place", Alexander V. Chernetsky said. In strength of this reason, it is proposed here to investigate all secondary effects, i.e. the possibility to use this area of structured vacuum for deactivation of radioactivity materials and for isotopes stabilization.

It is proposed to use minimum operation voltage in the system, according to known Pashen function, for example 220V. The hydrogen of 0.1 Torr pressure is proposed as operation body of the plasma. Output power is depend of density of the current, so it is function of the particles concentration, frequency and parameters of the excitation circuit. Since the goal is maximum power, it is proposed to increase the frequency up to possible design limitations.

The system can be designed for energetics as autonomous power supply, also it can be used for investigation of the chemical transmutation processes and in deactivation process with radioactivity materials.

References

1. Alexandrov A.F., "Base of plasma electrodynamics", in Russian, Moscow, 1988.
2. The Correa Invention, Infinity Energy, p. 10-14, May 1996, USA.
3. Chernetsky A.V. "Processes in plasma systems with electric charge division", G.Plekhanov Institute, Moscow, 1989.