THE CALCULATION OF PARAMETERS AND DESIGNE OF «PLASMA FOCUS» FACILITY

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In this paper, the plasma focus type devices are seen as an alternative to traditional magnetic systems and laser fusion. The authors present the researches results of plasma formation on the ”CPA-30” plasma accelerator and plasma installation “Focus fusion”.

Today, the efforts of scientists to address the fusion problems are mainly associated with magnetic systems, especially with tokamak’s (ITER project), as well as some other methods, for example by laser inertial fusion, traps and others. All of these methods are studied decades, published thousands of scientific papers, but operating reactor is not built. First of all, this is due to technical difficulties, but there are reasons of principle.

So, the direct calculation of all coordinates of plasma particles is not possible to individually [1], even at very low concentrations of plasma real objects. In such a situation, an alternative approach is the consideration of collective phenomena in plasma and study of its self-organization. Problems of plasma self-organization in various plasma devices are just beginning to be studied. For the first time structuring of the plasma in the form of striations observed in experiments on Z-pinch in the last century [2], a number of works registered in the structuring of the plasma accelerators [3,4]. In the high-dense plasma formed the objects of geometric structures, filaments and other peculiarities [5]. It is obvious that the presence of such objects points to a fundamental property of a dense and hot plasma structured. In this case, they will play a decisive role in the work of fusion devices.

Another approach to create fusion devices is a method based on plasma generation in devices such as plasma focus. Based on the study of dynamic structures in various PF devices the authors raises the question of creating a new type of reactor, based on the focus of plasma beams in a small area with a high density.

The estimation of the value of the discharge current and the dynamics of discharge circuit on the basis of the electrodynamic model was calculation for "plasma focus" installation. On the data obtained calculated the geometry of the electrode system. The description of the vacuum chamber and installation of electrical parts presented.

Finally, we discuss general problems common to all types of plasma focusing devices from a single viewpoint. In our opinion, a simple increase of the focus energy by increasing the current path is not acceptable. Much more important to develop the geometry of the electrodes so that the interaction between the current and the magnetic field is maximized. At the same time, an important indicator is not the plasma density and the path of the particles to provide a large number of collisions.

References

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