CONDITIONS FOR THE OCCURRENCE OF ANOMALOUS ION SCATTERING IN THE HELICAL OPEN TRAP SMOLA [*)]

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To suppress longitudinal losses in mirror traps, it is proposed to use multiple mirror sections [1]. The effectiveness of multiple mirror confinement increases if the field maxima move towards the confinement zone [2]. Such a system can be created if a rotating plasma is placed in a helical magnetic field. This method, called helical confinement, was proposed in [3] and is undergoing experimental testing [4] at the INP SB RAS.

In multiple mirror systems, effective confinement is achieved when the free path of ions is equal to the distance between the maxima of the field. The low frequency of Coulomb collisions in a hot weakly collisional plasma results in the need for additional scattering sources. Thus, the occurrence of bounce oscillations and Langmuir turbulence during injection of REB at the GOL-3 device led to an increase in the energy lifetime of the plasma [5]. At the SMOLA device, in experiments with a free path length of an order of magnitude greater than the corrugation step, confinement did not deteriorate [6]. At the same time, the occurrence of oscillations correlated along the length of the installation is observed.

It was previously shown that the spatial structure of the oscillations satisfies the condition for phase resonance with trapped ions, which should lead to their effective pumping [7]. The amplitude of the oscillations was also higher than estimated for an effective contribution to scattering [7]. The paper will present a comparison of oscillation parameters in a direct field, with helical and classical axisymmetric corrugation, as well as the dependence of the amplitude on the degree of corrugation and the value of the radial electric field.

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