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ICRH IN SMOLA THE OPEN TRAP BY THE "MAGNETIC BEACH" METHOD *)

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To suppress longitudinal losses of particles and energy in new generation mirror traps, it is proposed to install end multiple mirror and helical sections [1]. The helical sections implement a modified multiple mirror confinement scheme with movable mirrors. The experimental verification of the method is carried out at the SMOLA device [2]. The confinement parameters are consistent with theoretical predictions for dimensionless collisions of $\nu^* \gtrsim 0.1$ [3]. It is necessary to experimentally test the helical confinement at $\nu^* \lesssim 0.01$, which are typical for new generation mirror traps, such as GDML. The need for verification is due to the fact that in a hot weakly collisional plasma it is impossible to achieve the optimal ion collision frequency for confinement in multiple mirror systems only due to Coulomb scattering. Thus, additional scattering sources are required [4].

To reduce the frequency of ion collisions, it is proposed to increase their temperature by the "magnetic beach" method, which has shown its effectiveness when heating the ionic component of a relatively low density plasma in open traps[5, 6]. The method involves the introduction of radiation at a frequency close to cyclotron one. The excited Alphen wave is absorbed in a region with a low field. As part of the upcoming modification of the SMOLA device, it is proposed to install an additional heating system using RF power input. The power source is a generator with a peak power of 60 kW, operating frequencies of 0.6, 0.8, 1.2 and 2.3 MHz and the ability to change the frequency within 50 kHz. These frequencies correspond to B from 40 to 150 MT at the absorption point. The pulse length is up to 1 s. The generator allows you to output power to two channels with the ability to adjust the phase difference between them. This makes it possible to implement improved heating schemes. To coordinate the plasma load with the generator, a Pi-circuit based on reactive elements is implemented. The antenna current spectrum is calculated. Using finite element modeling, the fields created by the antenna and the area of radiation penetration into the plasma are determined. To achieve the design parameters, the temperature of the ionic component is 30 – 35 eV.

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