

Peer Review

Review of: "Drift-Cyclotron Loss-Cone Instability in 3D Simulations of a Sloshing-Ion Simple Mirror"

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The results of numerical particle-in-cell simulations of excitation of drift-cyclotron loss-cone instability are presented in the article. It should be noted that the results obtained are clear and the modeling performed is carefully described. The results are in qualitative agreement with results of experimental observation of the DCLC instability on the GDT device (see article [22]). There are the following comments:

1. The DCLC instability on the GDT device is observed as a sequence of relatively short (with a duration of several μs) flashes (see figure 4 in [22]). The time evolution of electric fields of the instability observed in the simulations is unclear. Therefore, it would be interesting to show the time dependence of the magnitude of the electric field observed in the simulations.
2. About the possibility of AIC excitation. The addition of cool ions should decrease the stabilization due to finite length (expression 4.6). So the conditions for the AIC instability excitation depend strongly on the density of target ions; the instability excites in the central region (not a turning point), see articles [G.R. Shmith et. al. Alfvén ion-cyclotron instability in tandem-mirror plasmas II. Physics of Fluids, 27 (8), 1984] and [74]. In the simulations, the AIC instability may excite in higher concentration and higher beta regimes.
3. The magnetic and electrostatic probes are usually used for experimental observation of microinstabilities in mirror machines. Therefore, it is interesting to show the perturbations of the electric and magnetic fields at the plasma periphery. Also, it is interesting to show the dependence of energy and particles lost from mirrors on time, as in figure 11 in the article [22].

Declarations

Potential competing interests: No potential competing interests to declare.