

Abstract Submitted
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Beam ion effects on FRC stability¹ ELENA BELOVA, Princeton Plasma Physics Laboratory — Stability properties of a hybrid FRC, in which field reversal is created both by plasma currents and by a low-density energetic component of large-orbit ions, have been studied by means of a generalized energy principle, and also by using 3D numerical simulations using the HYM code. The beam ion – thermal plasma interaction term has been derived including the effects of radial betatron resonances, and it has been demonstrated that these resonances are important in very kinetic configurations where assumptions for radial orbit averaging are not valid. The resonant condition has been compared with simulation results, and it has been demonstrated to reliably predict the most unstable modes. The HYM code has been modified to allow different distribution functions for the beam ions including a slowing-down and a delta-function distributions. The effects of the cold beams and slowing-down beam ion distributions on stability are studied numerically, using the generalized energy principle as a guide in the search of the stable FRC-beam regime.

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