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Theoretical study of plasma confinement by magnetic multicusp field[1] IVAN KHALZOV, CARY FOREST, University of Wisconsin-Madison — Plasma confinement in a magnetic multicusp field is studied numerically using both collisional particle-in-cell and isothermal two-fluid MHD codes and tested against the empirical model. The simulation domain is two-dimensional, periodic in one direction and bounded by absorbing boundaries with multicups field in other direction. First, we study the dependence of plasma loss width on plasma parameters and field strength and compare the results with the well-known empirical formula $w = 2\sqrt{\rho_e \rho_i}$ (two hybrid gyro-radius). Our results show that the loss width has the same scaling with magnetic field $w \propto 1/B$, but dependence on other plasma parameters does not agree with this formula. Second, we study the plasma flow drive in the cusp region due to electric field applied by discrete electrodes. The electrode positions are optimized for achieving the highest plasma flow. Comparison with available experimental data from Madison Plasma Dynamo Experiment (MPDX) is made.

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