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Hamiltonian gyro-averaged area preserving map models of finite Larmor radius effects on ExB chaotic transport JULIO FONSECA, University of Sao Paulo, Brazil, DIEGO DEL-CASTILLO-NEGRETE, Oak Ridge National Laboratory, IBERE CALDAS, University of Sao Paulo, Brazil — Area preserving maps have been extensively used to model 2-dimensional chaotic transport in plasmas and fluids. Here we focus on three types of area preserving maps describing ExB chaotic transport in magnetized plasmas with zonal flows perturbed by electrostatic drift waves. We include finite Larmor radius (FLR) effects by gyro-averaging the corresponding Hamiltonians of the maps. The Hamiltonians have frequencies with monotonic and non-monotonic profiles. In the limit of zero Larmor radius, the monotonic frequency map reduces to the standard Chirikov-Taylor map, and, in the case of non-monotonic frequency, the map reduces to the standard nontwist map. We show that FLR leads to chaos suppression, modifies the stability of fixed points, and changes the robustness of transport barriers. FLR effects also modify the phase space topology and give rise to bifurcations of the zonal flow ExB velocity profile. Dynamical systems methods based on recurrence time statistics are used to quantify the dependence on the Larmor radius of the threshold for the destruction of transport barriers.

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