Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Finite Larmor radius effects on chaotic transport in $\mathbf{E} \times \mathbf{B}$ zonal flows JULIO MARTINELL, Institute of Nuclear Sciences, UNAM, DIEGO DEL-CASTILLO-NEGRETE, Oak Ridge National Laboratory — Finite Larmor radius (FLR) effects on chaotic test particle transport are studied in the context of Hamiltonian dynamical systems. Based on a marginal stability assumption, the Hamiltonian is modeled as the superposition of a non-monotonic zonal shear flow and regular neutral drift wave modes. FLR effects are incorporated through a gyro-average of the $\mathbf{E} \times \mathbf{B}$ Hamiltonian. We provide numerical evidence of the following novel FLR effects on chaotic transport: (i) Bifurcation leading to the creation of additional shearless regions in the zonal flow profile; (ii) Double heteroclinic-homoclinic separatrix reconnection; and (iii) Chaotic transport suppression and transport barrier formation. Of particular interest is the dependence on the Larmor radius of the destruction of shearless transport barriers leading to global transport. To compute this we use indicator points based on the symmetry properties of the Poincare map.

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Date submitted: 16 Jul 2010 Electronic form version 1.4