Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Drift Hamiltonian Guiding Center Orbits with Full Electromagnetic Fields in Axisymmetric Geometry GUY COOPER, W.A. COOPER, J.P. GRAVES, Ecole Polytechnique Federale de Lausanne, EPFL/CRPP, Association Euratom-Suisse, Switzerland — A Hamiltonian/Lagrangian formulation of the guiding center drift orbits is extended to include full perturbed electromagnetic fields in axisymmetric tokamak geometry. Previous work only admitted perturbed fields with finite parallel component of the vector potential.[1] A background magnetohydrodynamic equilibrium state with anisotropic pressure is considered which allows a more consistent treatment of energetic particle physics. The contribution of radial equilibrium magnetic field in the covariant representation, usually ignored in most formulations of Hamiltonian drift orbit analysis, is retained. The manipulation of the drift Lagrangian and the imposition of a gauge transformation that relates the radial projection of the perturbed vector potential to its toroidal component constitute very important steps to identify the canonical angular variables and momenta[1,2] in the Boozer coordinate frame.[3] The radial drift motion and the evolution of the parallel gyroradius are subsequently determined. The drift equations are presented in a form amenable to implementation in the VENUS+δf code.
[1]G. A. Cooper *et al.*,Phys. Plasmas **14** (2007) 102506.
[2]S. Wang, Phys. Plasmas **13** (2006) 052506.
[3]A. H. Boozer, Phys. Fluids **23** (1980) 904.

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Date submitted: 15 Jul 2010 Electronic form version 1.4