

Exact canonical drift Hamiltonian formalism with pressure anisotropy and finite perturbed fields

G. A. Cooper,^{1,2} M. Jucker,² W. A. Cooper,² J. P. Graves,² and M. Yu. Isaev³

¹University of the South, Sewanee, Tennessee 37383,

²Ecole Polytechnique Fédérale de Lausanne, CRPP,
Association Euratom/Confédération Suisse, Lausanne, Switzerland

and

³Nuclear Fusion Institute, RRC Kurchatov Institute, 123182 Moscow, Russia

A Hamiltonian formulation of the guiding center drift orbits is extended to pressure anisotropy and field perturbations in axisymmetric systems. The Boozer magnetic coordinates are shown to retain canonical properties in anisotropic pressure plasmas with finite electrostatic perturbations and electromagnetic perturbed fields that affect solely the parallel component of the magnetic vector potential. The equations of motion developed in the Boozer coordinate frame are satisfied exactly by direct verification of the drifts.