Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Symmetry of Momentum Conservation in Gyrokinetics BRUCE SCOTT, Max-Planck-Institut fuer Plasmapysik — Gyrokinetic field theory is set up in terms of a Lagrangian with canonical structure – dependent field variables appear only in the time component. The gyrokinetic and associated field equations are the resulting Euler-Lagrange equations for the gyrocenter coordinate positions and field amplitudes. Canonical structure leaves the symplectic part time-independent and axisymmetric, from which energy and canonical momentum conservation follow. Conversion from canonical to plasma momentum uses the charge conservation equation which follows from continuity. The specific role of the time-dependent polarisation current is emphasised. It is shown that the contributions in the zonal toroidal momentum transport equation due to higher-order field components in the Hamiltonian can be put into the same symmetric structure as the lowest-order piece. Hence arguments about symmetry and cancellation should be applied equally to all orders, not just the lowest. Some measurements of the PDF of these terms in computations are given.

Bruce Scott
Max-Planck-Institut fuer Plasmapysik

Date submitted: 30 Jul 2012 Electronic form version 1.4