Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Non-local Heat Flow in a Sheared Slab with a Single-helicity Island[1] JOHN JAMES, ERIC HELD, Utah State University — In this work, we review the derivation and implimentation of non-local closures[2] for $\vec{q}_{\|}$ in the electron and ion plasma temperature equations which are valid in all geometries and for plasmas of all collisionalities. We then apply the closures to a plasma embedded in a magnetic field with a single-helicity perturbation. We compare quantities such as effective radial thermal diffusivity (χ_r) and on-axis plasma temperature with those obtained using a flux-limiting and a local diffusive form for the closure. Calculations are made in sheared-slab geometry using new algorithms for rapid approximation of the heat-flow integrals. A description of the algorithms will be presented along with results from validity and convergence tests.

[1]Research supported by the U.S DOE under grants no. DE-FG02-04ER54746 and DE-FC02-04ER54798.
[2]E. D. Held, J. D. Callen and C. C. Hegna, Phys. Plasmas 10, 3933 (2003).

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Date submitted: 17 Jul 2006 Electronic form version 1.4