Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Non-local Effects on Temperature Evolution in the Presence of Magnetic Islands[1] JOHN JAMES, ERIC HELD, Utah State University — We review diffusive and integral methods of closing the plasma temperature evolution equation for the conductive heat flow and list the assumptions and orderings made in deriving and using these closures. An outline of the numerical implementation of these terms in the plasma fluid code NIMROD[2] will be given with particular emphasis on the development of a general, integral form for $\vec{q}_{\|}$[3] with comment on the efficiency and accuracy of each method for relevant parameter regimes and magnetic field topologies. We calculate and compare several quantities of interest using each form of the closure including effective radial heat diffusivities and on-axis pressure vs. L_ν/L_T. These calculation will be made in slab geometry with a single magnetic island and with over lapping magnetic islands using the NIMROD code.

[1]Research supported by the U.S DOE under grants no. DE-FG02-04ER54746, DE-FC02-04ER54798
[2]C. R. Sovinec, et al., J. Comput. Phys. **195**, 355 (2004).
[3]E. D. Held, J. D. Callen, C. C. Hegna and C. R. Sovinec, Phys. Plasmas **8**, 1171 (2001).

John James
Utah State University

Date submitted: 21 Jul 2005 Electronic form version 1.4