Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Development of Tokamak Transport Solvers for Stiff Confinement Systems[1] H.E. ST. JOHN, L.L. LAO, General Atomics, M. MURAKAMI, Oak Ridge National Laboratory, J.M. PARK, Seoul National U. — Leading transport models such as GLF23 [1] and MM95 [2] describe turbulent plasma energy, momentum and particle flows. In order to accommodate existing transport codes and associated solution methods effective diffusivities have to be derived from these turbulent flow models. This can cause significant problems in predicting unique solutions. We have developed a parallel transport code solver, GCNMP, that can accommodate both flow based and diffusivity based confinement models by solving the discretized nonlinear equations using modern Newton, trust region, steepest descent and homotopy methods. We present our latest development efforts, including multiple dynamic grids, application of two-level parallel schemes, and operator splitting techniques that allow us to combine flow based and diffusivity based models in tokamk simulations.

[1] R.E. Waltz, et al., Phys. Plasmas **4**, 7 (1997).
[2] G. Bateman, et al., Phys. Plasmas **5**, 1793 (1998).

[1]Work supported by US DOE under DE-FC02-04ER54698 and DE-AC05-00OR22725.

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Date submitted: 21 Jul 2006 Electronic form version 1.4