

Abstract Submitted  
for the DPP07 Meeting of  
The American Physical Society

**A Preconditioned Newton-Krylov Code for Calculating 3D MHD Equilibria with Magnetic Islands**<sup>1</sup> DANIEL RABURN, ALLAN REIMAN, DONALD MONTICELLO, RAVI SAMTANEY, Princeton Plasma Physics Laboratory — We have implemented a Jacobian-free Newton-Krylov method with a Levenberg-Marquardt line-search in the PIES code, which solves for 3D MHD equilibria. The algorithm has performed well in tests on helical equilibria with islands. We are investigating further techniques, such as using an adaptive preconditioner, where the limited subspace information from each linear solve is used to construct a preconditioner for future linear solves.

<sup>1</sup>This work was supported by DOE contract number DE-AC02-76-CHO3073.

Daniel Raburn  
Princeton Plasma Physics Laboratory

Date submitted: 20 Jul 2007

Electronic form version 1.4