

Abstract Submitted  
for the DPP09 Meeting of  
The American Physical Society

**Reconstruction of current-driven equilibria in the Compact Toroidal Hybrid using magnetic diagnostics**<sup>1</sup> B.A. STEVENSON, Physics Dept, Auburn University, M. CIANCIOSA, J. HANSON, G. HARTWELL, J. HEBERT, S. KNOWLTON — There is a growing need for rapid reconstruction capability of fully three-dimensional equilibria in toroidal confinement experiments. Test and validation of the new V3FIT 3D magnetic equilibrium reconstruction code are underway on the Compact Toroidal Hybrid (CTH). The CTH is a heliotron-type device in which the magnetic configuration can be strongly modified by plasma current. The present suite of magnetic diagnostics includes internal and external 8-part and full Rogowski coils, four flux loops, and a diamagnetic loop. The measured signals from these diagnostics include contributions from the plasma current, externally applied currents, vacuum vessel current, and various sources of pickup and drift. The induced vacuum vessel current (<15kA) also contributes to the magnetic diagnostic signals. In order to include this contribution in the reconstruction process, the VALEN code was used to model the time varying vacuum vessel current distribution. For reconstructions, the plasma contribution is extracted from the total signal to provide the experimental input to V3FIT which utilizes least-squares fitting and the VMEC equilibrium code to reconstruct 3D plasma equilibria.

<sup>1</sup>Supported by US DOE Grant DE-FG02-00ER54610

B. Adam Stevenson  
Auburn University

Date submitted: 17 Jul 2009

Electronic form version 1.4