

Abstract Submitted  
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**V3FIT Reconstructions using Soft X-Ray and Interferometric Diagnostics on the Compact Toroidal Hybrid**<sup>1</sup> G.J. HARTWELL, M. CIANCIOSA, J.D. HANSON, M.C. ARCHMILLER, J. HERFINDAL, S.F. KNOWLTON, X. MA, D.A. MAURER, Auburn University — Reconstruction of three-dimensional (3D) equilibrium is important for improving the operation and understanding the physics of non-axisymmetric magnetic confinement devices. We present V3FIT[1] 3D reconstruction results from the Compact Toroidal Hybrid (CTH) experiment ( $R_o = 0.75$  m,  $a_p \approx 0.2$  m,  $B \leq 0.7$  T,  $\bar{n}_e \leq 5 \times 10^{19}$  m<sup>-3</sup>,  $T_e \leq 300$  eV,  $I_p \leq 80$  kA) where we have used internal diagnostic signals as inputs to the V3FIT code. The two diagnostics, a three-channel, 1 mm interferometer, and a 54-channel Soft X-ray (SXR) array, are chordal type measurements that generate signals based on the line-integrated values of the plasma density and/or temperature sampled from the interior of the plasma. We use two parameterization models for the electron density and SXR emissivity profiles: a two-power fit model capable of producing flat to centrally peaked profiles, and a line-segment model that can produce hollow profiles. Results show that SXR diagnostics are sensitive to plasma elongations caused by plasma current profile changes not detected by magnetic diagnostics.

[1] J.D. Hanson, S.P. Hirshman, S.F. Knowlton, L.L. Lao, E.A. Lazarus, J.M. Shields, Nucl. Fusion, **49**,(2009) 075031.

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Gregory Hartwell  
Auburn University

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