

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

First Results from a Coherence Imaging Diagnostic for the Compact Toroidal Hybrid¹ D.A. ENNIS, G.J. HARTWELL, C.A. JOHNSON, D.A. MAURER, Auburn University, S.L. ALLEN, LLNL — An optical coherence imaging diagnostic is being commissioned for time-resolved measurements (~ 10 ns) of ion emissivity, velocity, and temperature in the Compact Toroidal Hybrid (CTH) experiment. The Coherence Imaging (CI) technique measures the spectral coherence of an emission line with an imaging interferometer of fixed delay. CI has a number of advantages when compared to dispersive Doppler spectroscopy, including higher throughput and the capability to provide 2D spectral images, making it advantageous for investigating the non-axisymmetric geometry of CTH plasmas. A spectral survey of the visible and ultraviolet emission for a range of CTH discharges has identified helium and carbon impurity lines that will be utilized for CI measurements in CTH. First CI measurements of He II (468.6 nm) emission from CTH plasmas will be presented along with interferograms from a calibration light source and details of the instrument design. Results from this diagnostic will aid in characterizing the equilibrium ion parameters in both the edge and core of CTH plasmas for planned island divertor and MHD mode-locking experiments.

¹Work supported by USDoE grant DE-FG02-00ER54610

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Date submitted: 23 Jul 2015

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