

Abstract Submitted  
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**Coherence Imaging Measurements of Impurity Flow in the CTH and W7-X Experiments**<sup>1</sup> D.A. ENNIS, N.R. ALLEN, G.J. HARTWELL, C.A. JOHNSON, D.A. MAURER, Auburn Univ, S.L. ALLEN, C.M. SAMUELL, LLNL, D. GRADIC, R. KONIG, V. PERSEO, W7-X TEAM, IPP Greifswald — Measurements of impurity ion emissivity and velocity in the Compact Toroidal Hybrid (CTH) experiment are achieved with a new optical coherence imaging diagnostic. The Coherence Imaging Spectroscopy (CIS) technique uses an imaging interferometer of fixed delay to provide 2D spectral images, making it ideal for investigating the non-axisymmetric geometry of CTH plasmas. Preliminary analysis of C III interferograms indicate a net toroidal flow on the order of 10 km/s during the time of peak current. Bench tests using Zn and Cd light sources reveal that the temperature of the interferometer optics must be controlled to within 0.01C to limit phase drift resulting in artificially measured flow. A new collaboration between Auburn University and the Max-Planck-Institute for Plasma Physics is underway to develop two new coherence imaging instruments for ion impurity flow measurements in orthogonal directions to investigate the 3D physics of the W7-X island divertor during OP1.2. A continuous wave laser tunable over most of the visible region will be incorporated to provide immediate and accurate calibrations of both CIS systems during plasma operations.

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