

**Abstract Submitted for the Forty-Sixth Annual Meeting
Division of Plasma Physics
November 15–19, Savannah, Georgia**

Category Number and Subject: 10.0.0 Undergraduate Research

☐ Theory ☒ Experiment

Edge Density Profile Reconstruction Using the DIII-D Lithium Beam Diagnostic,* J. Culver *Massachusetts Institute of Technology*, A.W. Leonard, D.M. Thomas, *General Atomics* – The DIII-D lithium beam edge current diagnostic system offers the opportunity for measurement of the edge density profile with very high temporal and spatial resolution. The diagnostic utilizes a 30 keV neutral lithium beam injected near the midplane of DIII-D and measures the subsequent collisionally induced fluorescence at a ~0.5 cm resolution using a high-performance 32-channel detection system. Intensity of the 2S-2P lithium resonance line as measured in each of these 32 channels may be related to the local electron density in the plasma through an appropriate set of coupled collisional-radiative rate equations. After calibrating for the optical and electronic efficiencies of the detection system and taking into account the effects of beam attenuation on the fluorescence profile, one can calculate the density profile. Methodology of density profile determination and results will be presented, along with comparisons to existing density profile diagnostic techniques.

*Supported by U.S. DOE under DE-FC02-04ER54698 and a DOE National Undergraduate Fusion Fellowship.