

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Evaluation and Implementation of Helium Line Ratio Technique for Measurement of Edge Density and Temperature on DIII-D¹ L. HURD, Clemson U., N.H. BROOKS, GA, E.A. UNTERBERG, ORISE, O. SCHMITZ, FZ-Juelich — The electron density and temperature in the scrape-off layer of DIII-D have been determined in pure helium plasmas by the helium line ratio technique [1] employing spectral line monitors and an intensified fast-framing CCD camera. Both diagnostics viewed the plasma tangentially on the midplane of the vessel. Three visible He I transitions, one triplet ($3^3S \rightarrow 2^3P$) and two singlets ($3^1D \rightarrow 2^1P$ and $3^1S \rightarrow 2^1P$), were measured simultaneously — along a single spatial chord with the line monitors and over a 2D region of the outer midplane with the intensified camera. Column brightnesses through the emission shell recorded with the camera were Abel-inverted to yield local intensities with a spatial resolution of a few millimeters. The electron densities and temperatures deduced by the helium line ratio method are compared with results from the Thomson scattering diagnostic on DIII-D.

[1] O. Schmitz *et al.*, Plasma Phys. Control. Fusion **50** (2008) 115004.

¹Work supported in part by the US DOE National Undergraduate Fellowship, DE-FC02-04ER54698, and DE-AC05-06OR23100.

Bob Pinsker
General Atomics

Date submitted: 16 Jul 2009

Electronic form version 1.4