

Abstract Submitted
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Development and Measurements of the Edge Neutral Density Diagnostic¹ P.W. ROSS, D.A. GATES, A.L. ROQUEMORE, Princeton Plasma Physics Laboratory — Edge power balance is not well understood in a spherical torus, where large orbits of lost fast particles on the edge can drastically affect the center of the plasma. In order to gain a more precise understanding of power balance, it is important to have an accurate measure of the profile of neutral particles. The development and preliminary demonstration of the Edge Neutral Density Diagnostic are presented. A 2-D CCD with a maximum frame rate of 500 fps was used to image the outboard edge of the National Spherical Torus Experiment (NSTX), using a D_β filter to select an atomic transition. The spatial calibration and absolute photometric calibration are described. The image was Abel inverted assuming toroidal symmetry to obtain a radial profile of the emission intensity. A collisional-radiative model was used in conjunction with electron density and temperature obtained from Thomson Scattering to obtain an absolute radial density profile. Future development of this diagnostic is proposed, including using a 12 bit CCD camera to increase sensitivity and time resolution. Comparison is made between beam heated shots and RF shots.

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