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**X-Point Neutral Density Determination in DIII-D<sup>1</sup>**

R.J. COLCHIN, R. MAINI, R.C. ISLER, L.W. OWEN, Oak Ridge National Laboratory, M.E. FENSTERMACHER, Lawrence Livermore National Laboratory, T.N. CARLSTROM, General Atomics — A method has been developed to measure neutral densities in the divertor and X-point regions of diverted DIII-D plasmas. The method calibrates  $D_\alpha$  light intensities from a tangentially-viewing video camera by means of a vertically-viewing photomultiplier.  $D_\alpha$  light viewed by the video camera is reconstructed onto a poloidal plane in the region of the lower divertor. Neutral densities are obtained by dividing the  $D_\alpha$  light intensities by the electron density and the electron excitation rate coefficients. These coefficients are steep functions of the electron temperature and density, which are measured by the divertor Thomson scattering diagnostic. Data have been analyzed for L-mode plasmas just below the L-H transition at two X-point heights. The neutral density decreases in the vertical direction from  $10^{13}$  atoms/cm<sup>3</sup> just above the divertor floor in the private flux region to  $10^{11}$  atoms/cm<sup>3</sup> at the X-point. The neutral density just inside the X-point is in the range  $10^{10}$ – $10^{11}$  atoms/cm<sup>3</sup>.

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☒ Prefer Oral Session  
☐ Prefer Poster Session

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Special instructions: DIII-D Oral Session II, immediately following Fenstermacher
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