Abstract Submitted
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A TALIF Diagnostic for the DIII-D Tokamak[1] R.M. MAGEE, M.E. GALANTE, D.W. MCCARREN, E.E. SCIME, WVU, R.L. BOIVIN, N.H. BROOKS, General Atomics — The density profile of hydrogenic neutrals in the edge of DIII-D plays an important role in the problems of momentum transport, pedestal formation, and plasma-wall interaction, but an accurate measurement has proven difficult. A two-photon absorption laser induced fluorescence (TALIF) diagnostic is under construction and is intended to provide temporally and spatially resolved neutral density measurements in the pedestal region. This three-level TALIF scheme offers the advantages of direct excitation of ground state atoms, emission in the visible portion of the spectrum, a high degree of spatial localization, and the potential for a Doppler-free measurement. The large background of D_α emission, the principal challenge of the measurement, can be overcome by the focusing of a high power (1 MW) UV laser. Calculations of the SNR show that densities of 10^{15} m^{-3} or lower can be measured with a spatial resolution of 0.3 mm. We present design details of the proposed laser system, calculations of the expected performance in DIII-D and in a helicon source plasma, and measurements of the HI profile in the helicon plasma.

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Rich Magee
West Virginia University

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