

Abstract Submitted
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Direct measurements and comparisons between deuterium and impurity rotation and density profiles in the H-mode steep gradient region on DIII-D¹ S.R. HASKEY, B.A. GRIERSON, PPPL, C. CHRYSTAL, General Atomics, L. STAGNER, UCI, K. BURRELL, R.J. GROEBNER, D.H. KAPLAN, General Atomics, R. NAZIKIAN, PPPL — The recently commissioned edge deuterium charge exchange recombination (CER) spectroscopy diagnostic on DIII-D is providing direct measurements of the deuterium rotation, temperature, and density in H-mode pedestals. The deuterium temperature and temperature scale length can be $\sim 50\%$ lower than the carbon measurement in the gradient region of the pedestal, indicating that the ion pedestal pressure can deviate significantly from that inferred from carbon CER. In addition, deuterium exhibits a larger toroidal rotation in the co-Ip direction near the separatrix compared with the carbon. These differences are qualitatively consistent with theory-based models that identify thermal ion orbit loss across the separatrix as a source of intrinsic angular momentum. The first direct measurements of the deuterium density pedestal profile show an inward shift of the impurity pedestal compared with the main ions, validating neoclassical predictions from the XGC0 code.

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