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Category Number and Subject: 5.6.2 DIII-D Tokamak

☐ Theory ☒ Experiment

A D_α Fast Ion Density Profile Diagnostic at DIII-D,* Y. Luo, W.W. Heidbrink, *UC Irvine*, K.H. Burrell, P. Gohil, *GA* — A population of fast ions is created in the tokamak by neutral beam heating or rf heating. As they orbit around the tokamak and pass through the heating beams, some fast ions charge exchange with the injected neutrals and emit D_α light. The intensity of this emission is weak compared to the signals from the injected neutrals, the halo neutrals, and the edge recombination neutrals but, for a favorable viewing geometry, the emission is Doppler shifted away from the bright interfering signals. A three-channel prototype instrument consisting of a spectrometer, blocking bar, camera lenses and frame-transfer CCD camera has been constructed for measurement of fast ion density profiles. Acceleration of the fast ions during ion cyclotron heating should produce enhanced signals at large Doppler shifts; measurements of this effect during combined neutral beam and fast-wave heating will be reported.

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