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[] Theory [X] Experiment

Inferring DIII-D Edge Neutral Density from Fast-Ion D-Alpha Emission,* N.G. Bolte, W.W. Heidbrink, *UC Irvine*; D. Pace, M. Van Zeeland, *GA* — Promptly-lost beam ions produce Doppler-shifted Balmer-Alpha light after charge exchanging with edge neutrals. Spectra of this edge-localized fast-ion D-alpha (FIDA) emission have been measured at DIII-D using six chords that view the edge region. A new simulation *P-FIDASim* has been developed that models prompt-loss radiation. P-FIDASim uses modules from the active FIDA code, FIDASIM [1] but uses fast-ion orbits from a single beam in place of FIDASIM's use of a theoretical fast-ion distribution function and considers CX with edge, not beam or halo neutrals. Initial results show good correlation between experiment and simulation in spectral shape. Intensity variations between chords show that empirical results are inconsistent with neutral density being a pure flux function. Modeling a neutral source term at the wall gives the z-dependence of the neutral density by inversion. Results will be presented of 2D (R,z) cross-sectional values of neutral density found by this method.

[1] W.W. Heidbrink, et al., *Commun. Comput. Phys.* **10**, 716 (2011)

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