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Improved Spectral Fitting Models for the B-Stark Diagnostic at DIII-D,* N.A. Pablant, *UCSD*; B.A. Grierson, *PPPL*; K.H. Burrell, R.J. Groebner, D.H. Kaplan, *GA*; C.T. Holcomb, *LLNL* — Recent results are presented from the B-Stark diagnostic installed on the DIII-D tokamak. This diagnostic provides measurements of the magnitude and direction of the internal magnetic field. The B-Stark system is a version of a motional Stark effect (MSE) diagnostic based on the relative line intensities and spacing of the Stark split D_α emission from injected neutral beams. Improvements to the spectral fitting model are presented, including the addition of an analytical model for D_α emission from the fast-ion distribution. We discuss the accuracy of using in-situ beam-into-gas calibrations to find the beam emission line profiles, the viewing direction and the transmission properties of the collection optics. We also present results of efforts to improve the determination of the beam emission line profiles. Finally, the magnetic field measured with the B-Stark system is compared to values found from plasma equilibrium reconstructions (EFIT) and the MSE polarimetry system on DIII-D.

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