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Theory Experiment

Improvements to the Motional Stark Effect Diagnostic on DIII-D,* M.J. Lanctot, C.T. Holcomb, S.L. Allen, M.E. Fenstermacher, J.D. King, *LLNL*; J.R. Ferron, T.C. Luce, *GA* – Recent modifications to the motional Stark effect diagnostic on DIII-D have improved detection of the Stark-split beam emission and reduced uncertainty in the inferred magnetic field line pitch angles. The core system’s signal-to-noise ratio was increased and systematic errors reduced following the installation of redesigned monochrometers and by refining the in-vessel calibration procedure. Modeling of the neutral beam emission and MSE optics motivated the installation of narrowband optical filters for edge channels leading to reduced channel-to-channel offsets. The measurements are used to validate the modeling results, and constrain the edge magnetic field in equilibrium reconstructions of high confinement mode plasma scenarios. Modeling is used to assess the ability of the edge system to constrain the edge plasma current and the effect of mixed polarization states on the MSE pitch angles. Finally we investigate the specifications for future upgrades aimed at informing tearing mode stability studies

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