Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Tokamak Equilibrium Reconstruction with MSE-LS Data in DIII-D[1] L. LAO, General Atomics, B. GRIERSON, PPPL, K.H. BURRELL, General Atomics — Equilibrium analysis of plasmas in DIII-D using EFIT was upgraded to include the internal magnetic field determined from spectroscopic measurements of motional-Stark-effect line-splitting (MSE-LS). MSE-LS provides measurements of the magnitude of the internal magnetic field, rather than the pitch angle as provided by MSE line-polarization (MSE-LP) used in most tokamaks to date. EFIT MSE-LS reconstruction algorithms and verifications are described. The capability of MSE-LS to provide significant constraints on the equilibrium analysis is evaluated. Reconstruction results with both synthetic and experimental MSE-LS data from 10 DIII-D discharges run over a range of conditions show that MSE-LS measurements can contribute to the equilibrium reconstruction of pressure and safety factor profiles. Adequate MSE-LS measurement accuracy and number of spatial locations are necessary. The 7 available experimental measurements provide useful additional constraints when used with other internal measurements. Using MSE-LS as the only internal measurement yields less current profile information.

[1]Work supported by the PPPL Subcontract S013769-F and US DOE under DE-FC02-04ER54698.

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Date submitted: 12 Jul 2016 Electronic form version 1.4