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☐ Theory ☒ Experiment

Improved Beam Diagnostic Spatial Calibration Using In-Situ Measurements of Beam Emission,* C. Chrystal, *UCSD*; K.H. Burrell, D.C. Pace, *General Atomics*; B.A. Grierson, N.A. Pablant, *PPPL* – A new technique has been developed for determining the measurement geometry of the charge exchange recombination spectroscopy diagnostic (CER) on DIII-D. This technique removes uncertainty in the measurement geometry related to the position of the neutral beams when they are injecting power. This has been accomplished by combining standard measurements that use in-vessel calibration targets with spectroscopic measurements of Doppler shifted and Stark split beam emission to fully describe the neutral beam positions and CER views. A least squares fitting routine determines the measurement geometry consistent with all the calibration data. The use of beam emission measurements allows the position of the neutral beams to be determined in-situ by the same views that makeup the CER diagnostic. Results indicate that changes in the measurement geometry are required to create a consistent set of calibration measurements. However, changes in quantities derived from the geometry, e.g. ion temperature gradient and poloidal rotation, are small.

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