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Theory Experiment

Validation of Neutral Beam Physics on DIII-D,* C.C. Petty, J.S. deGrassie, A.W. Hyatt, A.W. Leonard, P.A. Politzer, R. Prater, M.A. Van Zeeland, *GA*; W.W. Heidbrink, *UCI*; M. Murakami, J.M. Park, *ORNL*; W.M. Solomon, *PPPL* – Experiments on the DIII-D tokamak have utilized the co/counter injection capability and recent diagnostic upgrades to study neutral beam physics in greater detail than previously possible. Particular attention is being paid to validating the neutral beam current drive (NBCD) profile owing to its importance in Advanced Tokamak scenarios. To avoid MHD instabilities and minimize the plasma density, these experiments were done in low-beta L-mode discharges before the onset of sawteeth. Primarily co- and counter-injection were compared to balanced-injection, with the noninductive current profile determined from the poloidal flux evolution measured by motional Stark effect (MSE) polarimetry. In addition, the fast ion pressure profile was determined from the shift in the plasma flux surfaces measured by the MSE diagnostic. The plasma current was varied between 0.6-1.2 MA to study the effect of fast ion transport. These experimental measurements will be compared to TRANSP calculations.

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