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Theory Experiment

Advanced Scenario Development Using Off-Axis Neutral Beam Current Drive in DIII-D,* M. Murakami, J.M. Park, *ORNL*, T.C. Luce, C.C. Petty, R. Prater, T.S. Taylor, M.R. Wade, *GA* – A goal of the DIII-D AT program is the development of Advanced Tokamak scenarios in support of ITER and future tokamak reactors. Research on DIII-D has focused on the stationary fully noninductive, high-bootstrap fraction scenario development. One-dimensional self-consistent scenario modeling using both scaled experimental transport and theory-based (GLF23) models shows that the proposed 10-MW off-axis NBCD with high power electron cyclotron and fast wave heating and current drive will allow full noninductive operation at high beta with flat safety factor profile with $q_{\min} > 2$ for twice the current relaxation time, consistent with $Q=5$ steady-state operation of ITER. The modification of the DIII-D NB system for off-axis NBCD will provide a flexible scientific tool for understanding transport, energetic particles, heating and CD physics, and validating the off-axis NBCD in support of scenarios for ITER and FDF.

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