Abstract Submitted
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Impact of broadened fast ion pressure profile on Alfven eigenmodes in high qmin steady state scenarios in DIII-D[1] C.S. COLLINS, M.A. VAN ZEELAND, GA, C.T. HOLCOMB, LLNL, E. BASS, UCSD, C. MARINI, ORAU, F. TURCO, Columbia U, W.W. HEIDBRINK, D. LIN, UCI, M. WEILAND, MPI, DIII-D TEAM — The reverse-shear, qmin>2 steady state scenario is of interest for high-beta, fully noninductive long pulse tokamak operation. In previous DIII-D experiments, the high fast-ion fraction (40%) and steep energetic particle (EP) pressure profile strongly drives Alfven Eigenmodes (AEs) that cause redistribution, loss, reduced beam heating and current drive efficiency, and ultimately limit the achievable β_{N}. In new experiments, DIII-D's recently upgraded off-axis neutral beams will be used to create EP pressure profiles near the critical gradient, enabling improved control of EP transport. Additional techniques, including reduced beam voltage, q-profile manipulation with electron cyclotron current drive, varied toroidal field, and other plasma parameters will be used to alter AE drive and damping and test limits of whether classical fast-ion behavior can be achieved while preserving heating and current drive performance. The TGLF-EP+Alpha critical-gradient model will be compared to experimental EP pressure profile measurements as part of a rigorous validation effort, which is needed to assess accuracy of reduced models for integrated predictive modeling and scenario development in DIII-D and future tokamaks.

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