Abstract Submitted
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Suppressing Alfven eigenmodes by q-profile engineering to improve fast-ion confinement[1] G.J. KRAMER, B.J. TOBIAS, R. NAZIKIAN, PPPL, C. HOLCOMB, LLNL, C. COLLINS, M.A. VAN ZEELAND, GA, W.W. HEIDBRINK, Y. ZHU, UCI — High levels of Alfven eigenmode (AE) activity often limit the plasma performance of steady-state target plasmas. Experiments were performed on DIII-D to suppress harmful AEs by q profile engineering. Current ramp rates of 0.6 MA/s are typically used in L-mode discharges to create q_{min} near r/a = 0.3 where the fast-ion pressure gradient is strong, leading to strong AEs and enhanced fast-ion transport. In a new experiment a current ramp-rate of 7 MA/s was used together with ECCD at mid-radius. This resulted in a q_{min} radius larger than 0.5 which is outside the fast-ion pressure gradient region. This resulted in a complete suppression of TAEs in the core and a highly reduced RSAE activity near q_{min} giving rise to classical fast-ion transport as deduced from neutron measurements. Although q_{min} was not sustained at large radii, these experiments show that AEs can be suppressed by q profile engineering. For sustaining q_{min} at large radii a stronger off-axis current drive source is planned with neutral beam upgrades in 2017.

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