Abstract Submitted
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Characterizing Critical Gradient Threshold for Alfvén Eigenmode Induced Fast-Ion Transport[1] C.S. COLLINS, W.W. HEIDBRINK, L. STAGNER, UCI, M.A. VAN ZEELAND, D.C. PACE, C.C. PETTY, GA — Recent experiments on DIII-D indicate a sudden increase in fast-ion transport in the presence of many simultaneous Alfvén eigenmodes (AEs) at a threshold in neutral beam power. The threshold is beyond the AE linear stability limit and appears to differ between various fast-ion diagnostics, indicating phase-space dependent transport. Above threshold, transport becomes stiff, resulting in virtually unchanged fast-ion density profiles despite increased beam drive. In the experiment, a beam power scan (2-9 MW) varies AE activity, while the fast-ion pressure profile is modulated using an off-axis neutral beam. Measurements of the fast-ion density evolution are used to infer flux. Fast-ion Dα (FIDA) spectroscopy indicates the peak of the modulated fast-ion flux is localized to mid-core radii, corresponding to the radial location of AEs. These measurements facilitate numerical model validation studies, giving greater confidence in predicting the fusion alpha density profiles and losses in future burning plasma devices.

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