Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Critical Gradient Behavior of Alfvén Eigenmode Induced Fast-Ion Transport in Phase Space[1] C.S. COLLINS, D.C. PACE, M.A. VAN ZEELAND, GA, W.W. HEIDBRINK, L. STAGNER, Y.B. ZHU, UCI, G.J. KRAMER, M. PODESTA, R.B. WHITE, PPPL — Experiments on DIII-D have shown that energetic particle (EP) transport suddenly increases when multiple Alfvén eigenmodes (AEs) cause particle orbits to become stochastic. Several key features have been observed; (1) the transport threshold is phase-space dependent and occurs above the AE linear stability threshold, (2) EP losses become intermittent above threshold and appear to depend on the types of AEs present, and (3) stiff transport causes the EP density profile to remain unchanged even if the source increases. Theoretical analysis using the NOVA and ORBIT codes shows that the threshold corresponds to when particle orbits become stochastic due to wave-particle resonances with AEs in the region of phase space measured by the diagnostics. The kick model in NUBEAM (TRANSP) is used to evolve the EP distribution function to study which modes cause the most transport and further characterize intermittent bursts of EP losses, which are associated with large scale redistribution through the domino effect.

[1]Work supported by the US DOE under DE-FC02-04ER54698.

C.S. Collins
GA

Date submitted: 13 Jul 2016 Electronic form version 1.4