

Abstract Submitted  
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**Toroidal Alfvén Eigenmode Avalanches on the National Spherical Torus Experiment**<sup>1</sup> ERIC FREDRICKSON, D. DARROW, N.N. GORELENKOV, S.S. MEDLEY, Princeton Plasma Physics Laboratory, Princeton, New Jersey, S. KUBOTA, N. CROCKER, UCLA, Los Angeles CA — Experiments on the National Spherical Torus Experiment have found the fast ion beta threshold for excitation of Toroidal Alfvén Eigenmodes (TAE). A further increase in beam heating power is seen to push the TAE into a repetitive cycle of increasingly stronger bursts, each cycle culminating in a large, multi-mode burst and a drop in the neutron rate of approximately 10%. These strong bursts are identified as TAE avalanches [Nucl. Fusion 35 (1995) 1661]. In such an avalanche, the fast-ion phase-space islands describing the orbits of fast ions trapped in the TAE wave field have reached such an amplitude that islands from multiple modes overlap, leading to greatly enhanced transport of the fast ions, and a concomitant increase in the drive for the modes. Transport of fast ions in ITER is expected to be through a similar multi-mode interaction. Fast ion transport will be studied with NOVA and ORBIT, benchmarked on mode amplitudes measured with a multi-channel reflectometer array.

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