Abstract Submitted
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Simulation of Ion loss during TAE avalanches in NSTX[1] E.D. FREDRICKSON, D. DARROW, G. KRAMER, N.N. GORELENKOV, S.S. MEDLEY, B. LEBLANC, R.E. BELL, R.B. WHITE, PPPL, Princeton, NJ, M. PODESTA, N.A. CROCKER, S. KUBOTA, UC Irvine, CA, F.M. LEVINTON, H. YUH, Nova Photonics, Princeton, NJ — Non-linear interactions of multiple Toroidal Alfvén Eigenmodes (TAE) can result in explosive mode growth and enhanced losses of fast ions in a repetitive cycle of TAE bursts called avalanches. Fast ion losses have been documented with NPA diagnostics and fast neutron measurements during strongly bursting TAE on NSTX. The mode structure and mode amplitudes are measured with arrays of reflectometers and Mirnov coils. These experimental data are used to identify and scale the amplitude and frequency evolution of Toroidal Alfvén Eigenmodes simulated with the NOVA code. These scaled eigenmodes are then used in the ORBIT code to simulate the fast ion redistribution during a strong, 1ms, TAE burst. Fast ion redistribution is seen for the energies > 30 keV, consistent with experimental observations. The simulated level of fast ion losses are in good agreement with the observed losses.

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