Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Correlations of Neutral Particle Analyzer Diagnostics with Instability Bursts[1] D. LIU, W.W. HEIDBRINK, M. PODESTÀ, UC Irvine, E.D. FREDRICKSON, S.S. MEDLEY, R.B. WHITE, PPPL — The extensive set of fast-ion diagnostics [neutron detectors, E||B-type neutral particle analyzer (NPA), four-chord solid state neutral particle analyzer array (SSNPA) and Fast-ion D-alpha diagnostic (FIDA)] on National Spherical Torus Experiment (NSTX) provides a good test-bed for the study of fast ion confinement. A cross-correlation analysis has been performed on the NSTX 2007 and 2008 run campaign data in order to find the correlation between NPA/SSNPA signals and instability bursts. It is shown that sawteeth and large fishbones often cause bursts at outer chords of SSNPA and NPA and drops in the neutron rate, which indicate fast ion loss. It is also observed that Toroidicity-induced Alfven Eigenmode (TAE) avalanches always cause bursts at some chords of SSNPA. High energy channels respond earlier than low energy channels. Examples of experimental data and comparison with ORBIT simulation will be presented along with physical explanations.

[1]This work was supported by US DOE grant DE-FG03-02ER54681 and contract DE-AC02-76CH03073.

D. Liu
UC Irvine

Date submitted: 22 Jul 2008 Electronic form version 1.4