

Coupling of Toroidicity-induced Alfvén Eigenmodes with MHD during avalanches in NSTX

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- Low frequency, kink-like modes commonly observed after large TAE bursts (avalanches) on NSTX: **Both fast ions *and thermal plasma* affected**
- Main motivation: have broader view/understanding of effects of TAEs on NSTX – and future devices – beyond fast ion losses
- This work will
 - Explore conditions leading to enhanced low-f activity *as a result* (?) of TAEs/EPs
 - Identify low-f modes: kinks? fishbones? others?
 - Characterize deterioration of ‘confinement’ caused by the system TAEs/low-f
 - > Good dataset (L-mode) is already available from 2009, 2010 Runs.
 - > Need data in 2011 for H-mode? (perhaps a few shots can be found from 2009/2010)
 - > May benefit from RTV data → would require new XPs in 2011
- So far, observations indicate that
 - Appearance of n=1 mode is a persistent feature in most TAE bursts
 - Low-f is consistent with n=1 kink-like mode
 - > Mode ‘triggered’ when $f_{\text{plasma}}^{\text{TAE}}(R \sim R_0) \rightarrow 0$
 - > EP effects can not be ruled out
 - Loss of fast ions may further reduce kink stability – calculations needed
 - > Results in long-lived modes that affect confinement for 10’s of milliseconds
 - Evidence of effects on thermal plasma:
 - > Decrease of toroidal rotation, density after TAE avalanches (during low-f activity?); effects on NB-driven current; haven’t look at stored energy, etc.