

Neutral Beam Ion Loss During Multimode MHD



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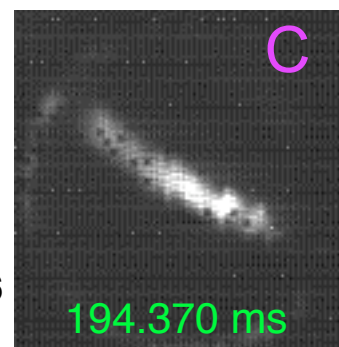
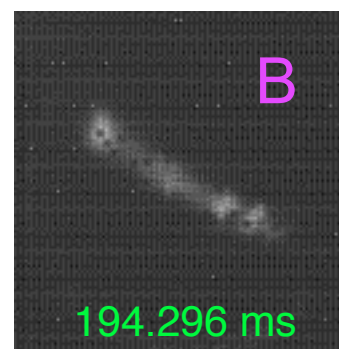
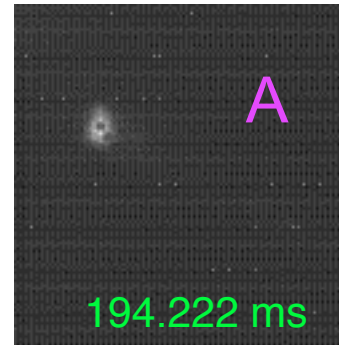
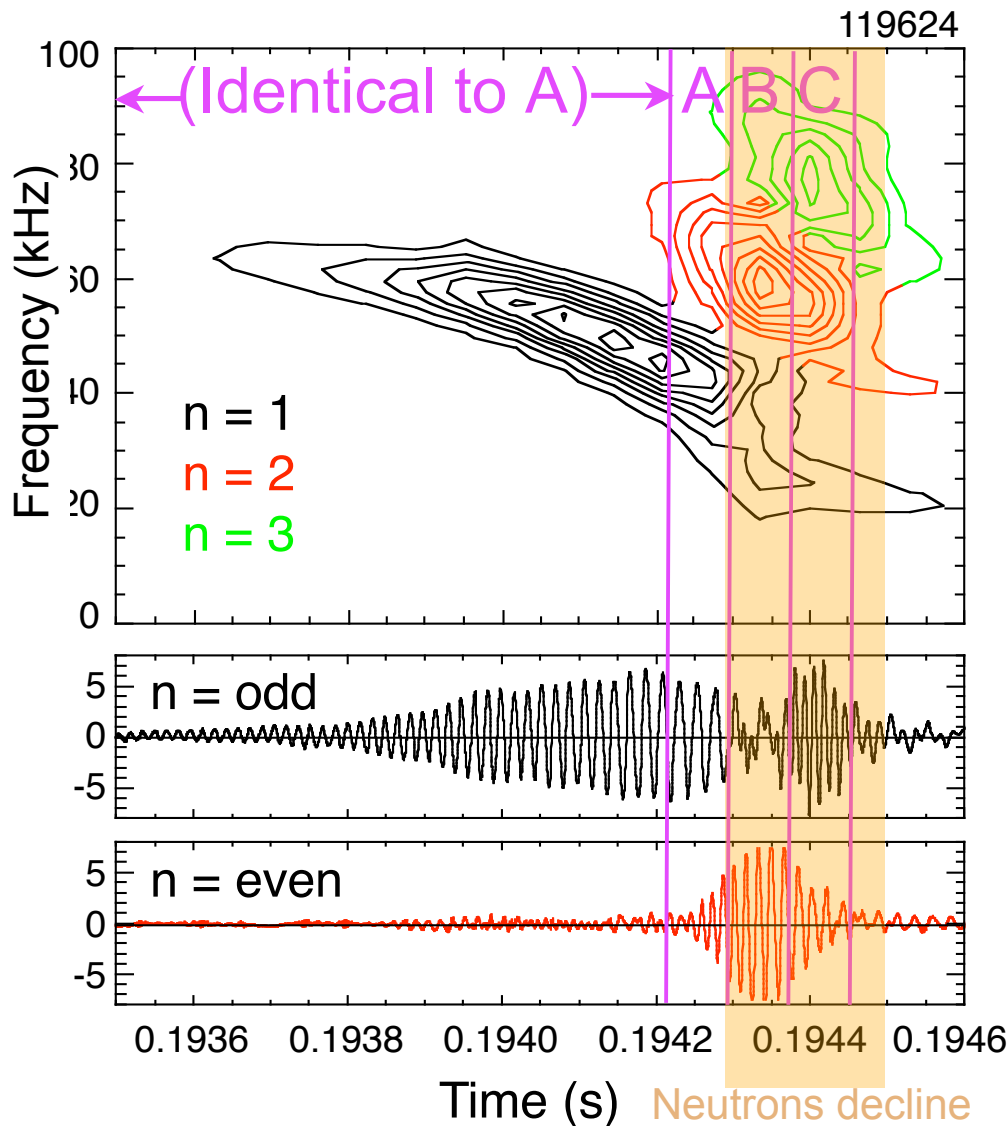
Why do multiple simultaneous fast ion driven MHD modes sometimes affect large populations of fast ions, but at other times not?

Fast ion redistribution & loss important for ITER

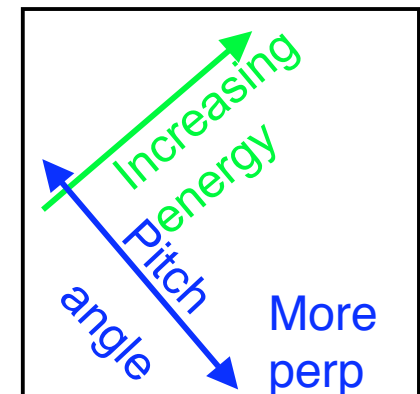
NSTX Results Review

August 7, 2008

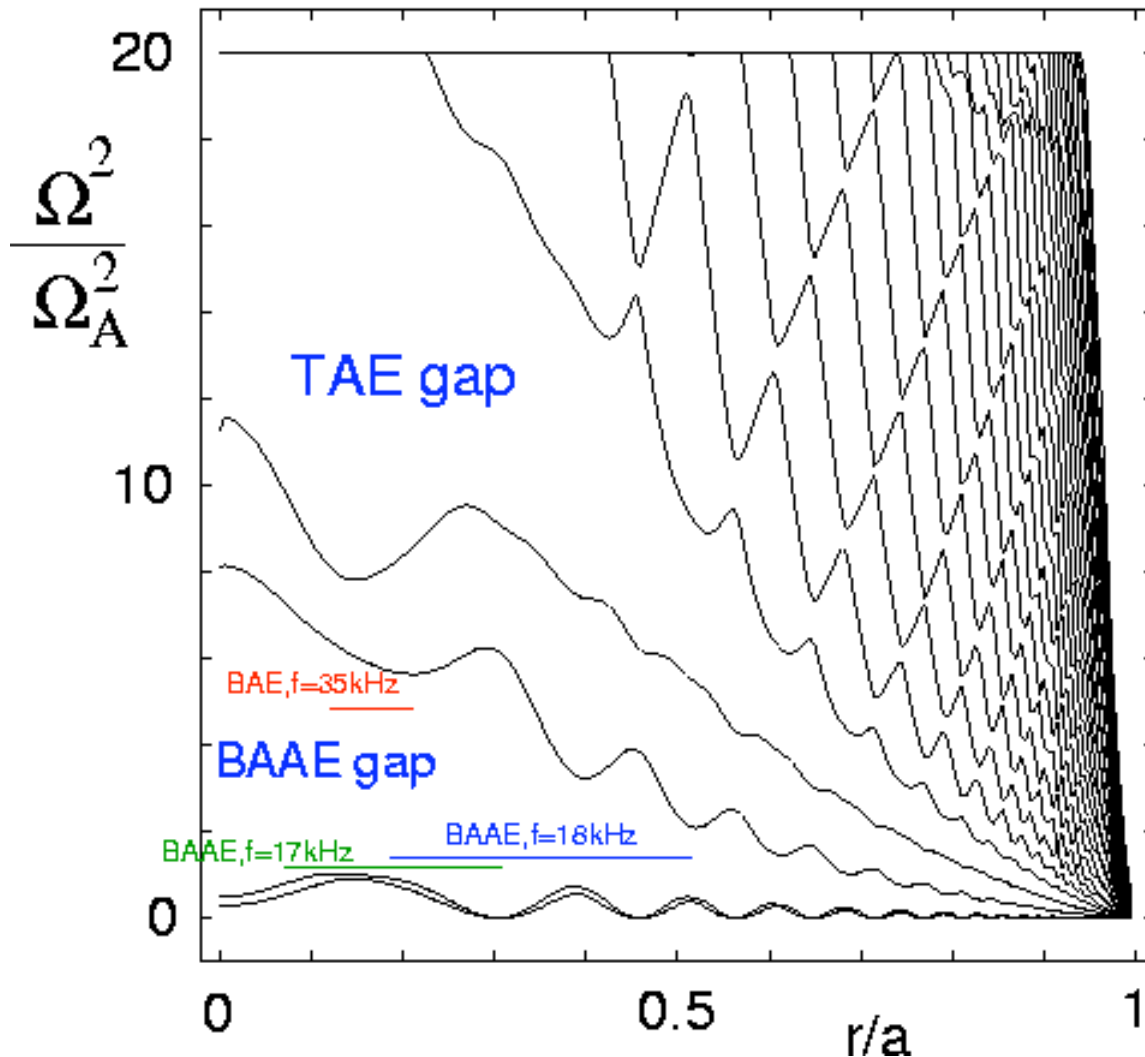
EPM burst causes broad pitch range loss when multiple n values present



- Neutron rate drops 13%
- when multiple n values present & broad pitch angle loss seen

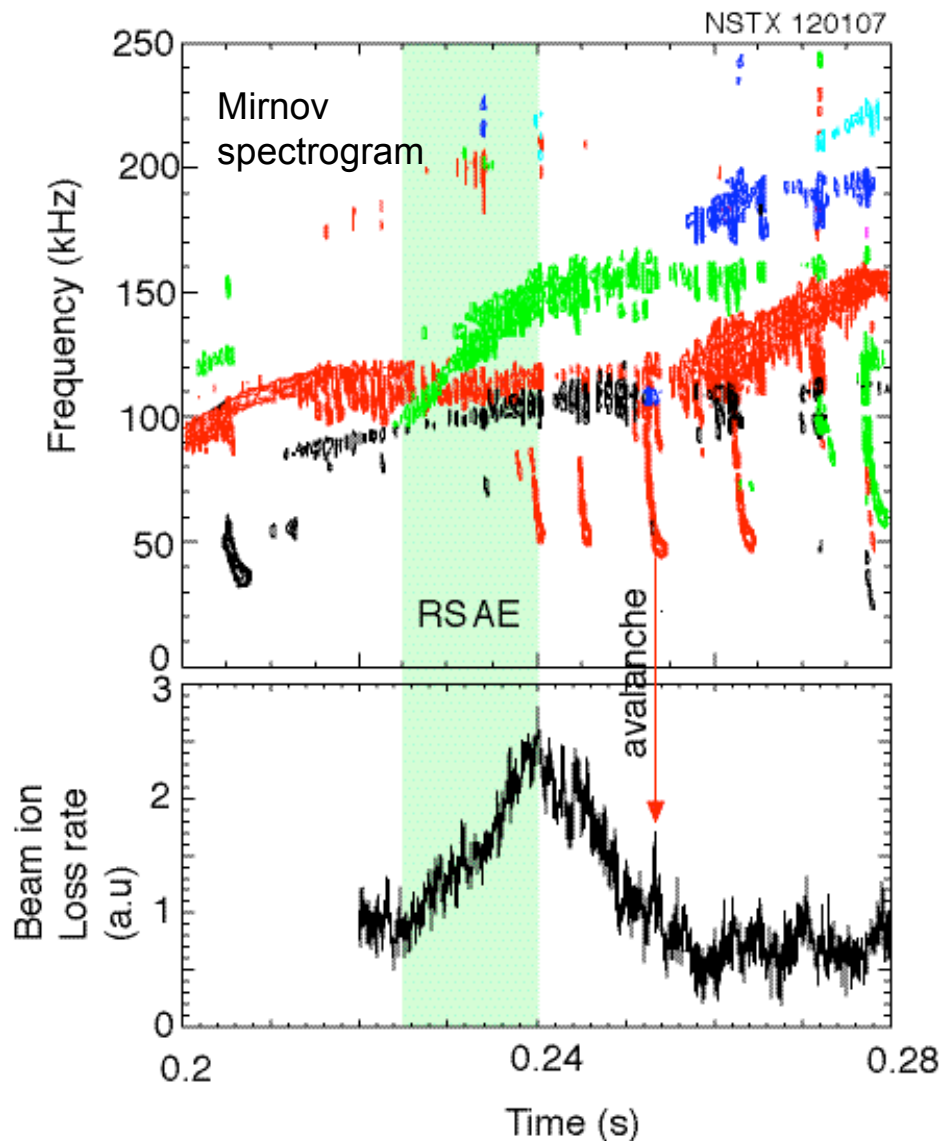


n=3 mode frequency lies in BAAE gap



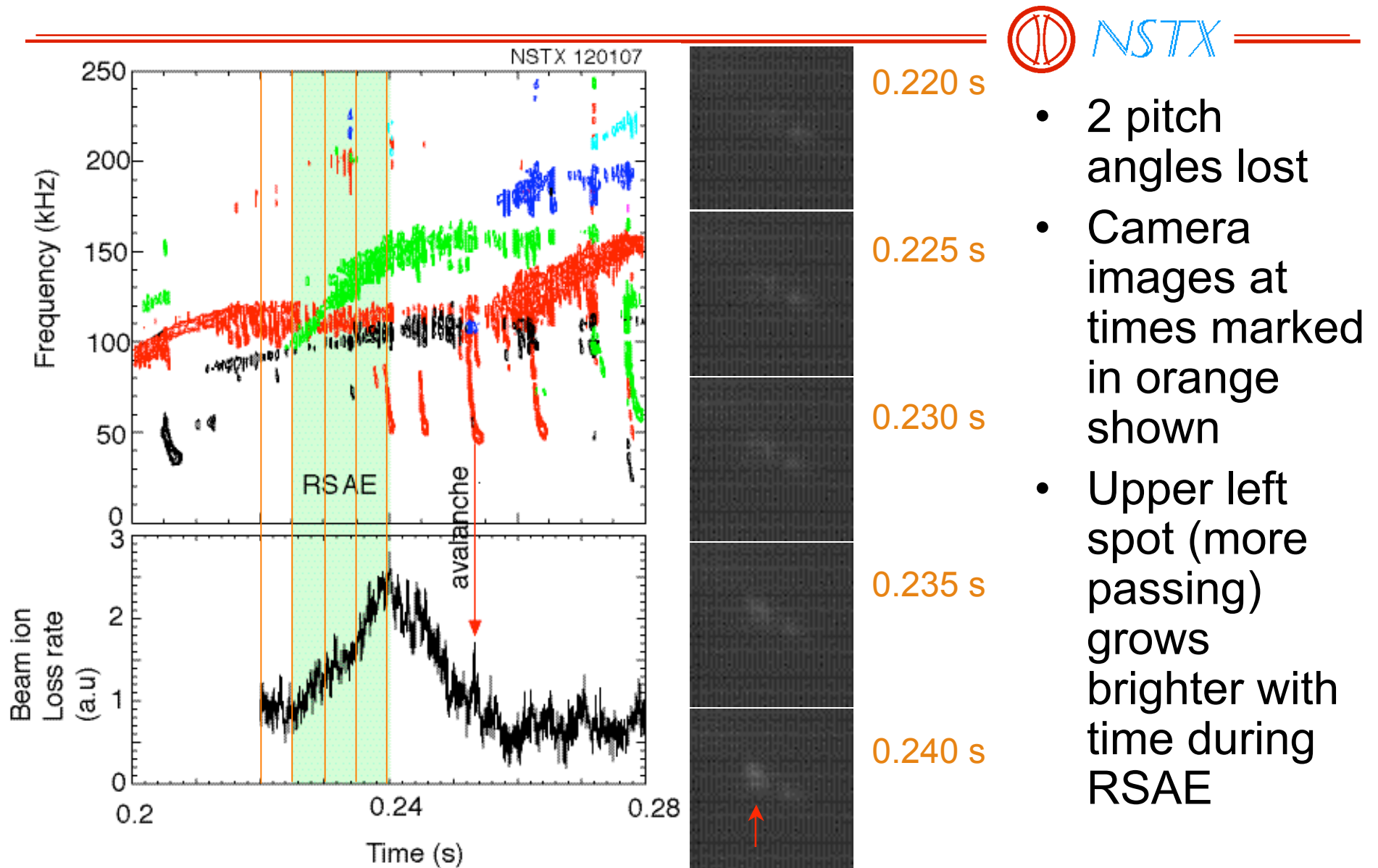
- BAAE=beta-induced Alfvén coustic eigenmode
- $f_{\text{rot}}=20$ kHz
- For n=3 mode:
 - $f_{\text{BAAE}}=78$ kHz
 - $f_{\text{obs}}=78$ kHz
- Good agreement

Interesting shot with RSAE & AE Avalanche



- Losses increase while RSAE frequency increases
- Avalanche also produces burst of loss
- Colors designate n numbers

RSAE loss localized in pitch angle

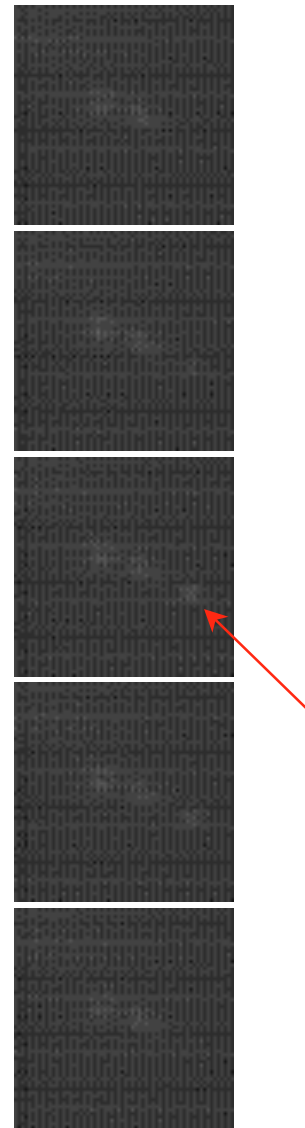
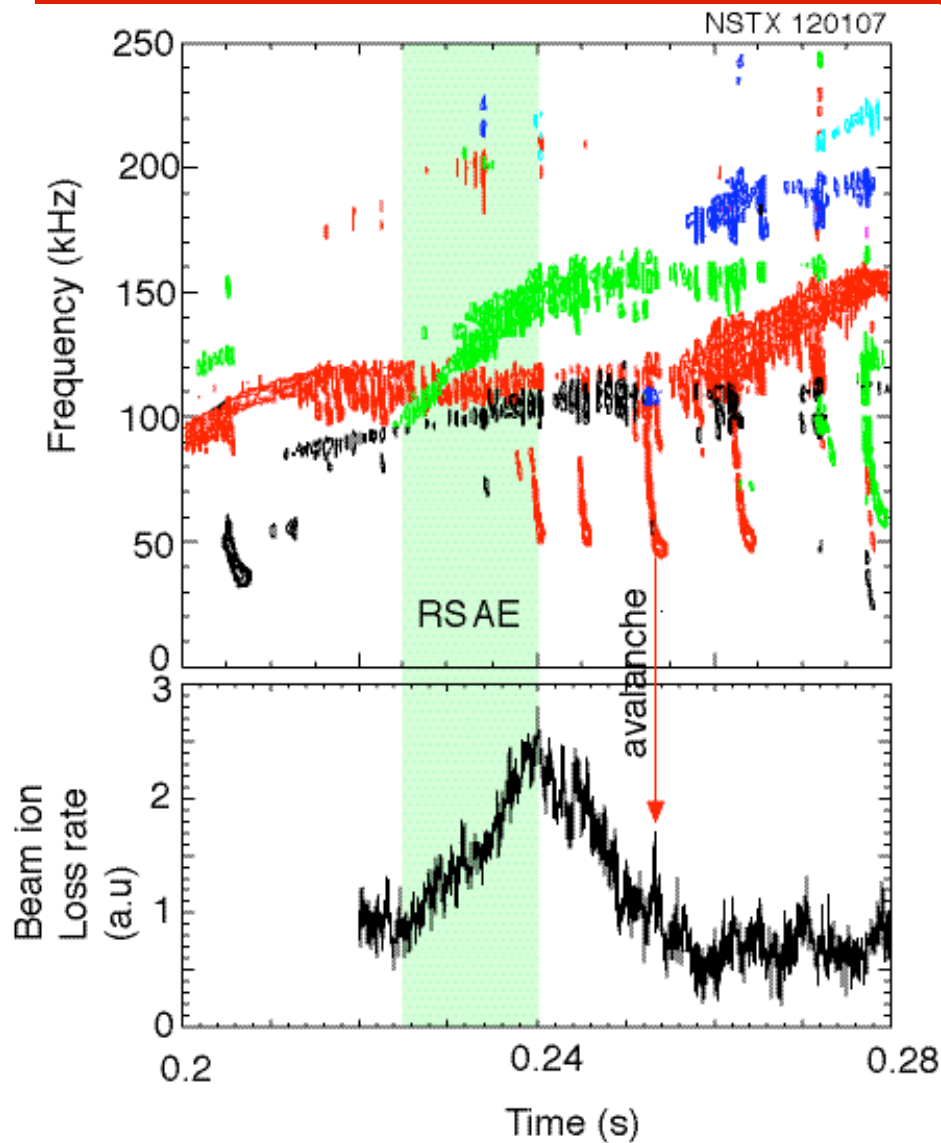


RSAE loss contrasts with EPM



- During EPM, simultaneous multiple n modes appear to cause stochastic loss of fast ions (broad range of pitch angles)
- During RSAE, even though multiple n modes are present concurrently, loss is over only a small range of pitch angles
- Are modes seen during RSAE radially disjoint?

Avalanche loss also localized in pitch angle



- Loss appears at right (more perp) during avalanche
- Only this avalanche studied in detail to date
- Study of more events warranted