# Develop H-mode TAE avalanche target plasma XP-1011 (1/2 day)

- Goal is to develop reproducible H-mode plasma with TAE avalanches

- Explore sensitivity to density, source voltage, toroidal field and beam sources.

- Attempt to optimize target to acquire some data with BES, sxi cameras and interferometers (FIReTIP) on mode amplitude

Some H-mode TAE avalanches already identified
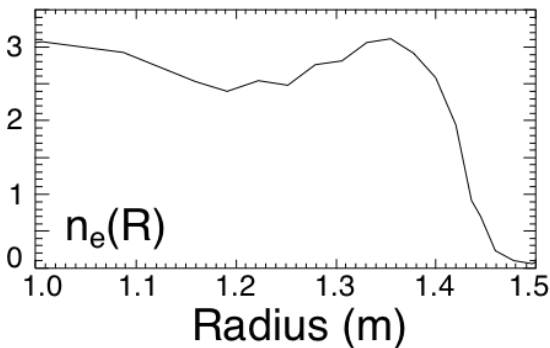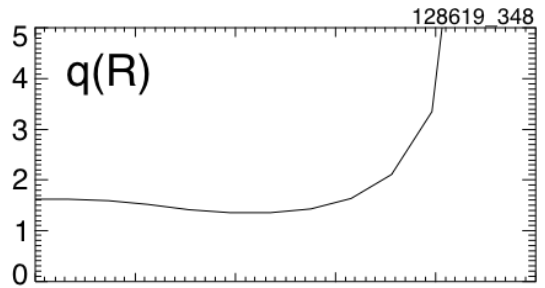
- Neutron rate drops at avalanches, as in L-mode plasmas.

- Range of n-numbers is similar to L-modes (2-5).

- Seen with full beam voltage.

- Just as in L-mode cases, q-profile is slightly inverted with $q_{min} \approx 1.2 - 1.5$.

- Density in right range seems to be key to TAE avalanches.
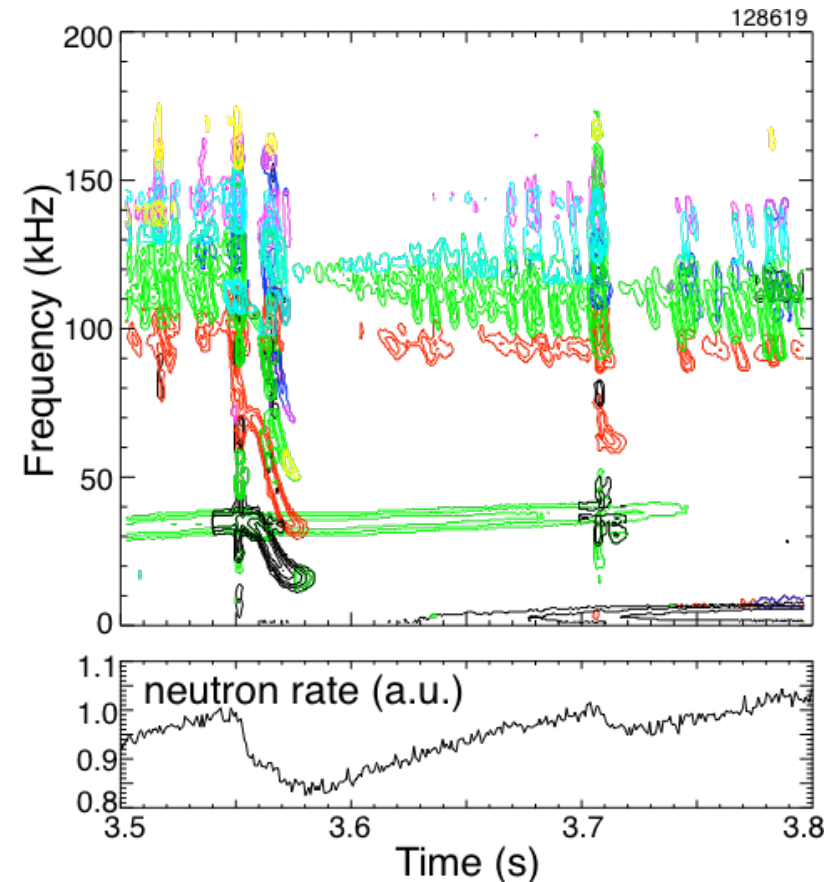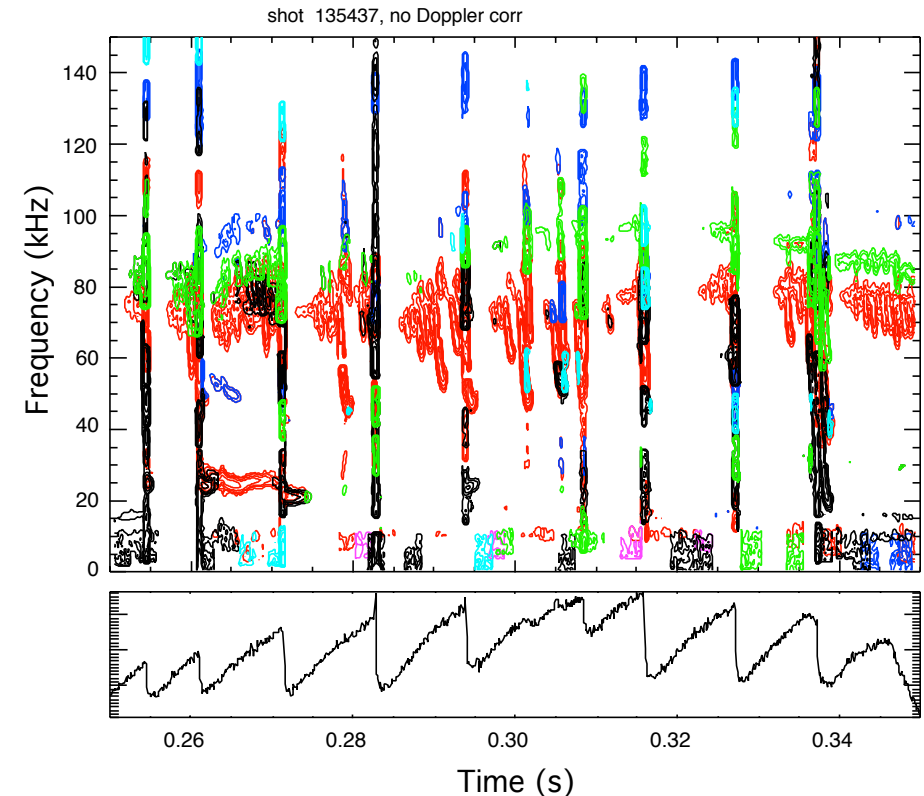
Newer shot, without IRE, has pretty good avalanches

Shot = 135437, time = 280.00006ms

- Strong neutron rate drops.

shot 135437, no Doppler corr
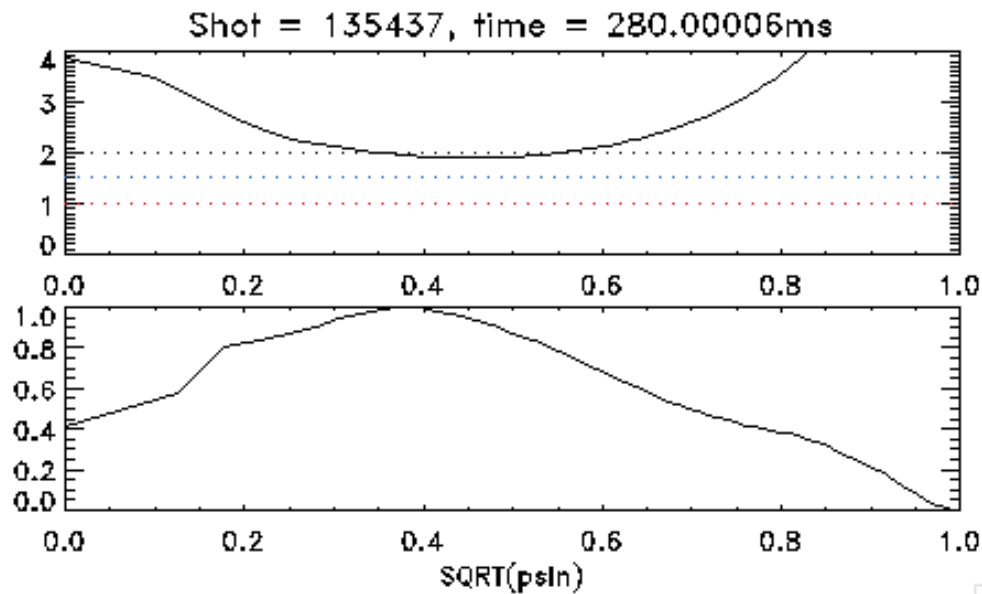
- Strongly inverted q profile; some inversion seems necessary for avalanches.

Run plan, goals:

- Goals for this half-day:
  - Reproduce TAE avalanches in H-mode shot
  - Explore existence criteria
  - FLIP, FIDA, SXI, FIReTIP, BES, MSE
- Experiment plan:
  1. Reproduce shot 135437, sources A,B,C   (3 shots)
     A,B - 90kV, C - 70kV, 700 kA, 4 kG
  2. Small density scan; $n_e(0) \approx 2.7$, (3.2), 3.7.   (4 shots)
     A,B - 90kV, C - 70kV, 700 kA, 4 kG
  3. Beam source scan; A&B, A,B&C   (4 shots)
     A,B - 90kV then A,B - 90kV, C - 80kV, 700 kA, 4 kG
  4. Small current scan; 800 kA, 900 kA. (4 shots)
     Best densities, beams