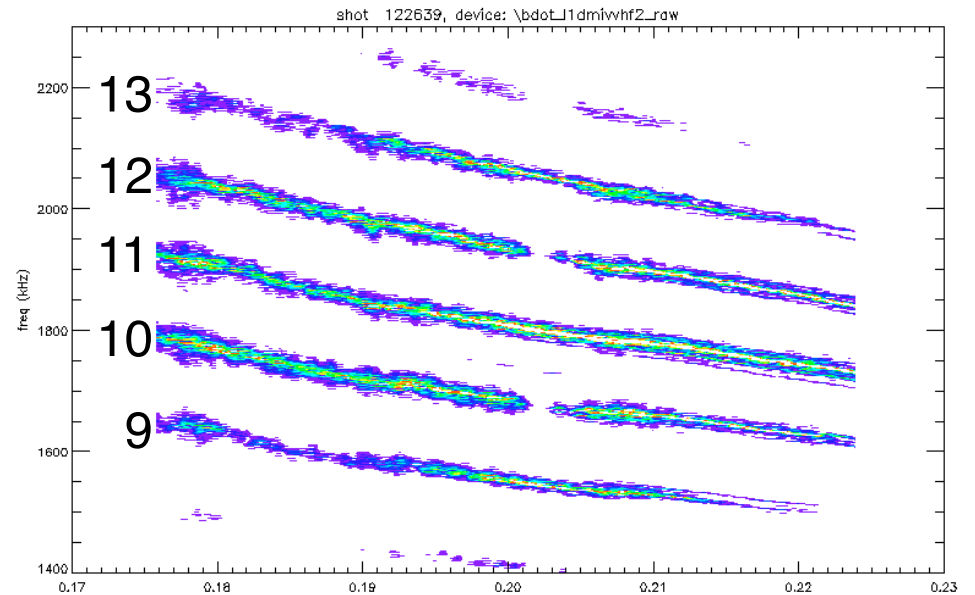
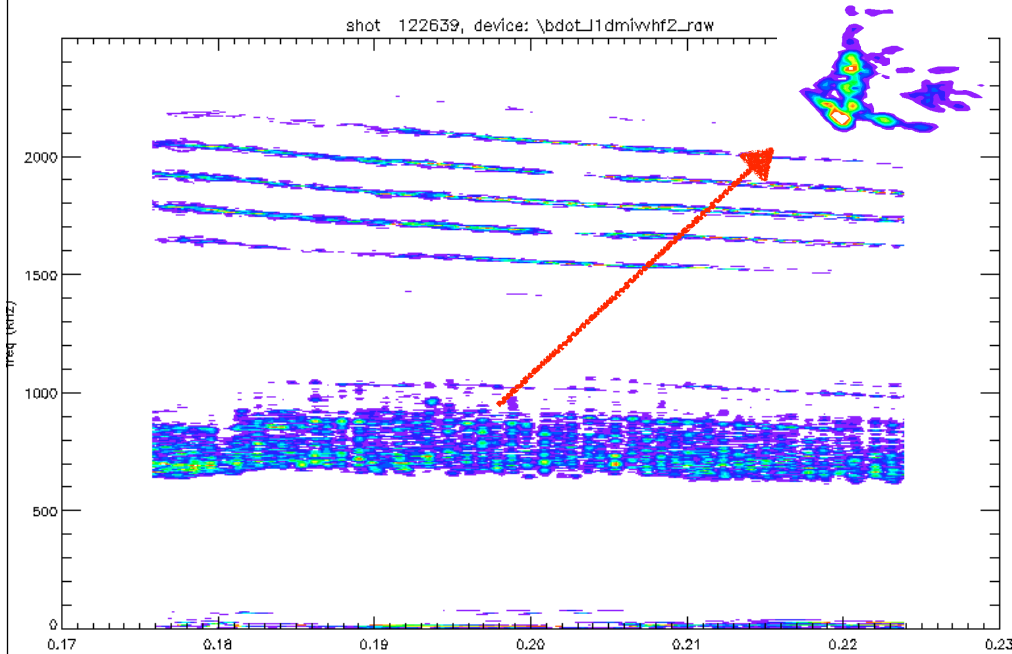


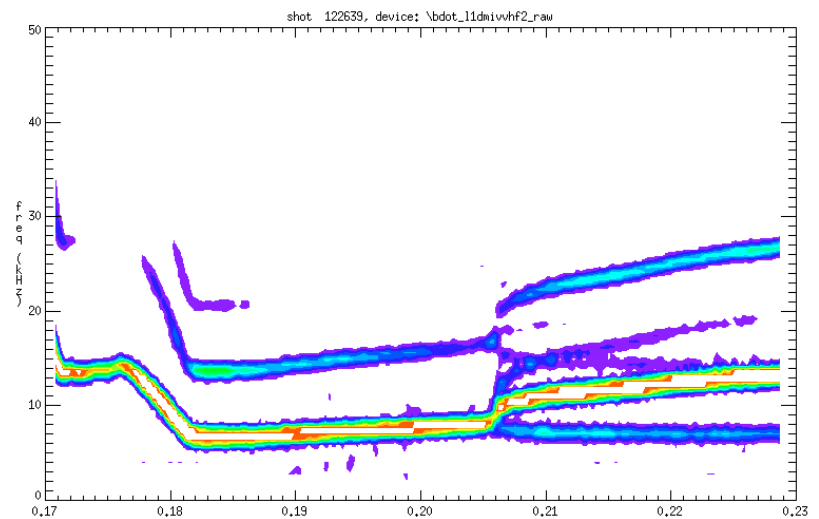
Documentation of CAE/GAE modes (XP-907, 1/2 day)

- Possible targets:
 - Angelfish
 - High frequency CAE
 - Broad spectrum modes (see Angelfish)
- Problem is, most cases to study are H-mode, no internal measurements.
 - Need to "convert" to L-mode, but retain mode to study.

CAE at higher frequencies (1.5 - 2.5 MHz)



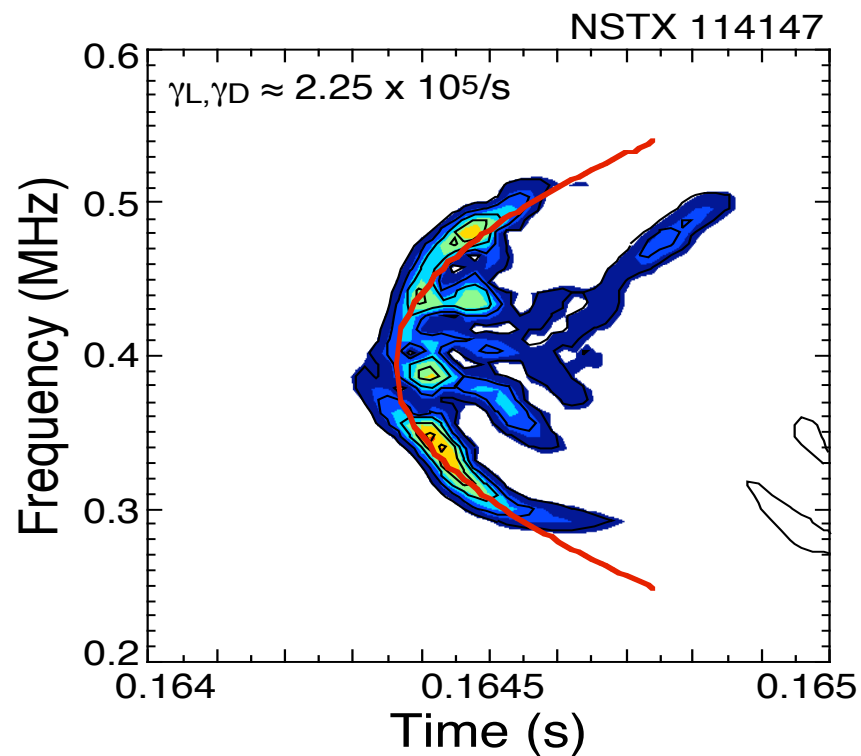
- Good fit to CAE dispersion relation and fast ion resonance condition.
- Only present with low frequency kink.
- So far, only seen in H-mode, but most plasmas are H-mode by this time.
- Reflectometer data would be nice...



Considerable analysis can be done if available data is acquired

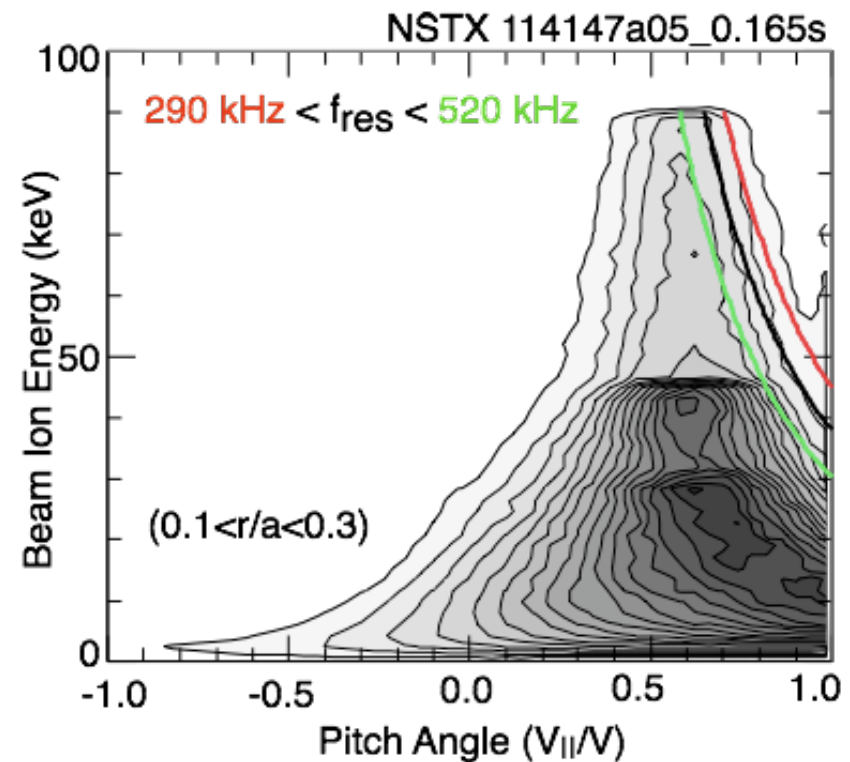
Dispersion relation:

$$\omega_{lab} = \omega_{GAE} - k_{\parallel} V_{tor} = k_{\parallel} V_{Alfvén} - k_{\parallel} V_{tor}$$



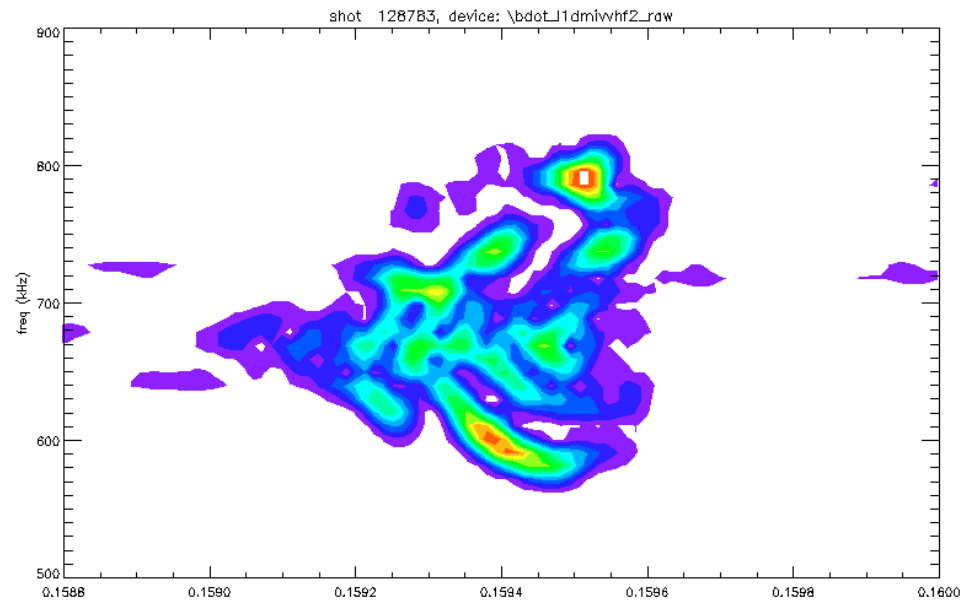
Resonance condition:

$$\omega_{ci} - k_{\parallel} V_{b\parallel} + k_{\parallel} V_{tor} = \omega_{GAE}$$



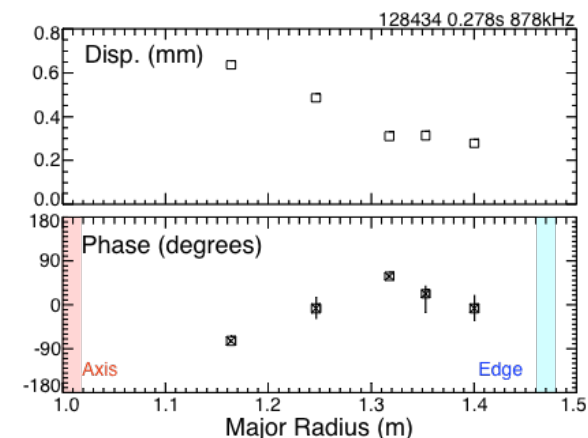
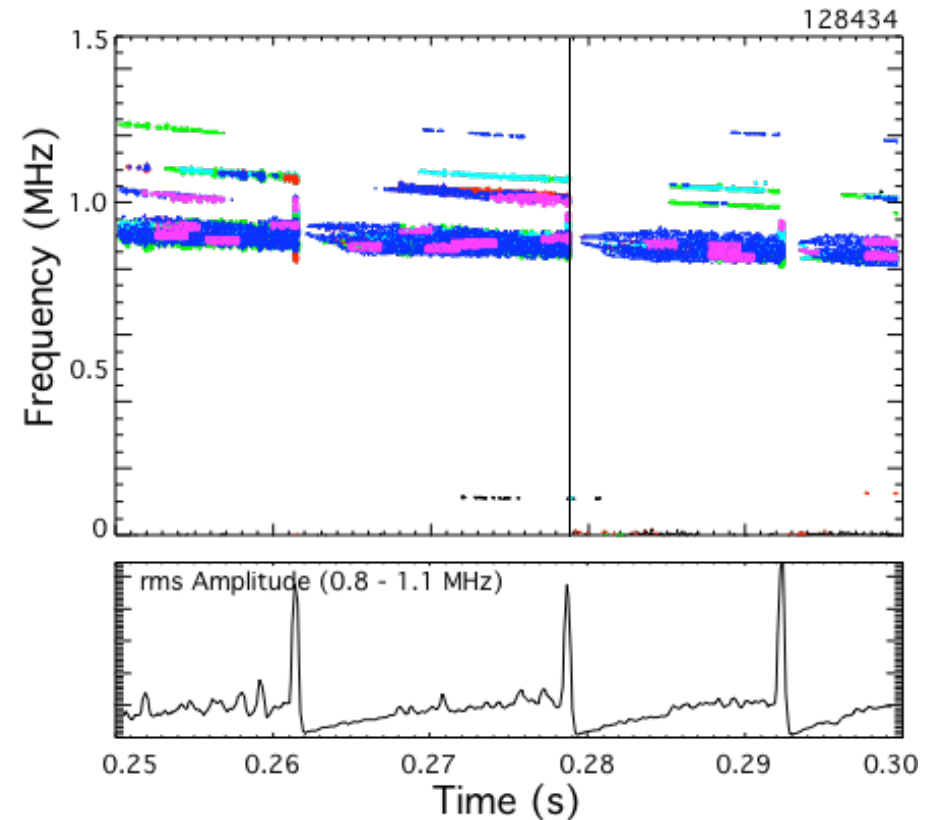
Experiment Outline:

1. Reproduce good Angelfish shot (128783 or similar):
 - MSE, polarization data, some reflectometer data.
 - Full fast particle diagnostics (fast FIDA?)
2. Raise density slowly to improve reflectometer coverage:
3. Source dependence:
 1. Switch A, B and C.
 2. Voltage scans
4. Parameter scans:
 1. TF - easiest
 2. Density?
 3. Plasma current



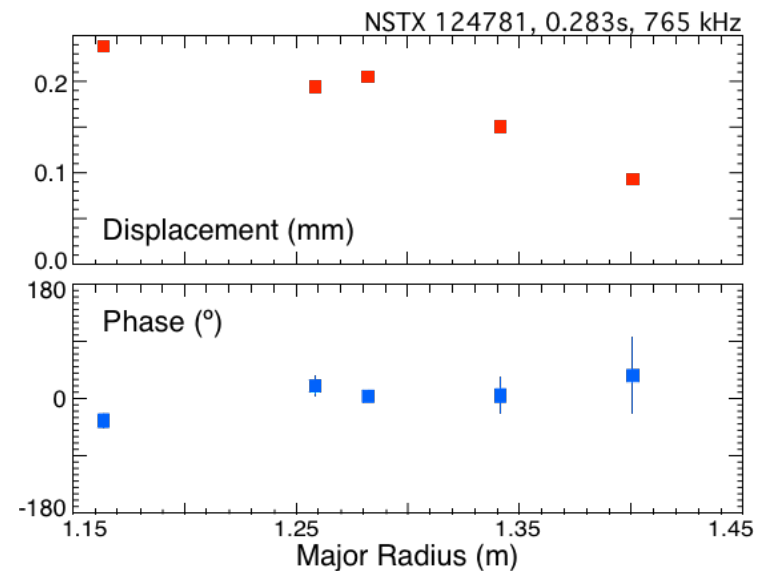
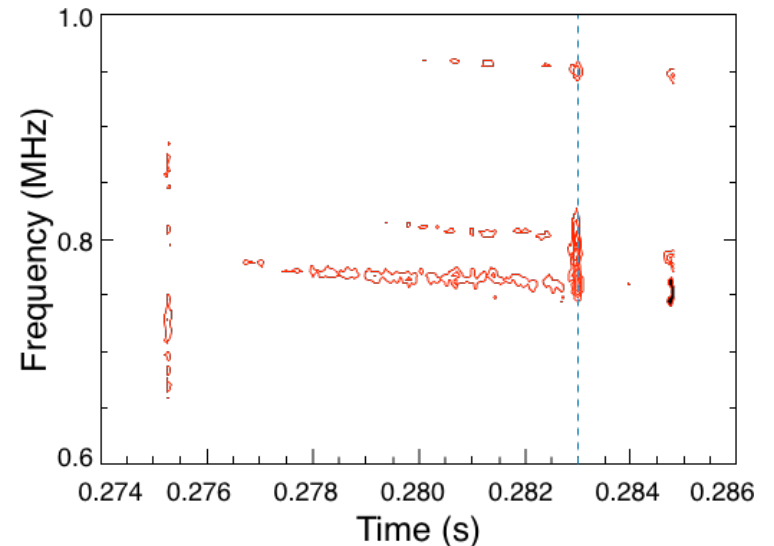
Documentation of CAE/GAE

- Measure amplitude and spatial profile of modes for range of conditions.
- Needed to benchmark HYMN code.
- GAE/CAE Avalanches can trigger EPM or TAE bursts; potentially play important role in fast ion redistribution on NSTX.
- Measurement of typical mode amplitudes would improve understanding of its role in electron thermal transport



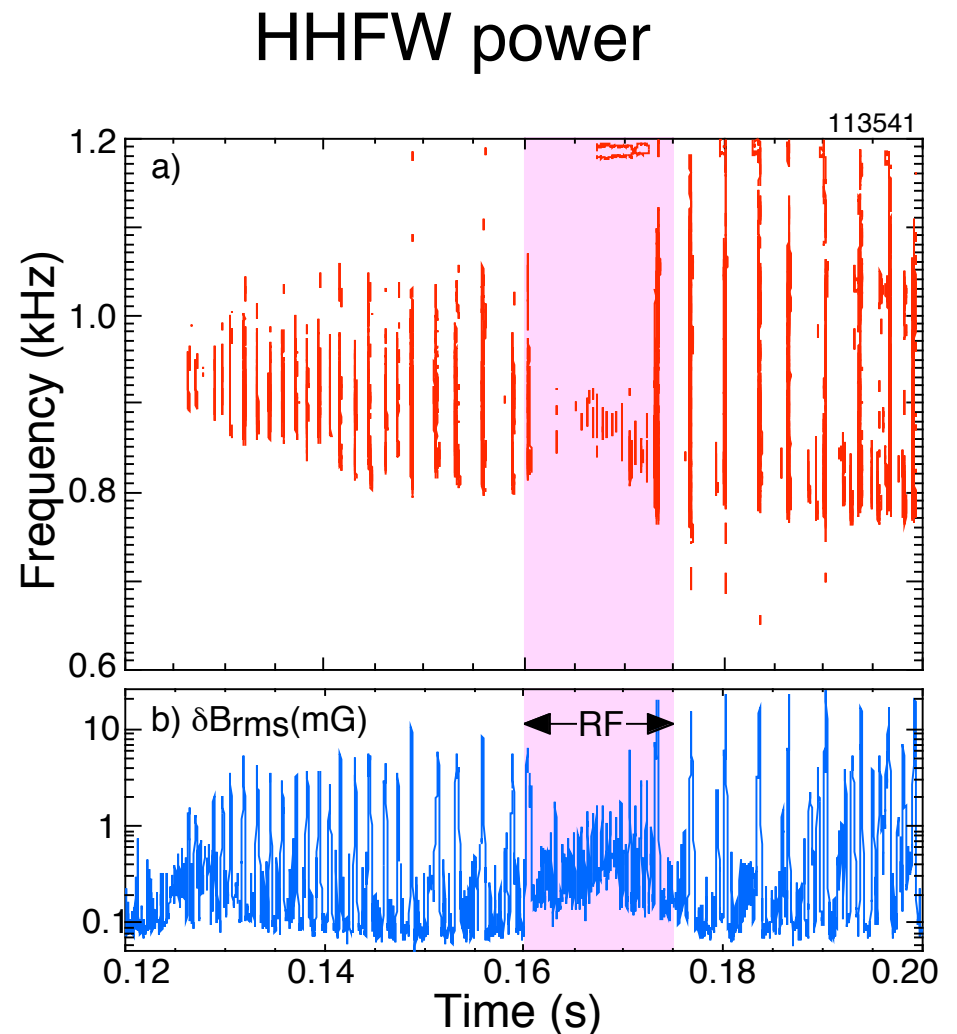
We have the technology...

- Present data set is somewhat hit and miss.
- Studies of Angelfish, CAE need comprehensive, self-consistent sets of data.
- Reflectometer arrays can provide radial profile of mode, showing whether modes are core-localized (GAE) or peaked off-axis (CAE).
- Profile of mode during GAE avalanche is shown; need profiles for Angelfish, modes believed to be CAE.

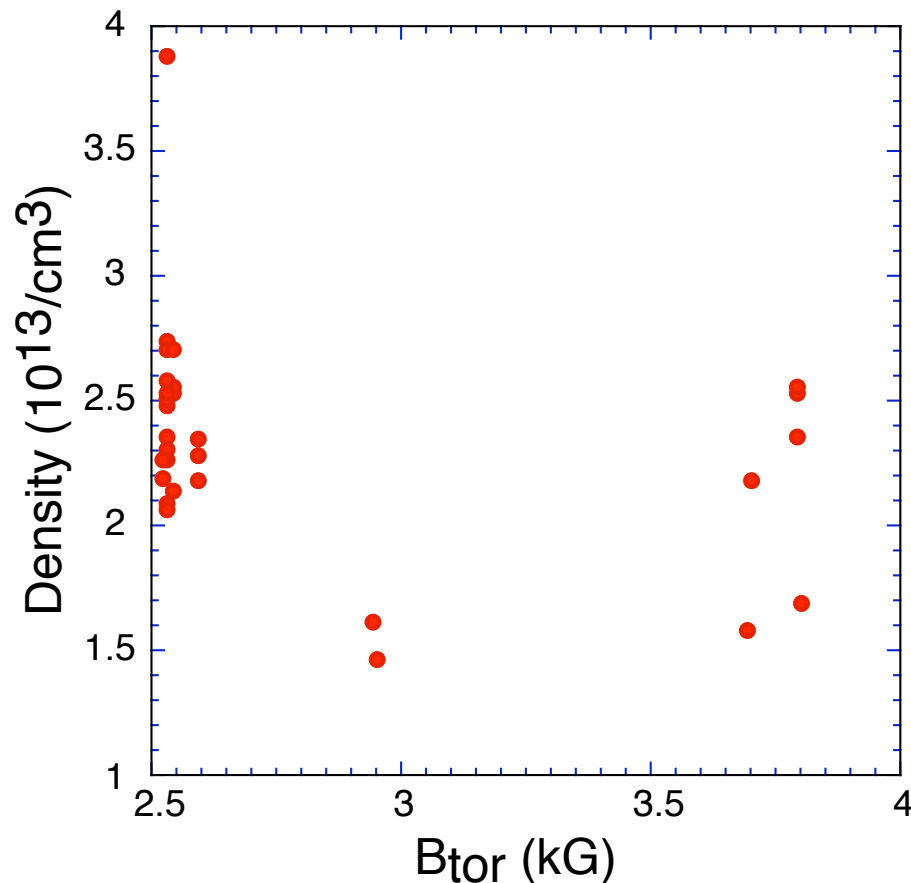


Some evidence of Angel-suppression with HHFW

- However, there is a single burst towards end of RF pulse; incomplete suppression.
- Also, shots 113982-113985 are 'similar' shots, two with HHFW, two without, suggesting suppression
- Problem is low field...



Most good data at low field, lowish density



- There are a few higher field points; needs more study.
- Angelfish seen with either source A or B, or with multiple sources
- Chirping faster with multiple sources?