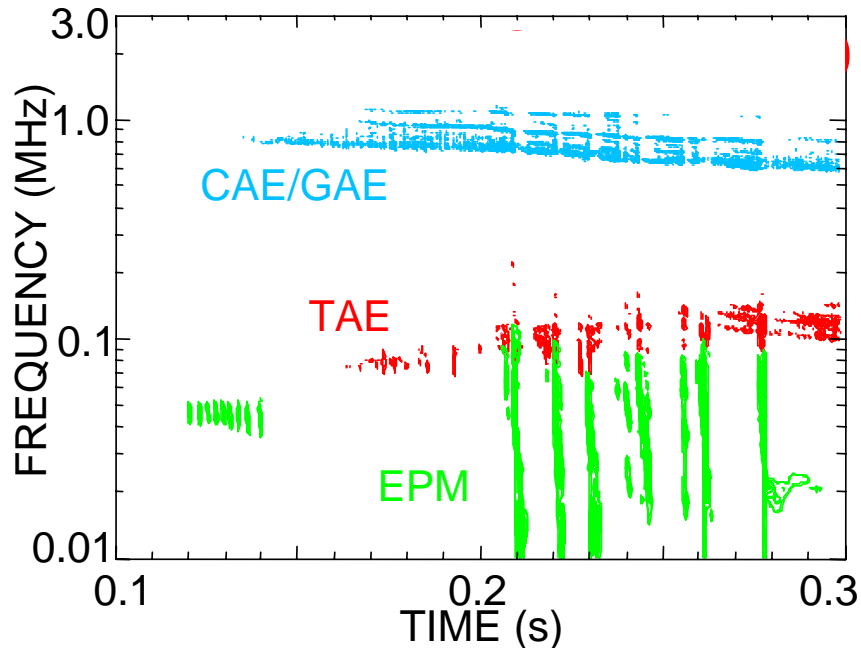


# Transport of Fast Ions by Fishbones and TAEs

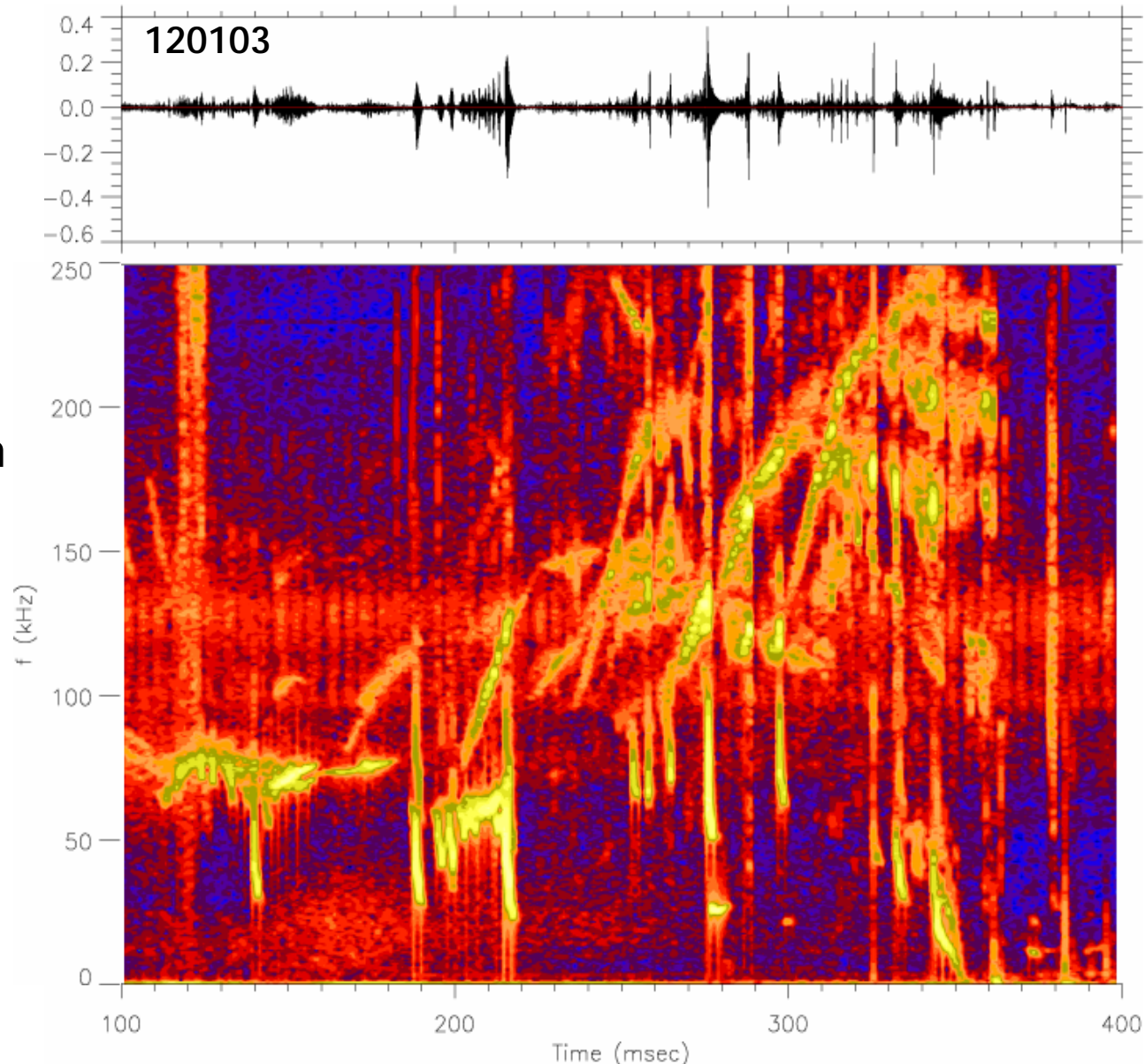
(XP 607)



- Same conditions as 2004 chirping experiment: Helium L-mode plasma
- Use soft x-rays and reflectometer to measure internal mode structure
- Use SSNPA and NPA to measure the fast-ion profile

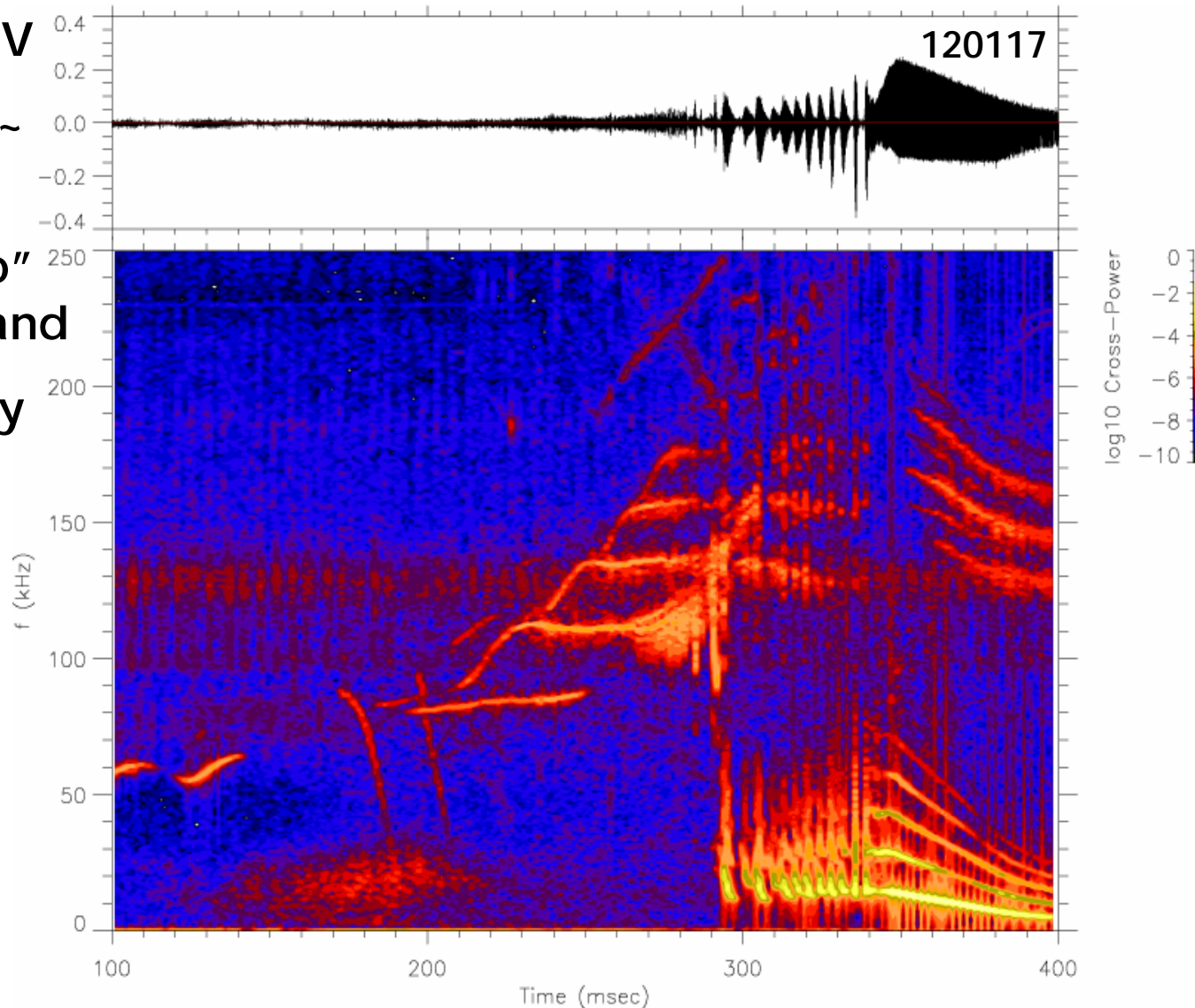
# Low Density "Accident"

- 90 keV Source C
- Large frequency sweeps on intermediate (30 ms) timescale is reminiscent of Reversed-Shear Alfvén Eigenmodes (RSAEs)



# Similar MHD as 2004 Shots: TAEs early, Fishbones Late

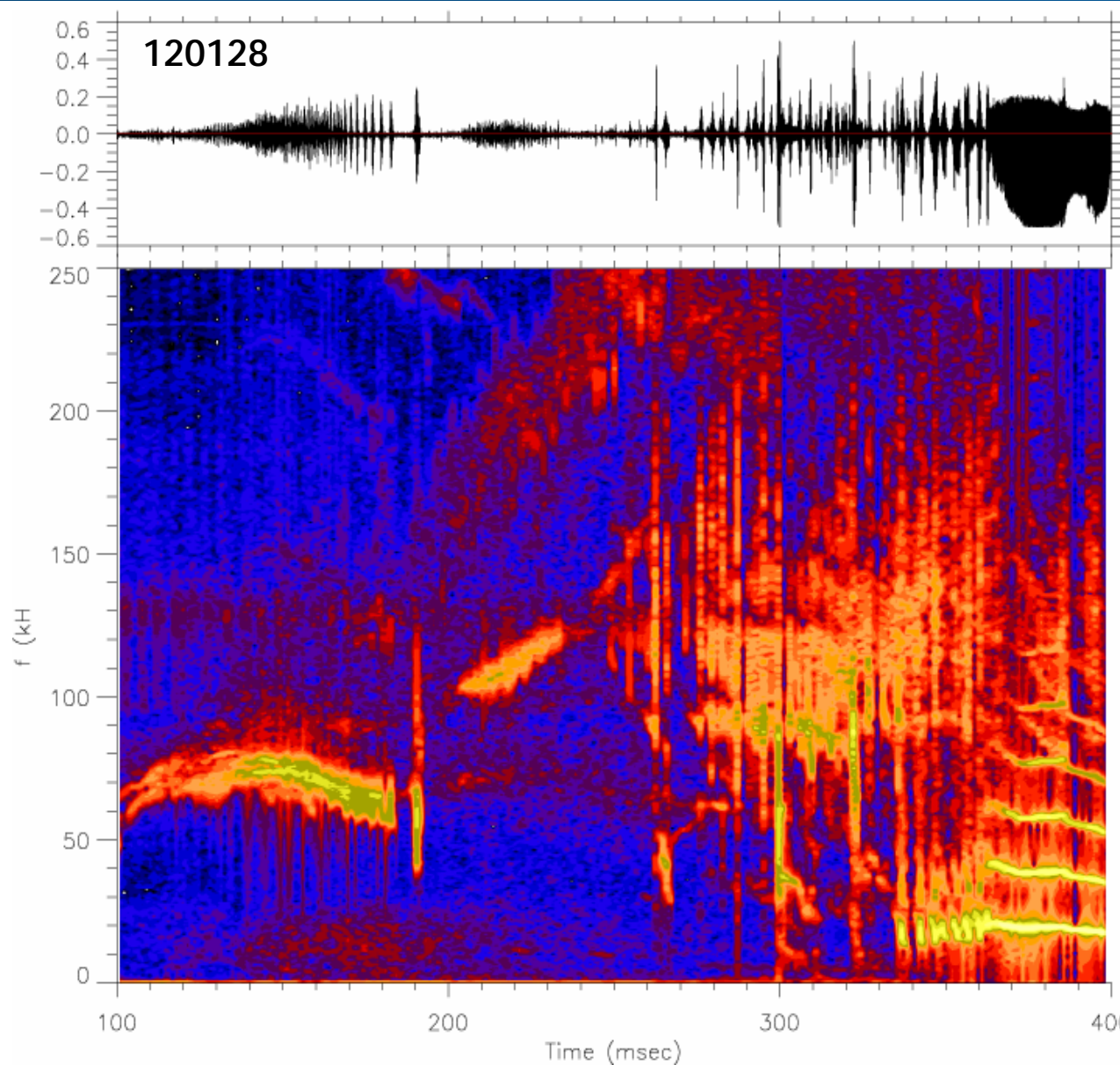
- Source C @ 90 keV
- Target density of  $\sim 3e13 \text{ cm}^{-3}$
- Unusual "stairstep" behavior in TAE-band
- MHz-band activity throughout





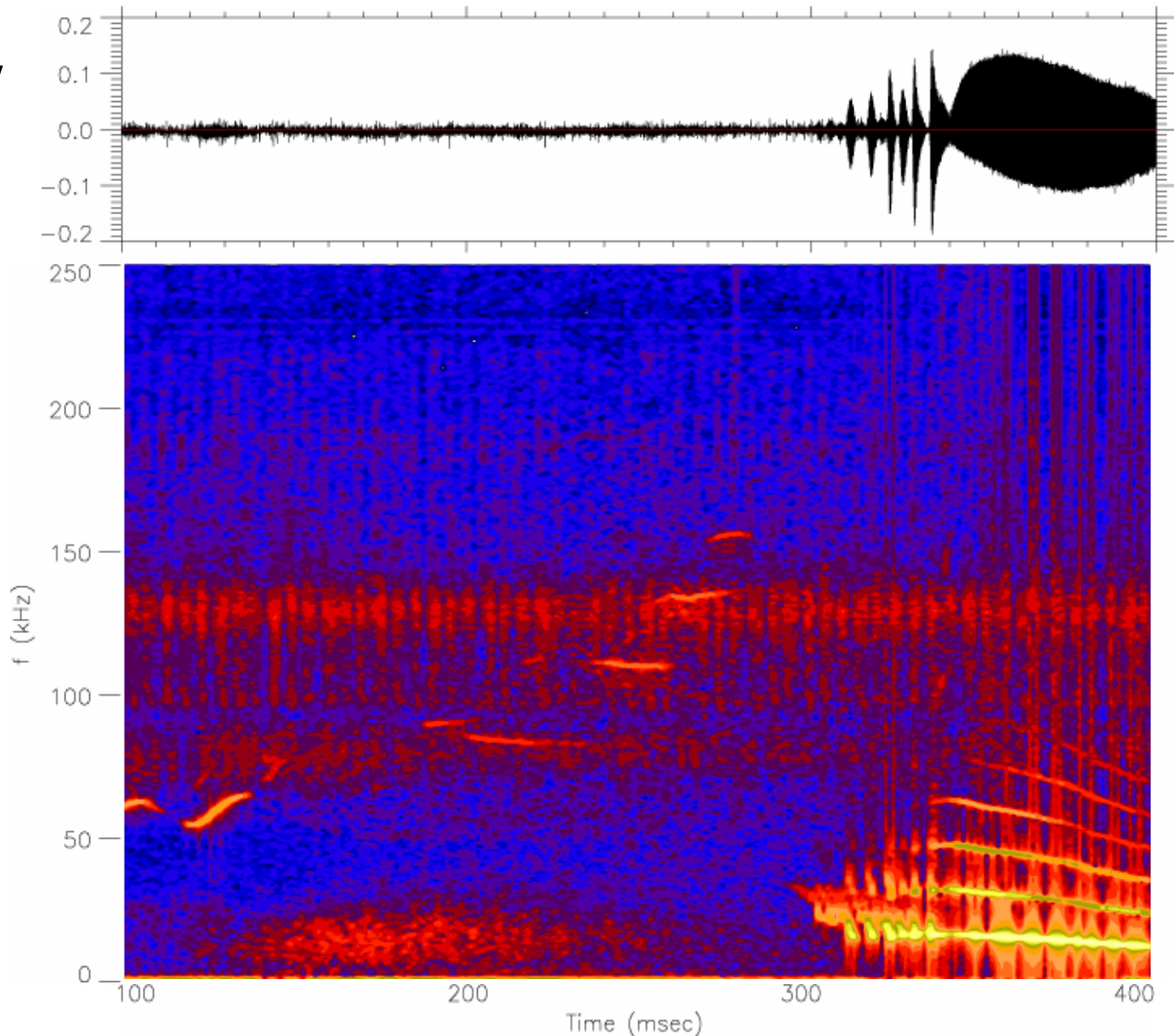
# Source A Drives More TAE-band Chirping

- Similar to 2004 data
- TAE-band probably driven principally by co-passing fast ions

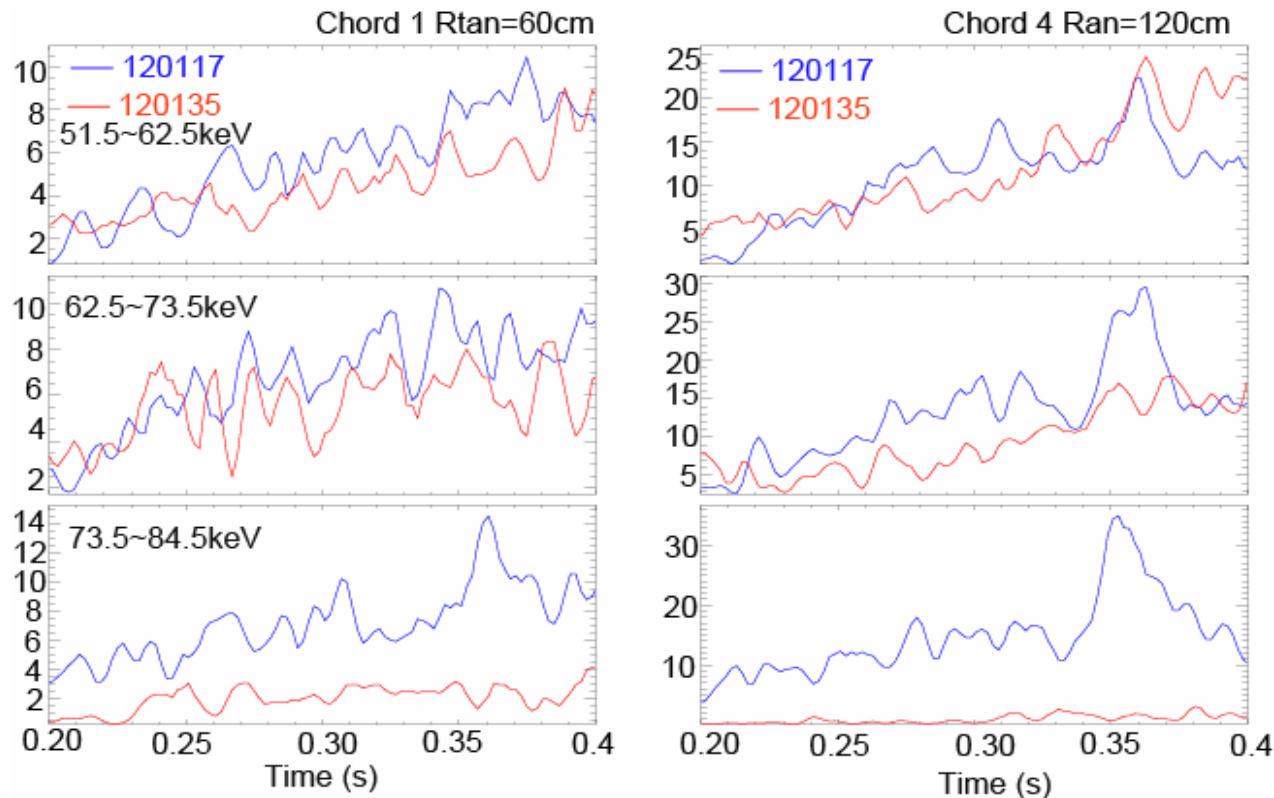


# Source C @ 70 keV: Much weaker MHD

- TAE-band activity greatly reduced
- Fishbone amplitude and  $\Delta f$  of chirp smaller



# Complete Sets of Neutral Particle Data for 3 Moderate-Density Conditions



- Sample SSNPA data
- Nothing above injection energy
- Similar below injection energy
- Enhanced signal during strong low-frequency n=1 mode

**120117 = 90 keV Source C = TAEs then FBs then n=1**

**120135 = 70 keV Source C = few TAEs then weaker FBs then steady n=1**

# Analysis Plans: Compare Measured Mode Structure and Fast-ion Data w/ Theory

- **Compare fluctuation data with NOVA**
- **Calculate fast-ion distribution in presence of instabilities with ORBIT and/or GYROXY**
- **Compare with fast-ion data**