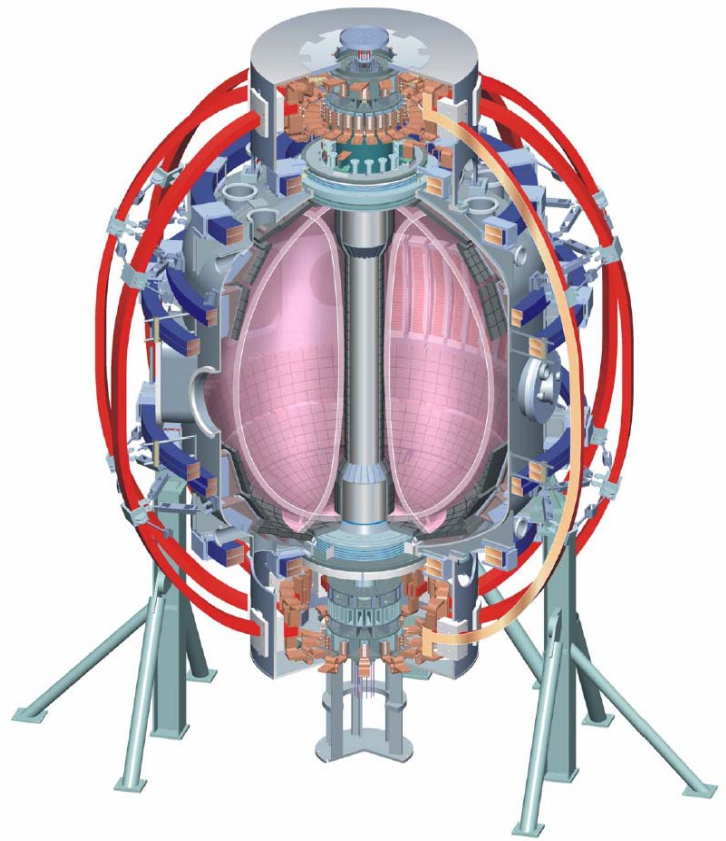


XP 829 - Magnetic shear effects on transport

Presented by H.Yuh

NOVA PHOTONICS

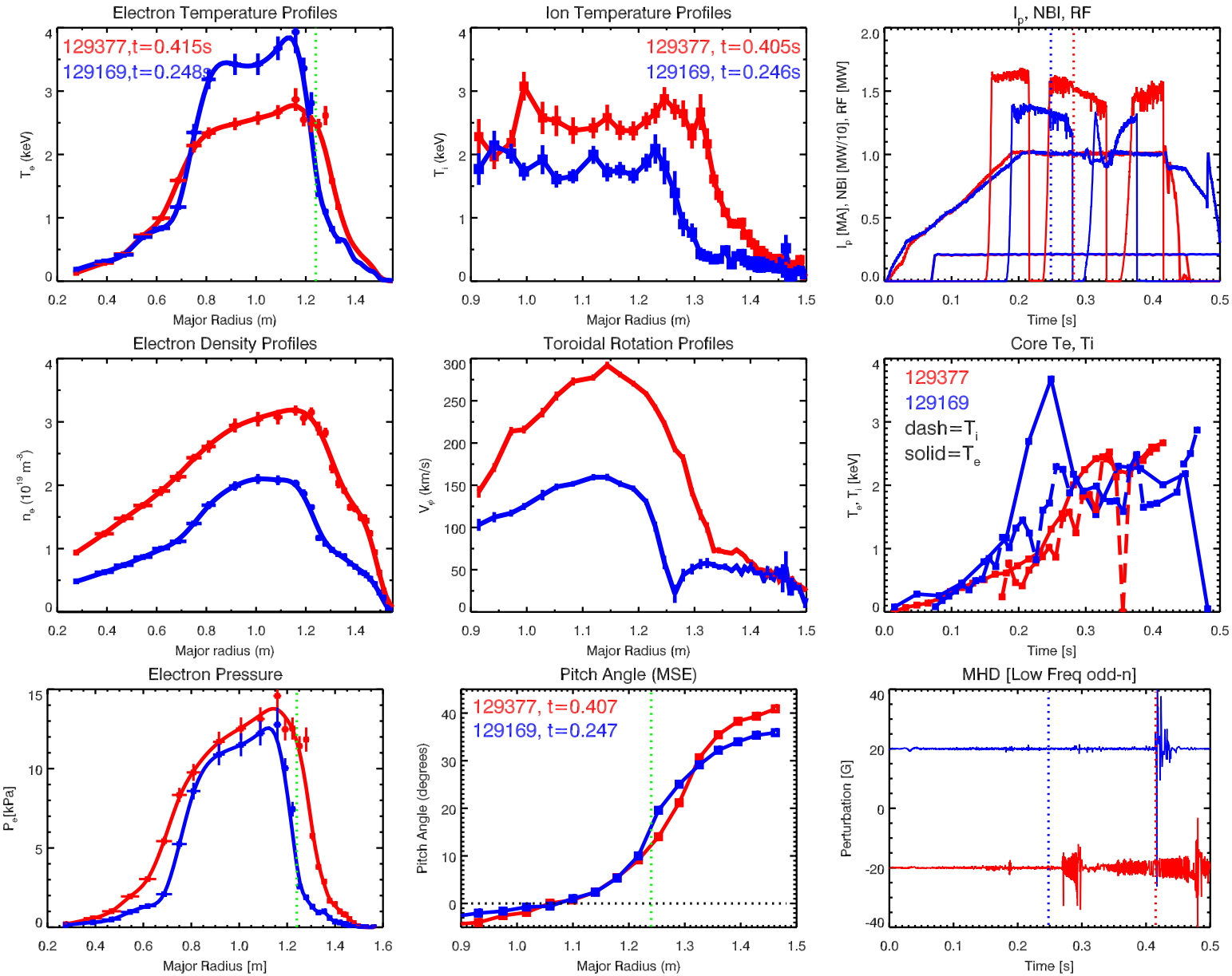
Aug 6, 2008

NSTX Results Review

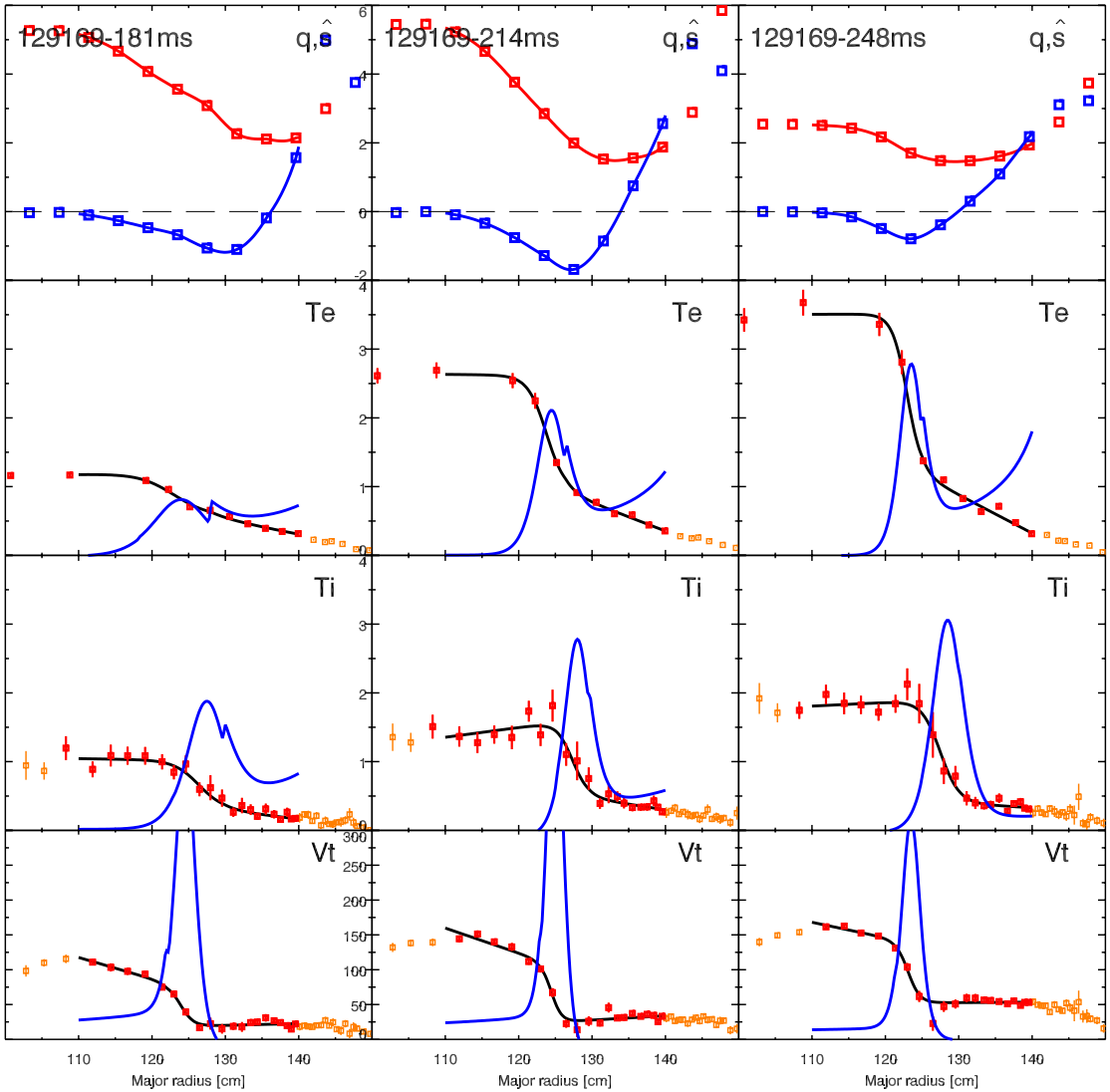
Successful XP with good results

- Measured magnetic shear (MSE) simultaneous with high-k in 4 locations (3 this year)
  - 114cm (2007), 120cm (07,08), 124cm (2008), 134cm (2008)
- Both Deuterium plasmas and Helium plasmas with ITB created
  - ITB region enlarged in D with somewhat lower temperatures
- Strong T_e gradients observed with negative magnetic shear
- Reduction of high-k fluctuations for negative shear, eITB conditions

ITB profiles in T_e, T_i, and v_ϕ



Profile data with high-k measuring at 124cm

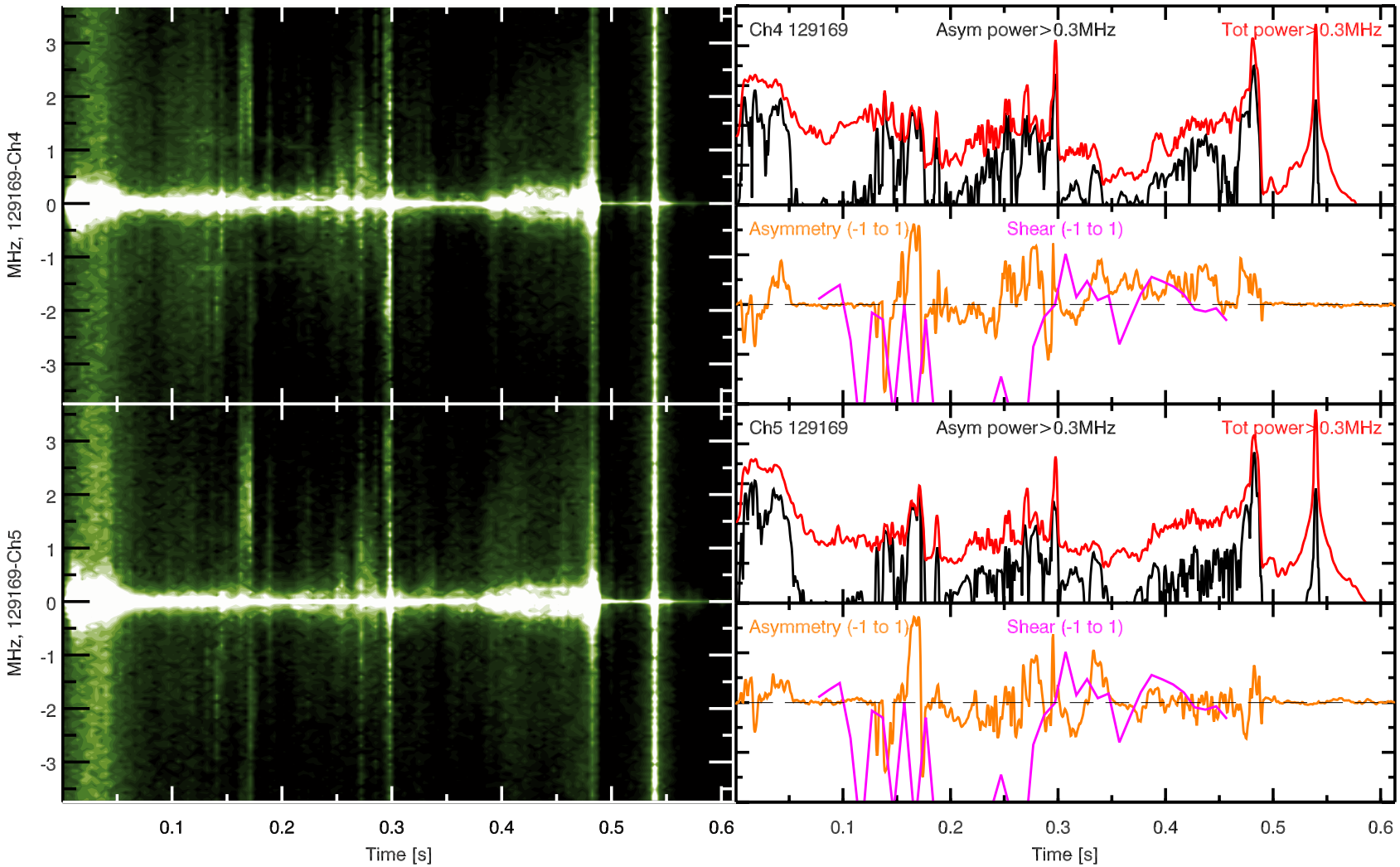


124 is in the ITB high confinement region

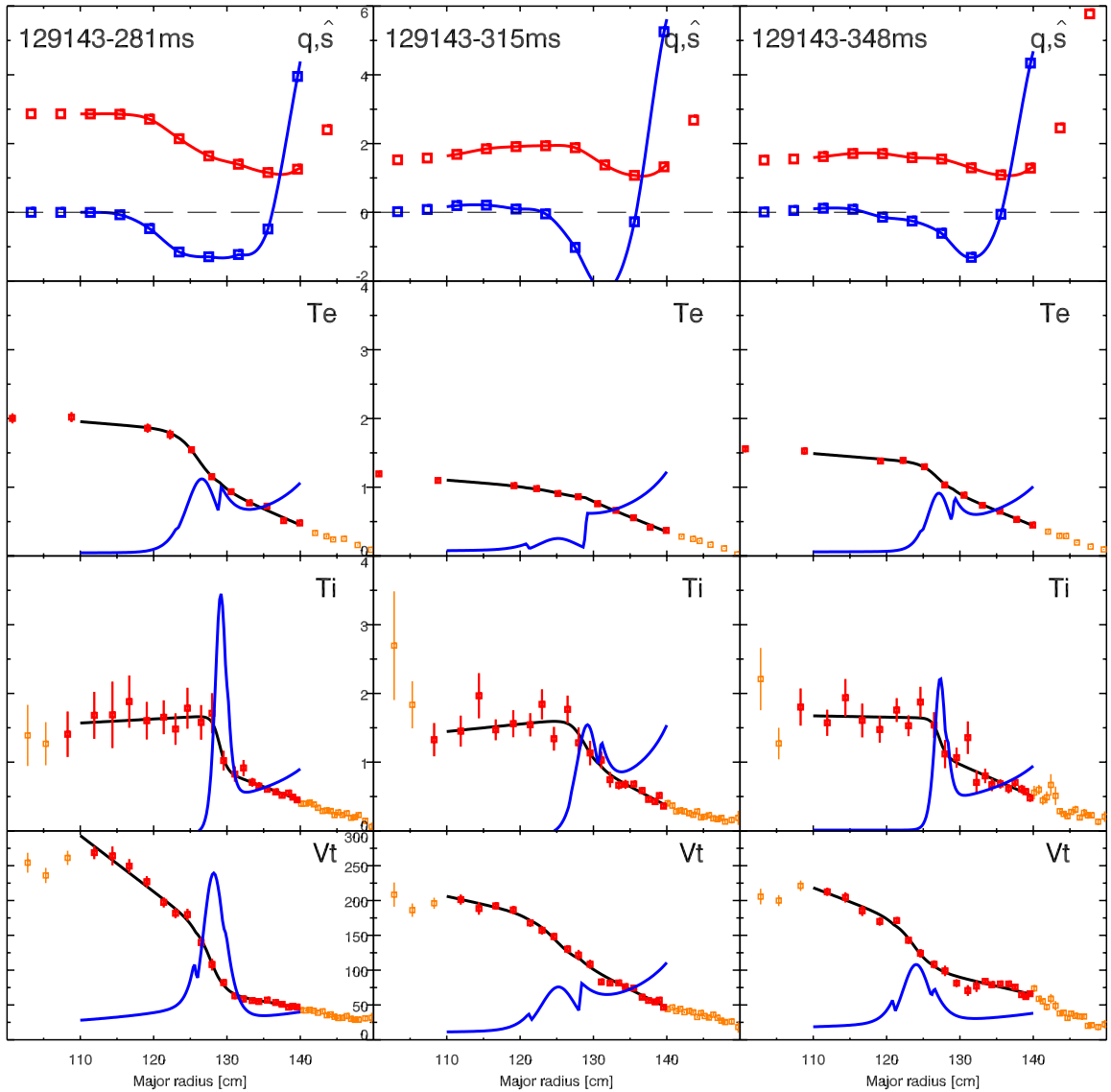
Tanh fitting for H-mode pedestals works quite well

eITB coincides with most negative shear very well

High-k measurements at 124cm, high confinement

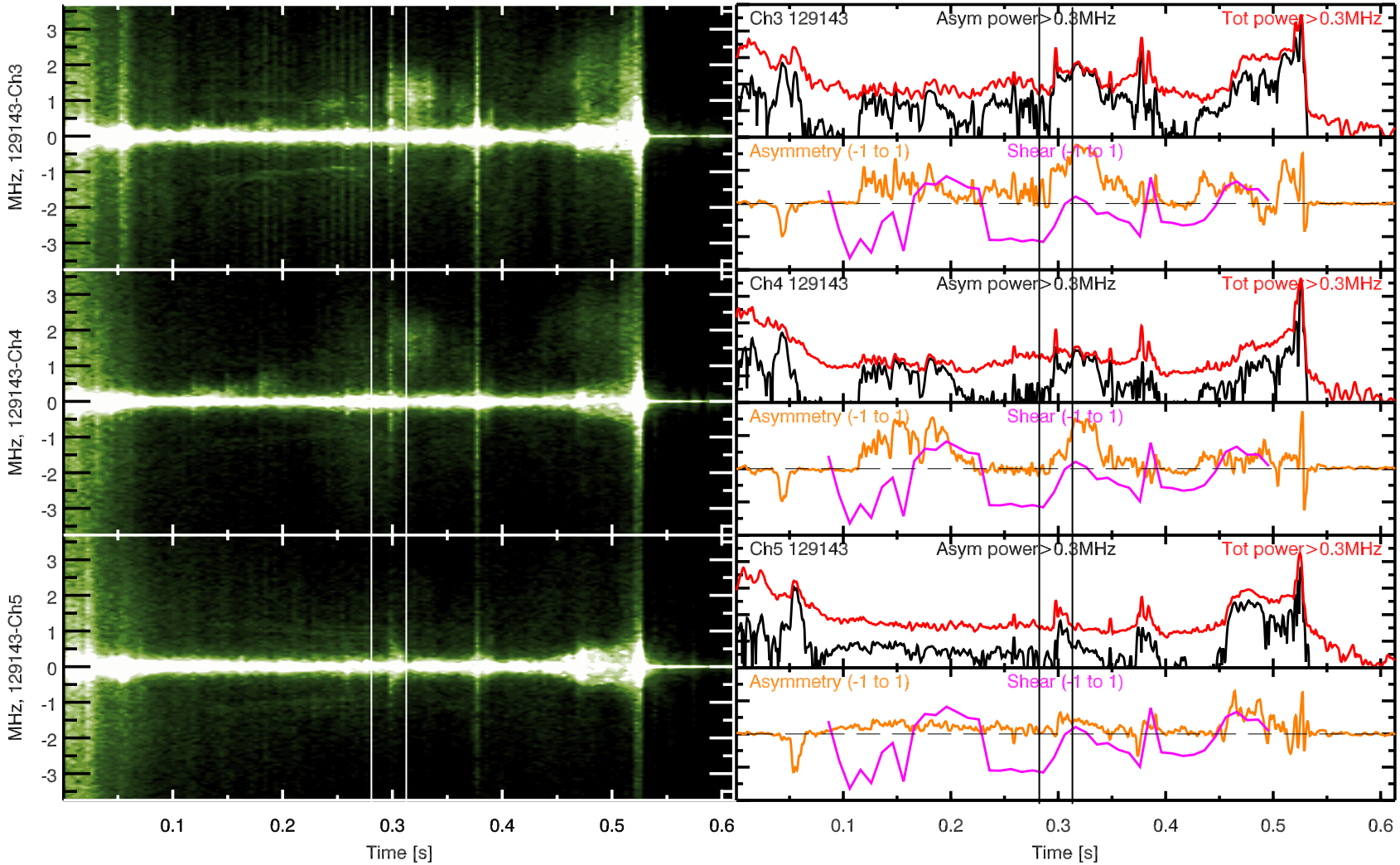


Profile data with high-k measuring at 120cm

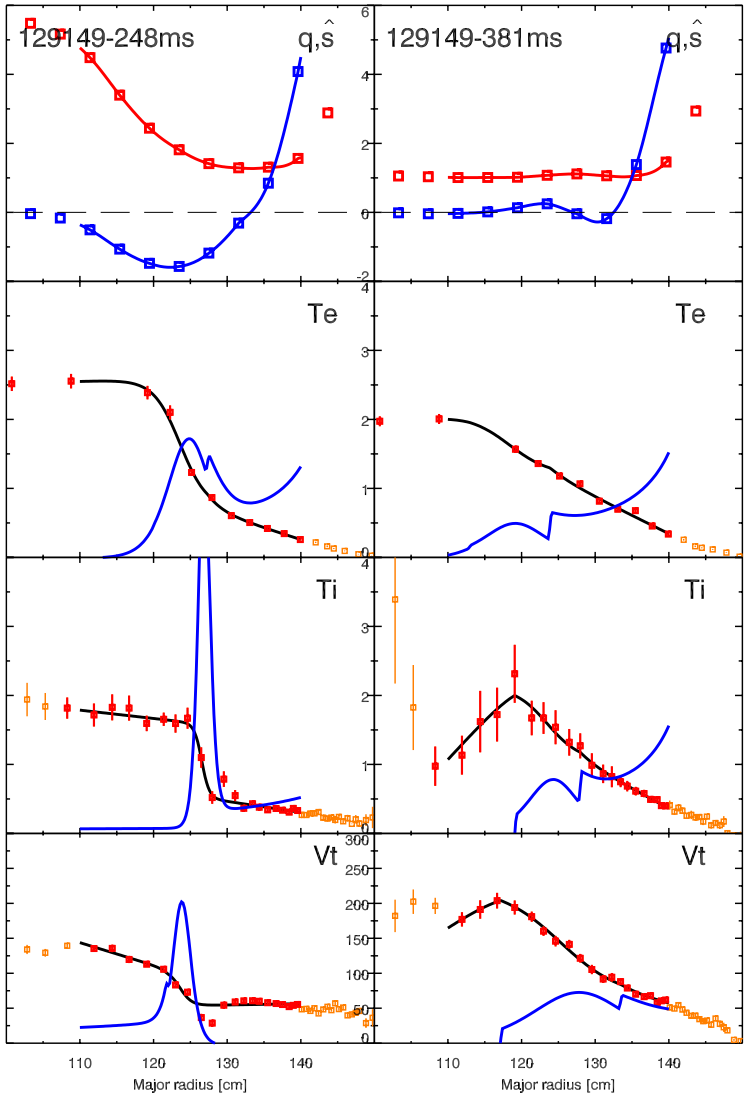


- 3 high channels at 120cm
- Can experience a variety of shear and gradient conditions
- Good location for statistical studies

High-k measurements at 120cm,varying confinement

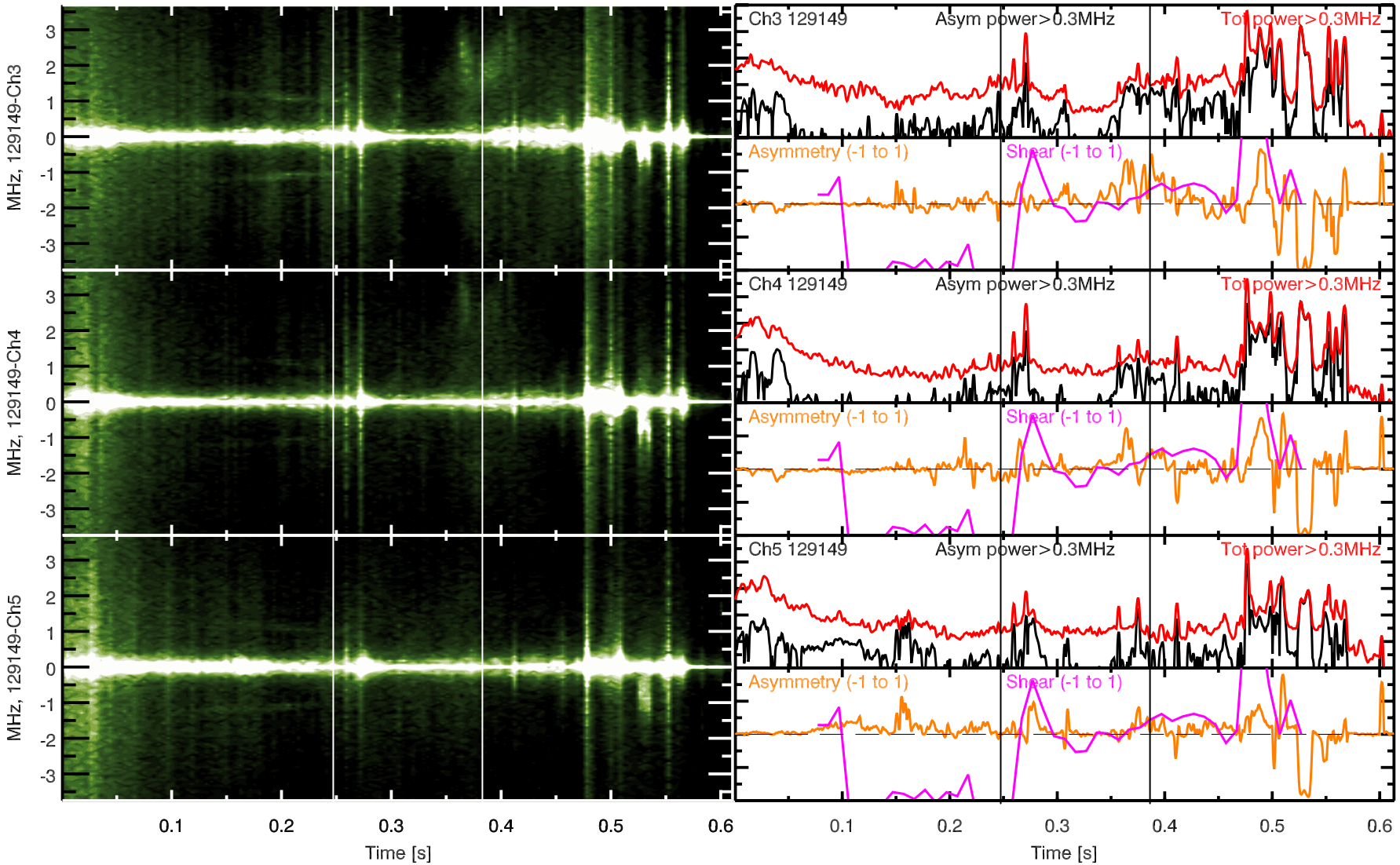


Another example at 120cm

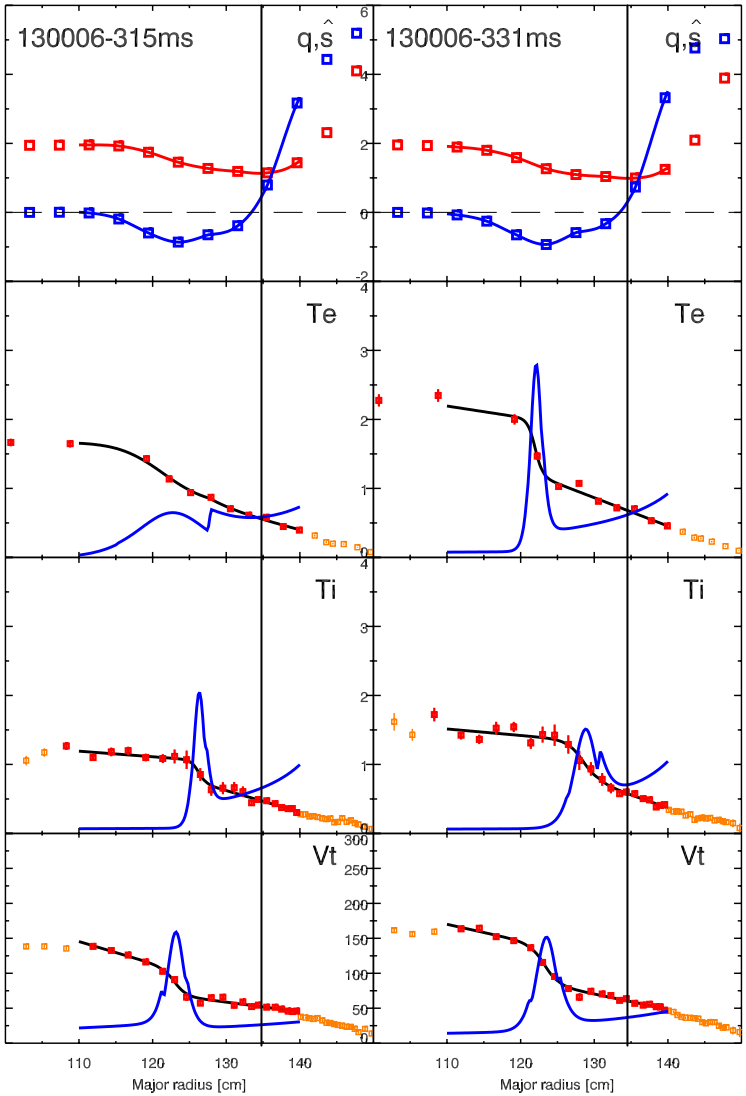


- Later timeslice has similar gradient at 120cm.
- Negative shear only in first timeslice
- High-k signal increases in later timeslice

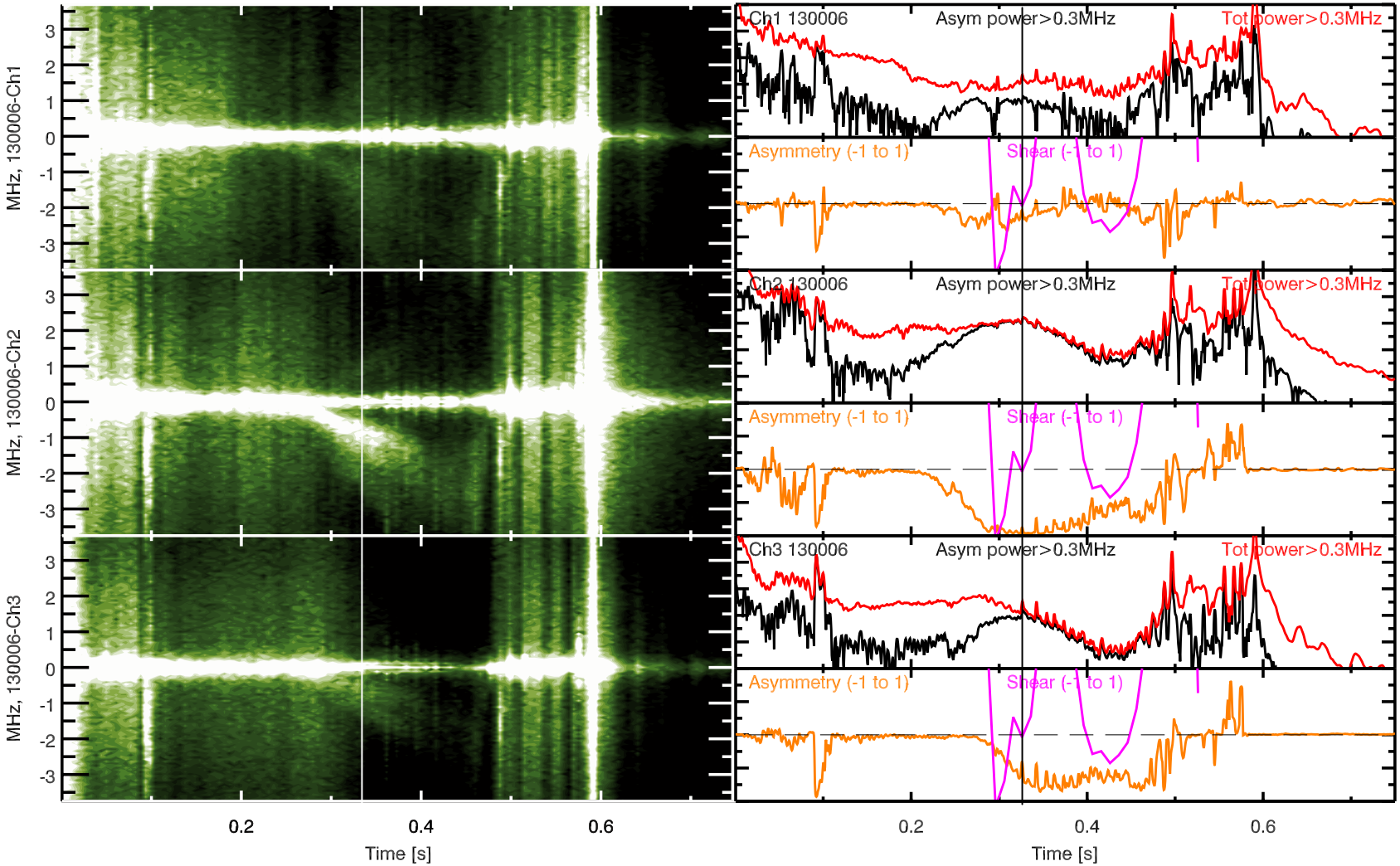
High-k fluctuations increase without negative shear



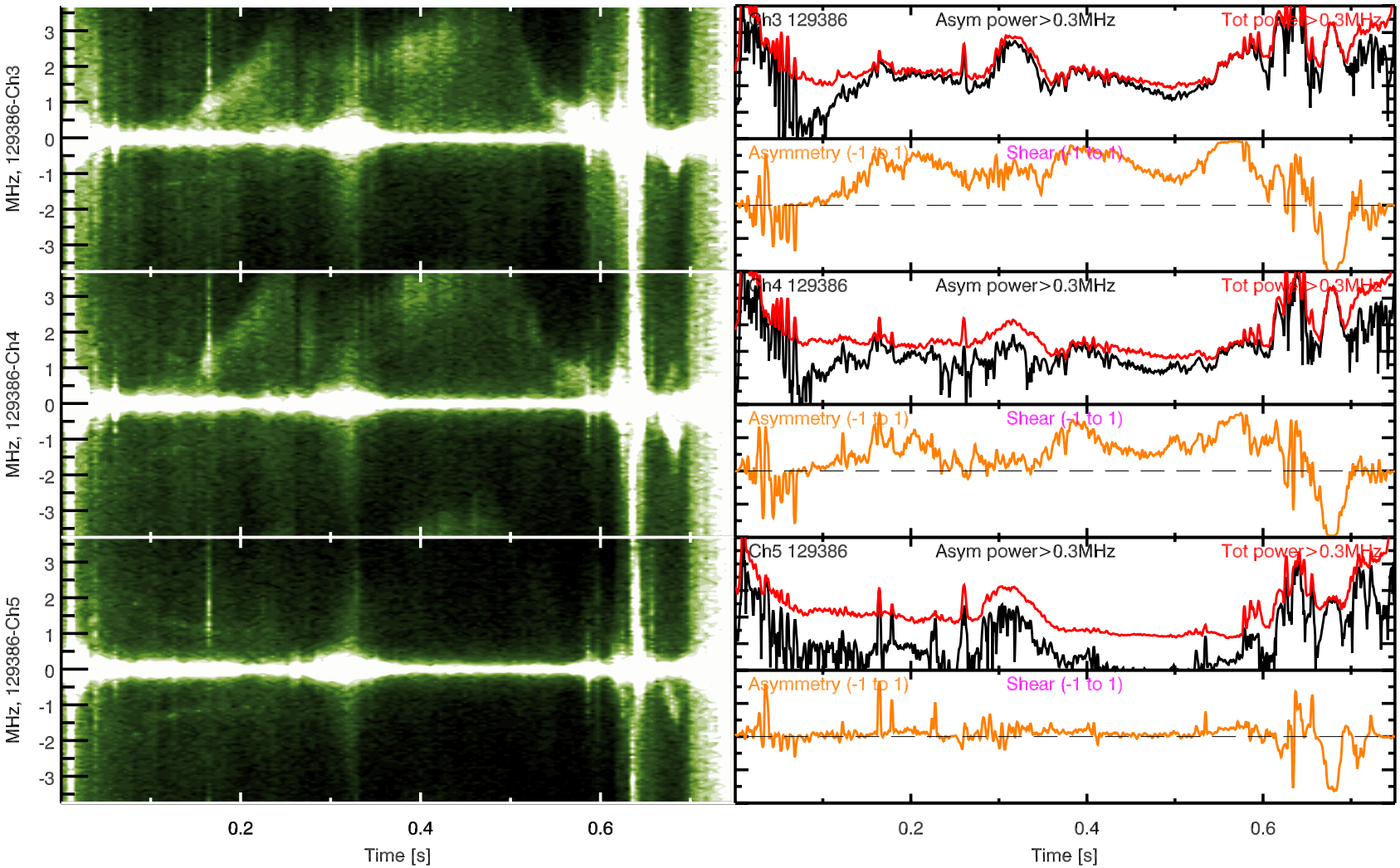
134cm is outside q_{min}, not negative shear



Strong high-k at 134cm during ITB



H-mode not RS, high-k prominent at weak gradients



Conclusions and work to be done

Results so far

- Numerous measurements of magnetic shear, high-k under a variety of conditions
- eITBs, iITBs, vITBs observed
- High-k measurements at several radii support
- Reduction of high-k fluctuations for negative shear, eITB conditions

Continuing work

- TRANSP with RF/NBI, Helium
- Linear GYRO / GS2 to confirm ETG is unstable at measured conditions
- A small number of non-linear GYRO simulations of best shots
- Use non-reconstruction methods for shear