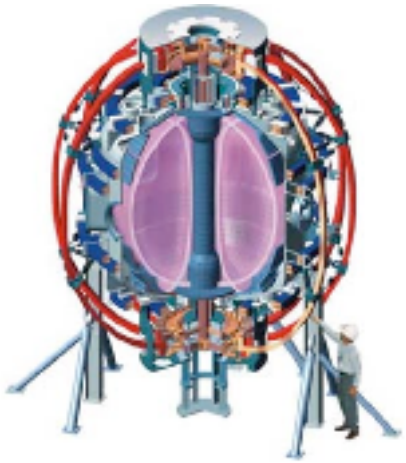


High frequency AE structure in plasma with T_e flattening

NA Crocker, ED Fredrickson, NN Gorelenkov
and many others …

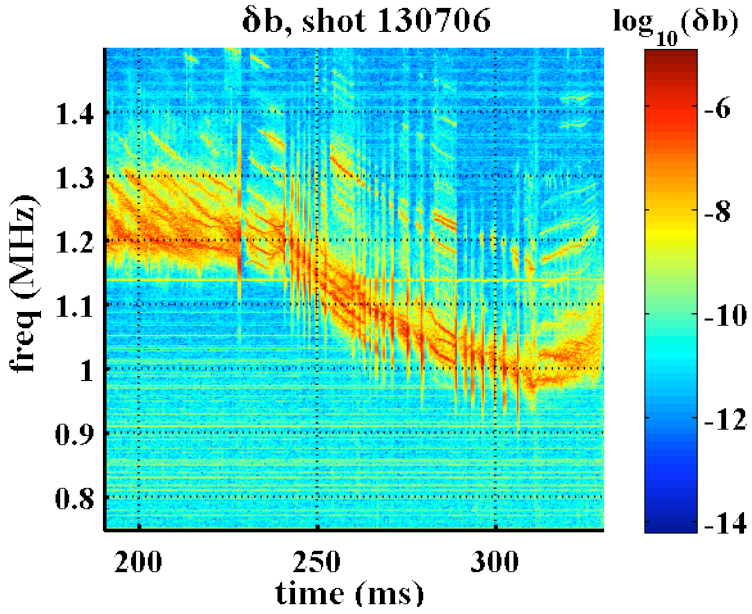
NSTX Results and Theory Review

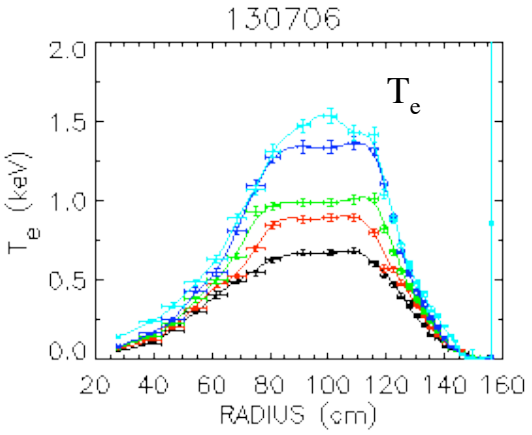
August, 2008

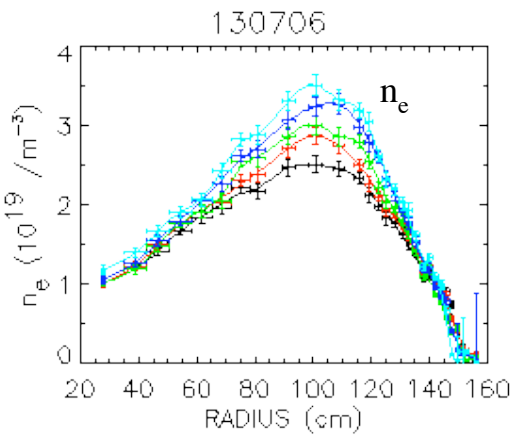
High frequency AEs observed in plasma with T_e flattening

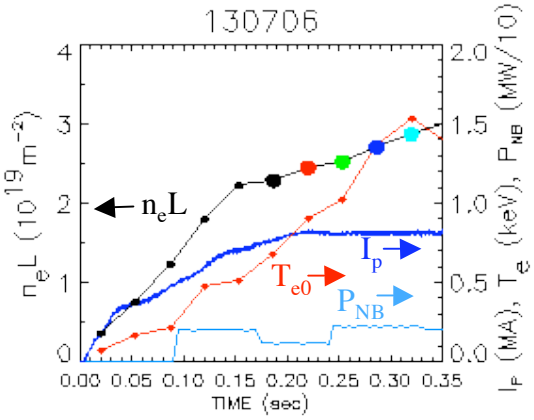
- High frequency modes (f ~ 1 MHz) observed with edge Mirnov coil
  - Beam drive plasma: modes may be GAEs or CAEs

- T_e profile flattened: Mode-induced electron transport?



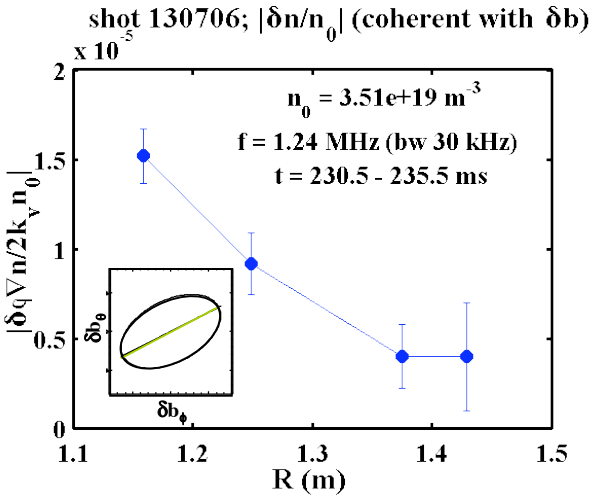


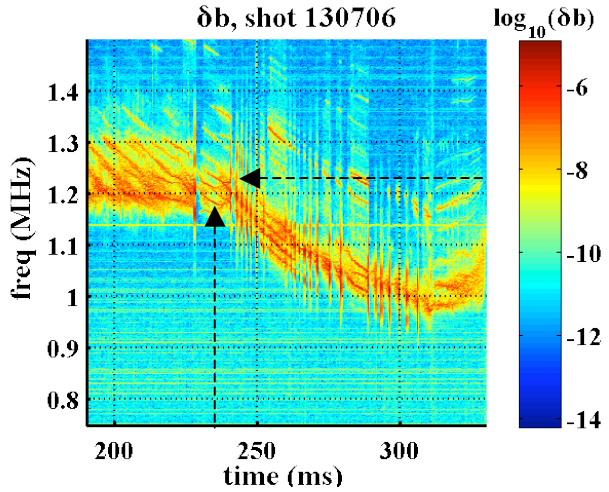


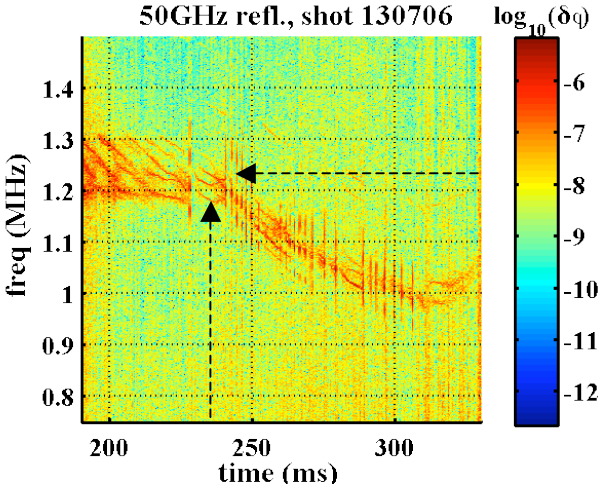


High frequency AEs are core localized

- Reflectometers show high frequency AEs: modes are core localized
- For typical mode (t = 233 ms, f = 1.24 MHz, n = 8), $\delta n/n_0 \sim 1.5\times10^{-5}$
  - modeling required for best $\delta n/n_0$; actual amplitude may be several times larger.
  - multiple simultaneous modes observed, some with δb several times larger $\Rightarrow$ total $\delta n/n_0 >> 10^{-5}$
- Typical mode is predominantly $\delta b_{||}$
  - $\delta b_\phi/B_0 \sim \delta b_\theta/B_0 \sim 10^{-6}$, $\delta b_\theta/\delta b_\phi \approx 0.7$; $\delta b \,||\, B_0$ at R = 130 cm (MSE not used)







- Mode identification (GAE or CAE) difficult: Mixed eigenmode (linear coupling)?
  - Core localized $\Rightarrow$ GAE
  - predominantly $\delta b_{||} \Rightarrow$ CAE.
  - n = 8 too high for GAE?