Ultra-high Speed GPI Measurements of the L-H transition with RF Heating

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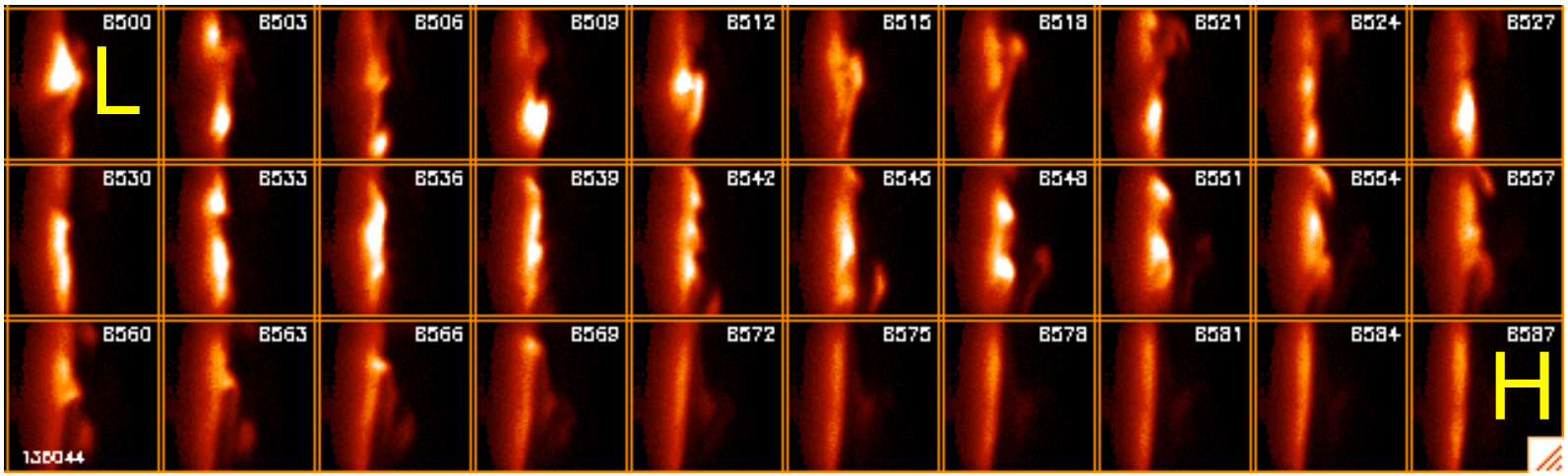
Goal: Compare edge/SOL turbulence changes during RF-driven L-H transition to those seen with NBI

Run time: ~ 1/2 day (20 shots) + piggybacks where possible

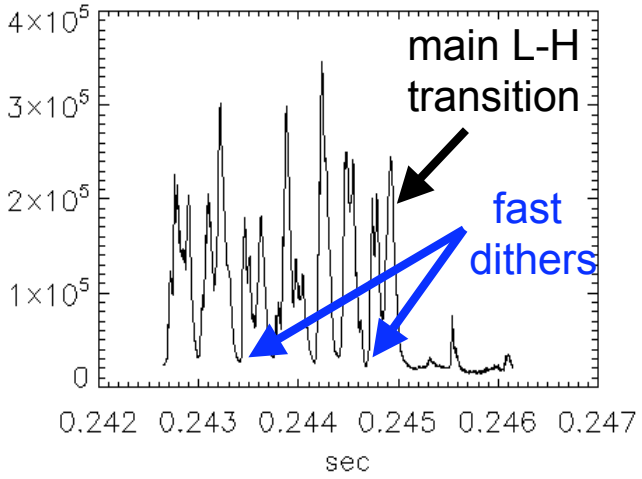
NSTX Forum 12/1/09

Results From Last Year with NBI

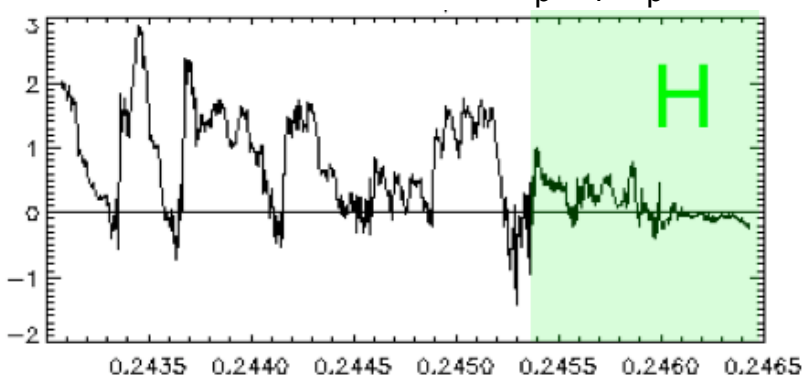


100 μs

SOL signal vs. time



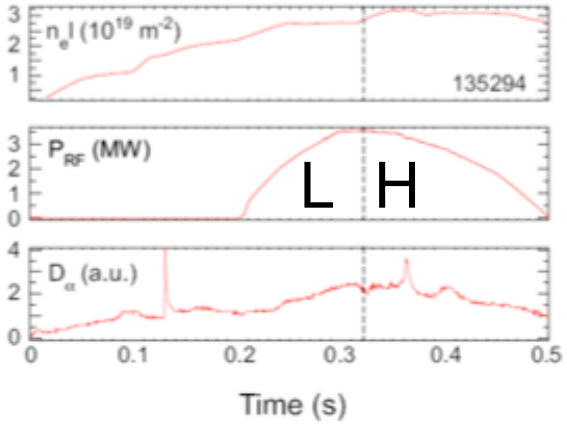
normalized shear $\nabla V_p(L_r/L_p)\tau$

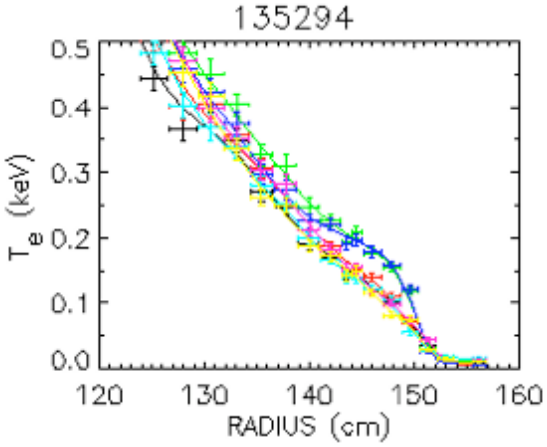


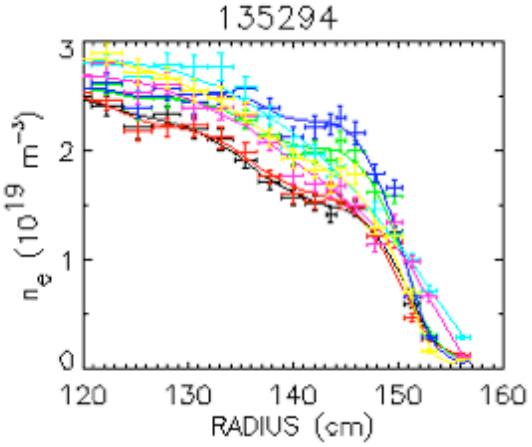
time (sec)

Plan for RF-driven L-H Transition

- Start with Stan's XP#941 #135294 (650 kA/5.4 kG)







- Change to I/B = 900 kA/4.5 kG for GPI (antenna phasing ?)
- Determine L-H power, then puff D_2 for GPI before transition
- Probably better to try with active LLD to reduce threshold ?

(w/ GPI, reflect's, FIReTip, CHERS, ERD, BES, USXR, high-k)

Data Analysis

- Compare L-H transitions seen with RF to those with NBI

  - where does L-H transition start (radially/poloidally) ?
  - how sudden/sharp is reduction in edge turbulence ?
  - pre-transition ‘fast dithers’ or shear flow changes ?
  - are there turbulence changes within pedestal ?
  - post-transition propagation of changes to core ?

  => look for evidence for mechanism of L-H transition

  => compare with existing theories of L-H transition