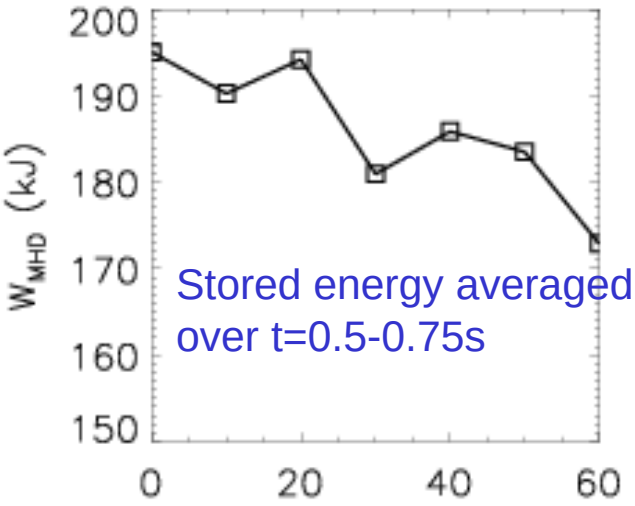
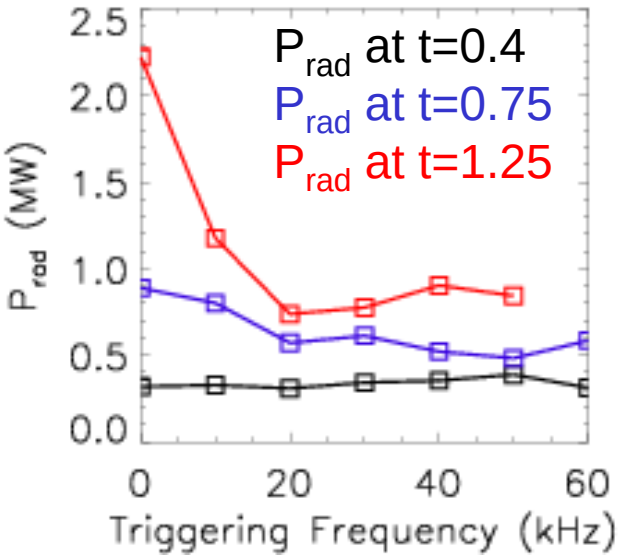
XP 943: Optimization of ELM Triggering

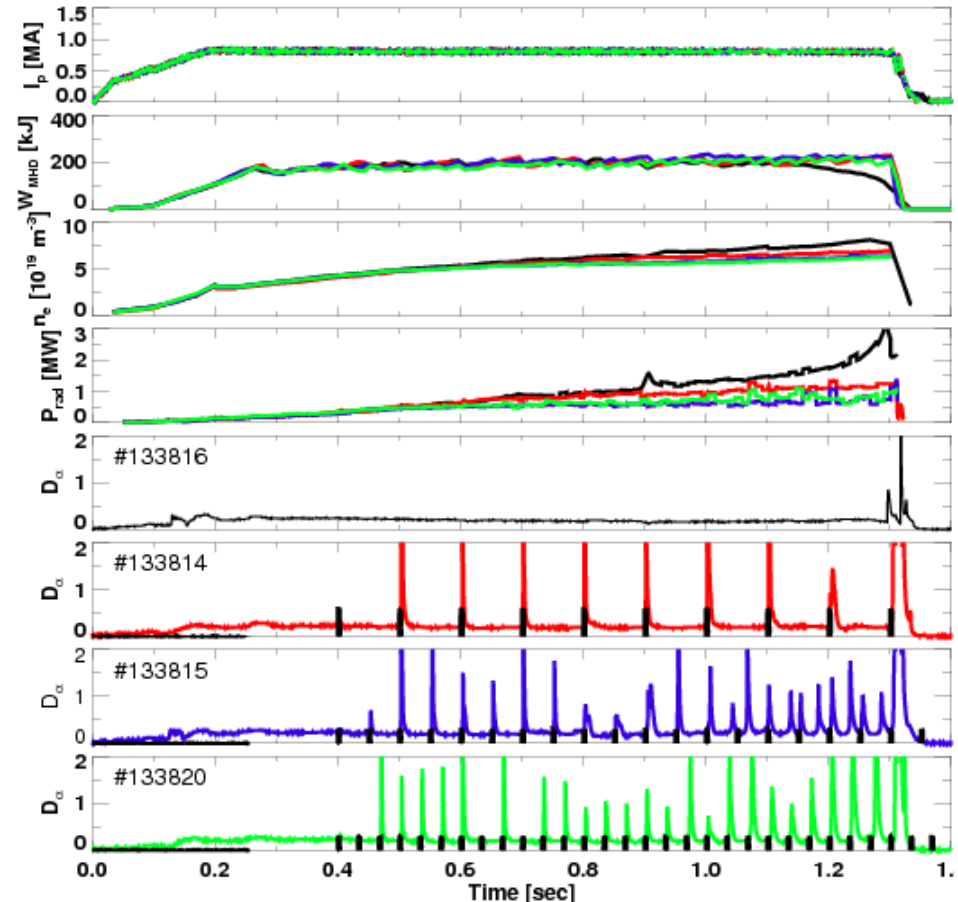
- Goal of XP: optimize for small ELMs and arrest of n_e,P_{rad} rise by varying n=3 waveform, shape, fuelling
- Plasma current reduced to 800 kA, based on smaller ELMs there last year than at 1 MA
- Controlled scan of triggering frequency at fixed shape, P_{NBI}, etc
- Need fast reconstructions for ELM size
  - Excursions in diamagnetic flux are much lower at 60 Hz
  - ELM size from two reasonably similar shots (62.5 Hz)
    - Ip=1 MA: <ΔW/W> = 9.0 % (133280)
    - Ip=0.8 MA: <ΔW/W> = 6.5 % (133813)

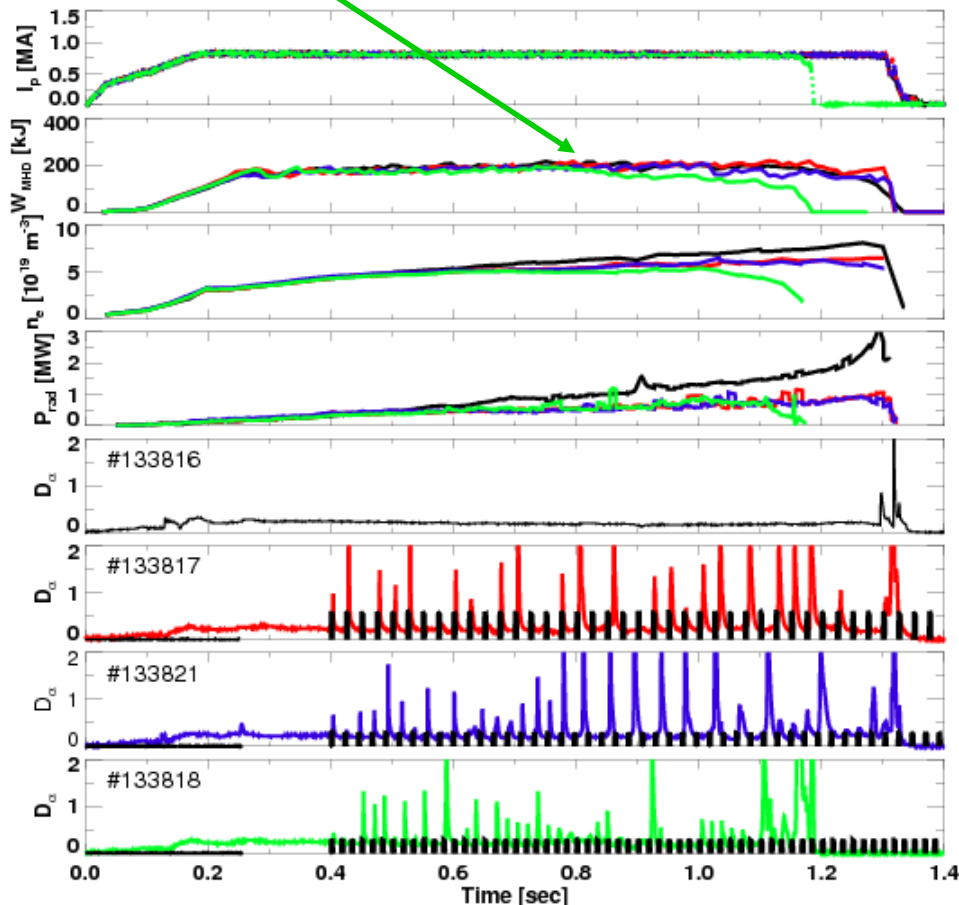




Time traces from frequency scan

Stored energy drops from 0.8s on at 60 Hz





MHD activity limits performance at high triggering rates

- Aggressive triggering led to n=1 mode towards end of discharges
  - Appeared at frequencies>40 Hz, with onset time decreasing with f
- Density increase is arrested before mode
  - Red curves at right: SGI fueling