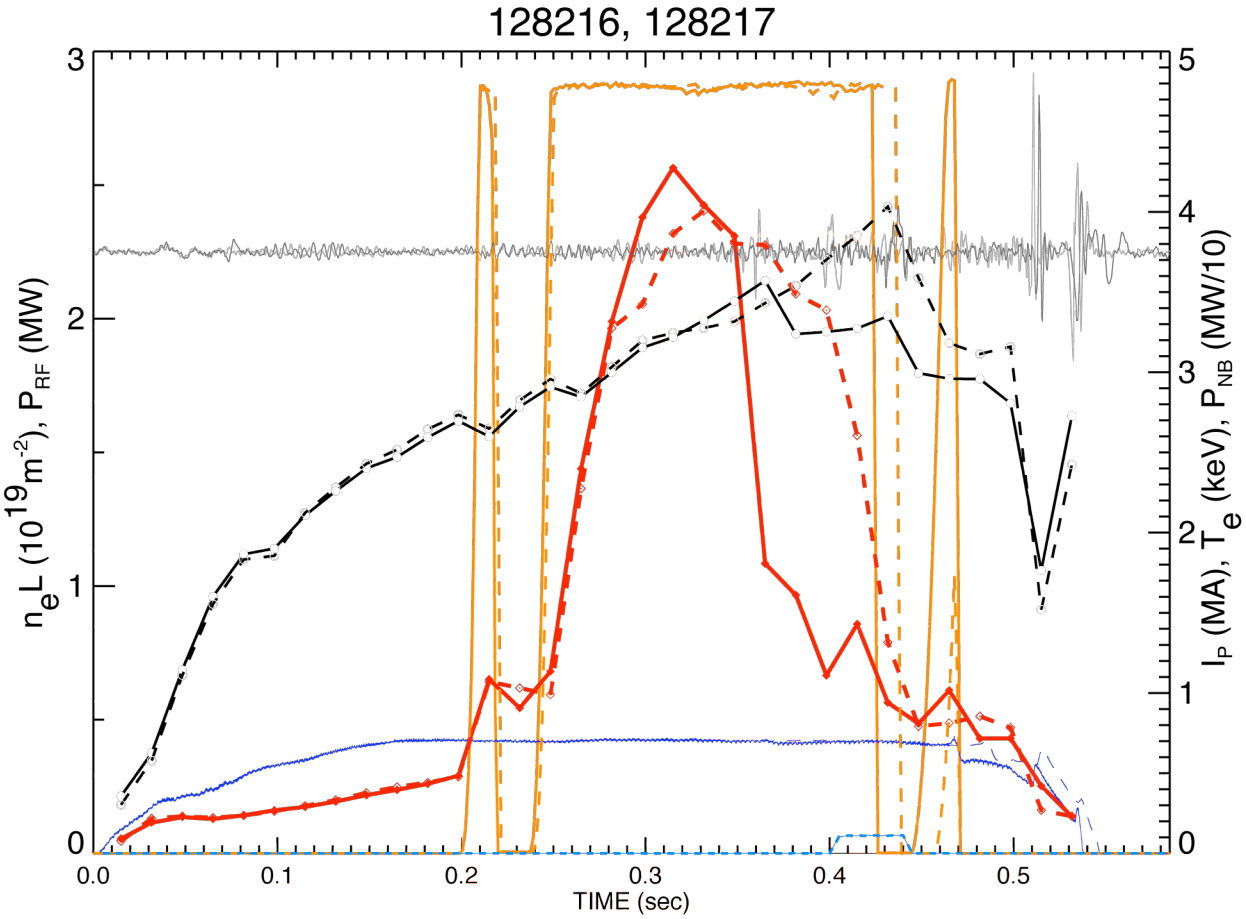
Summary of April HHFW results

Outline:

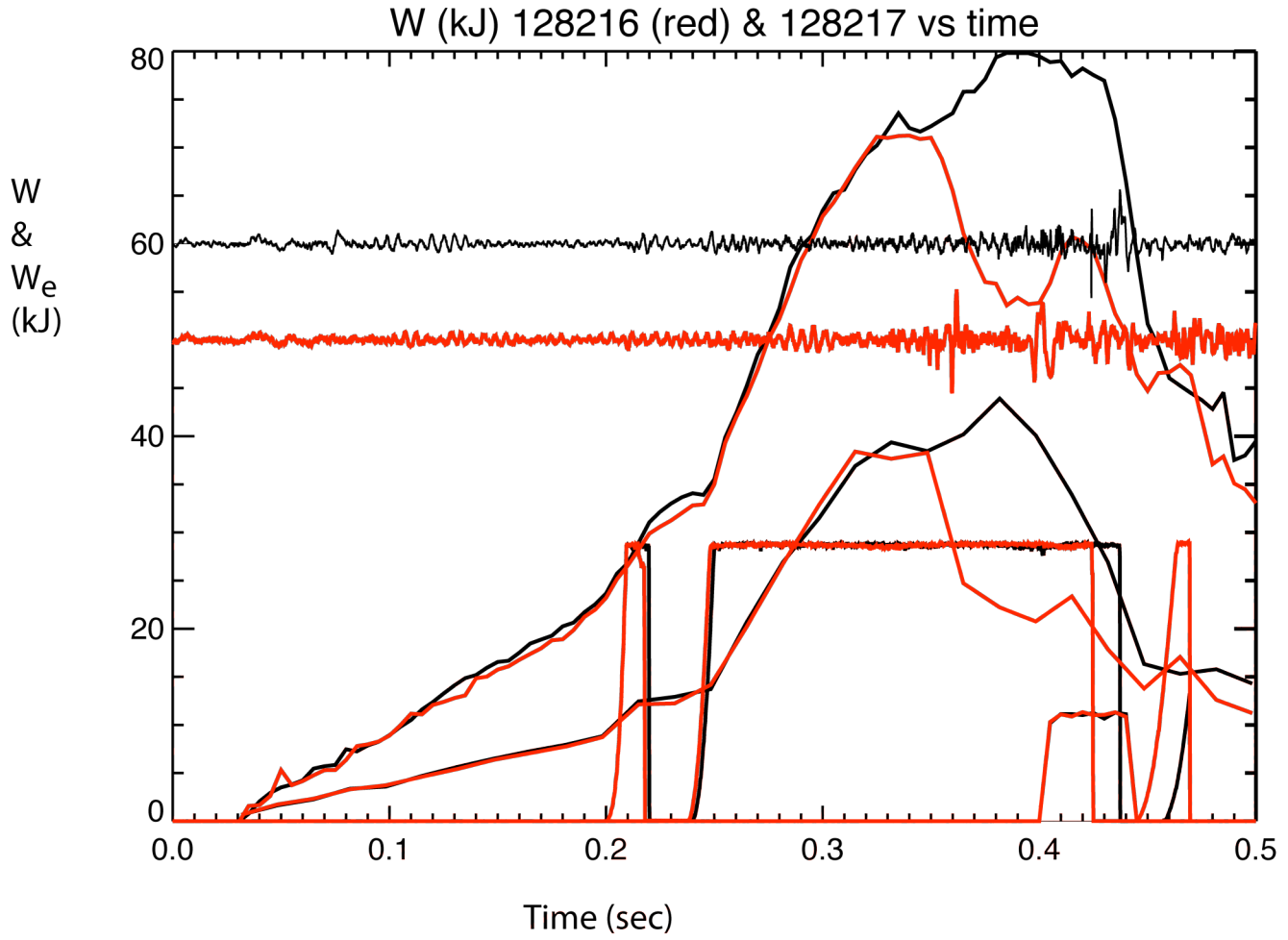
- April 2 Mazzucato high k run in helium
  - 4 keV results … importance of instability, edge density
- April 3 Ryan/Hosea deuterium L mode scans
  - W & W_e vs time, phase
- April 3 Steep T_e gradients in D_2 for high k scattering study
- April 1 Coupling to H mode in D_2 versus NB voltage

Helium April 2 (Mazzucato XP821)

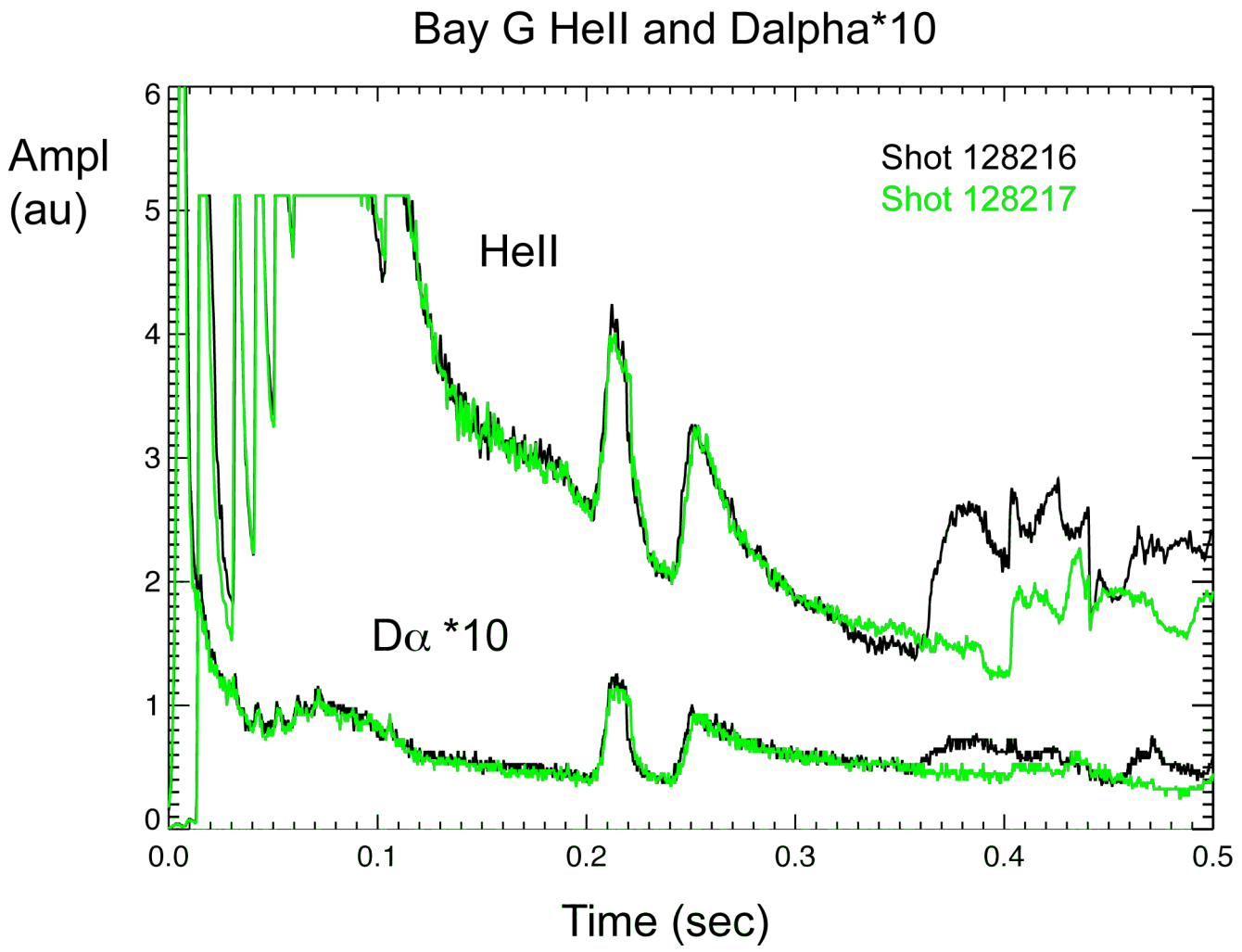


- 4 keV achieved on two shots
- Instability apparently causes fall-off of $T_e(0)$

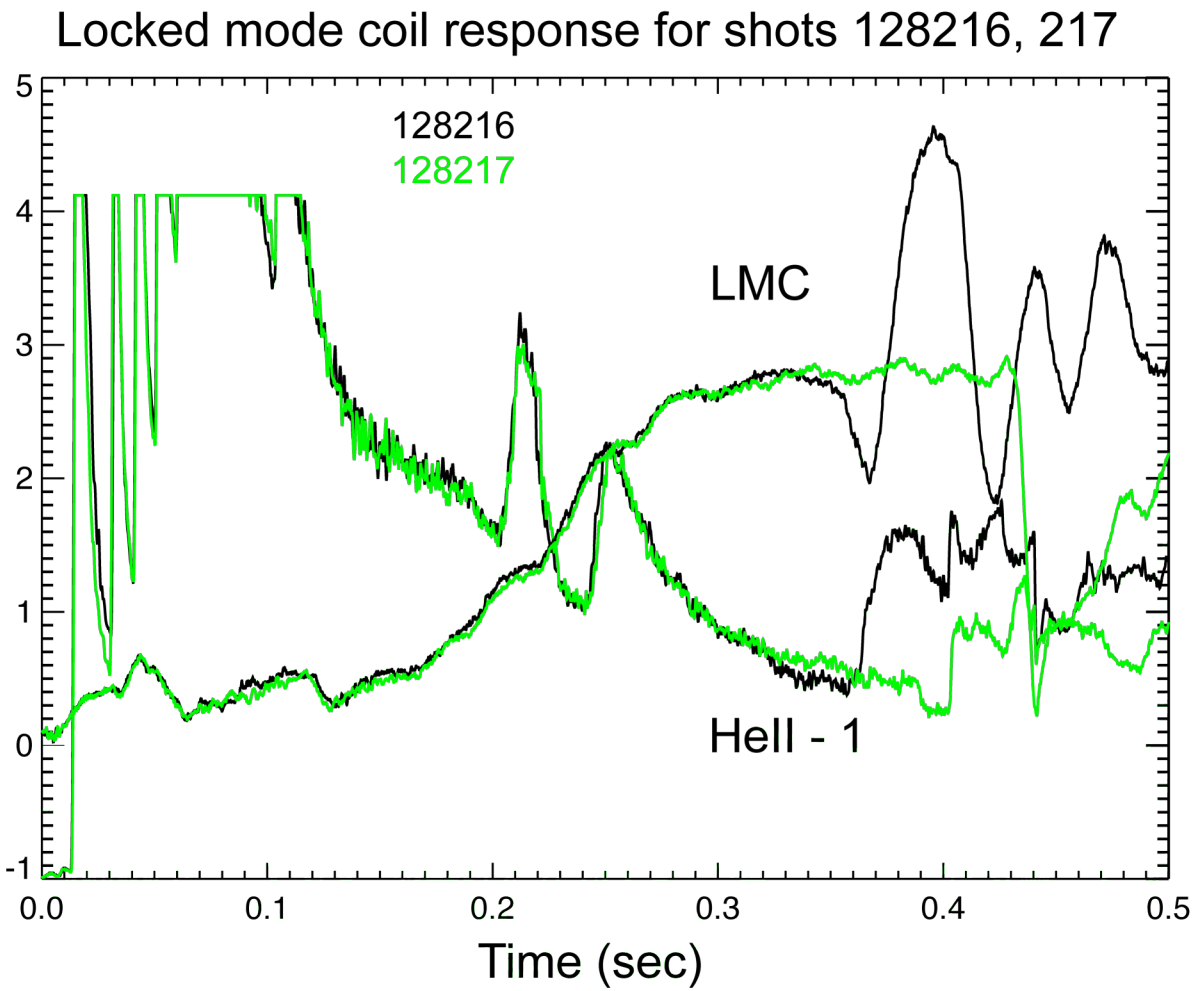
Stored energy shows dramatic fall-off at instability



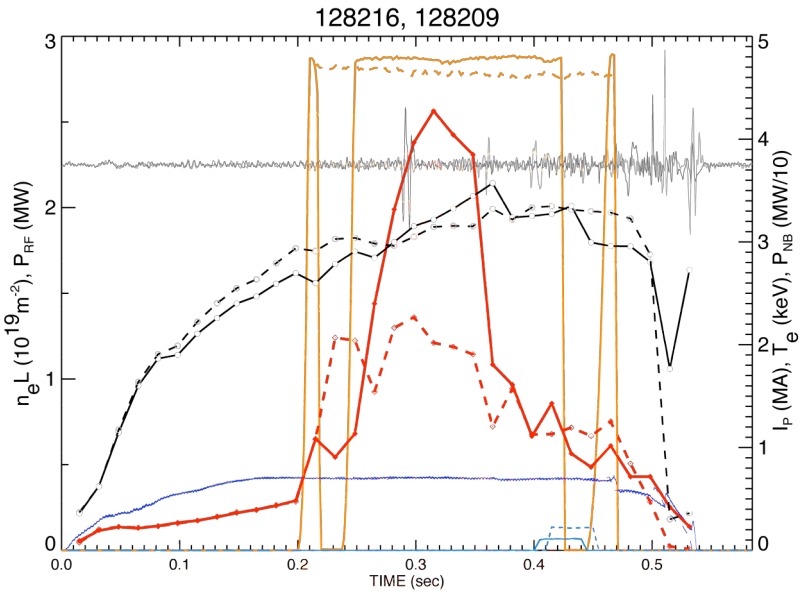
Edge helium light indicates large increase in edge density at instability

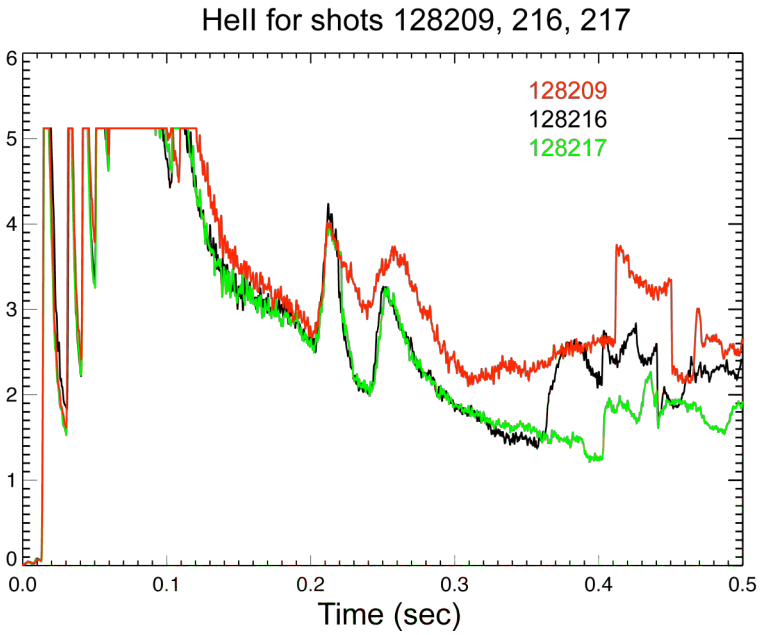


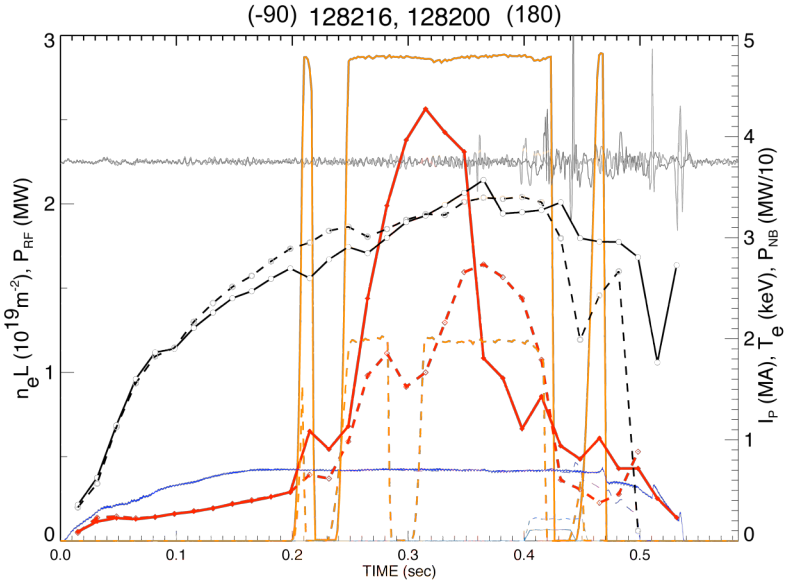
Locked mode signal reacts strongly at instability

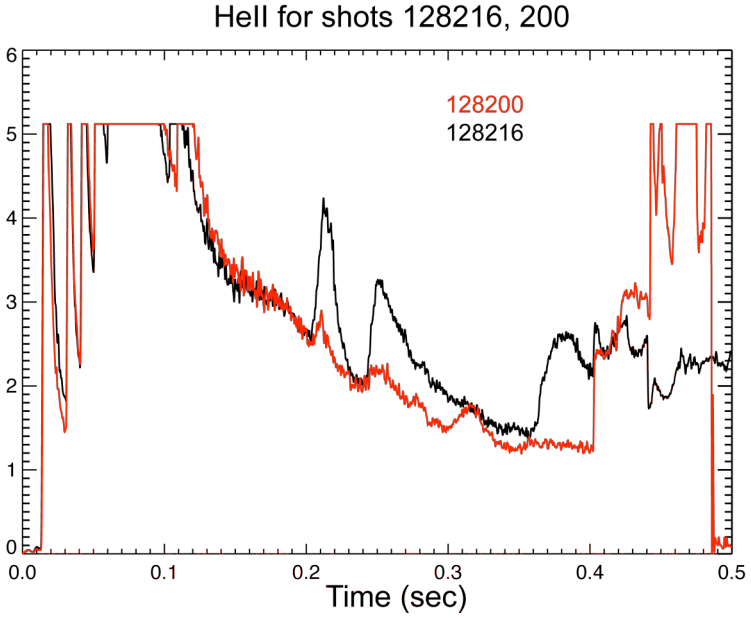


High edge helium II associated with less heating



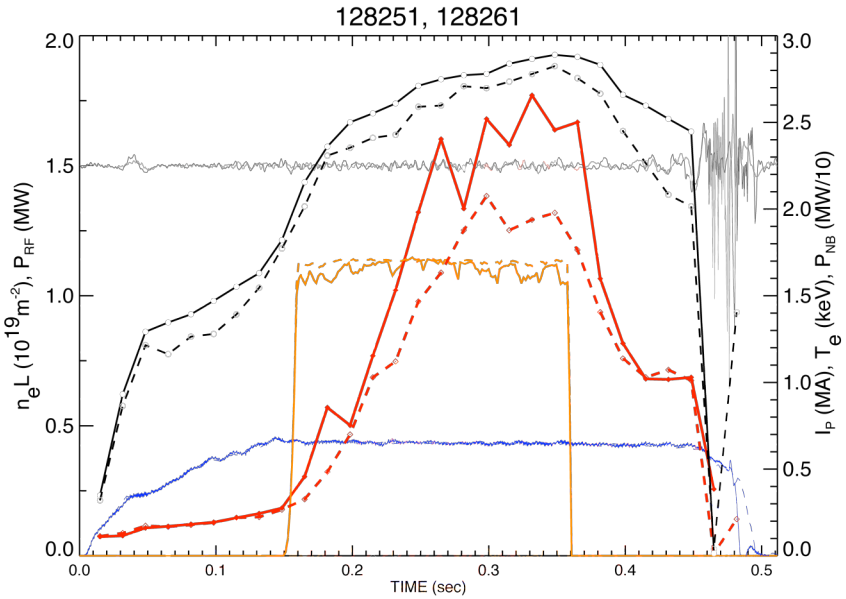


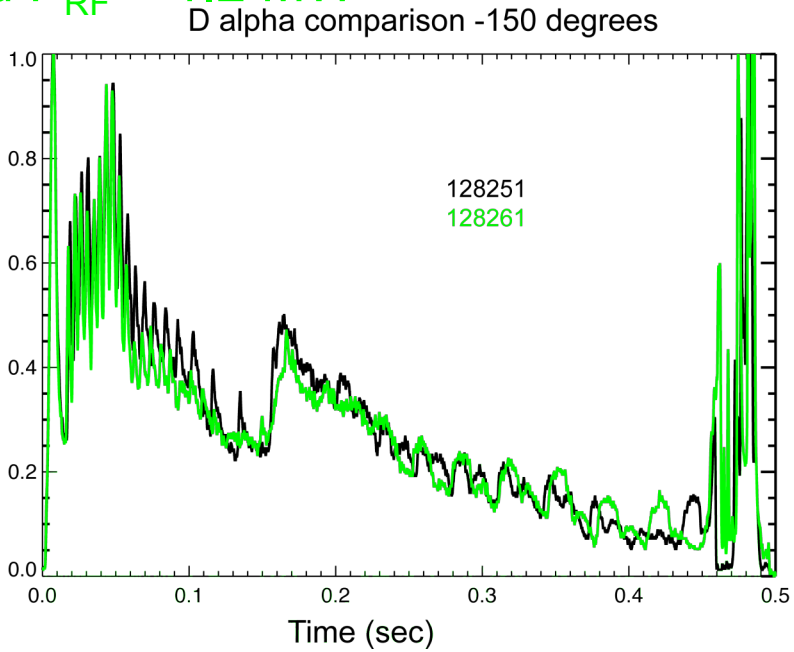


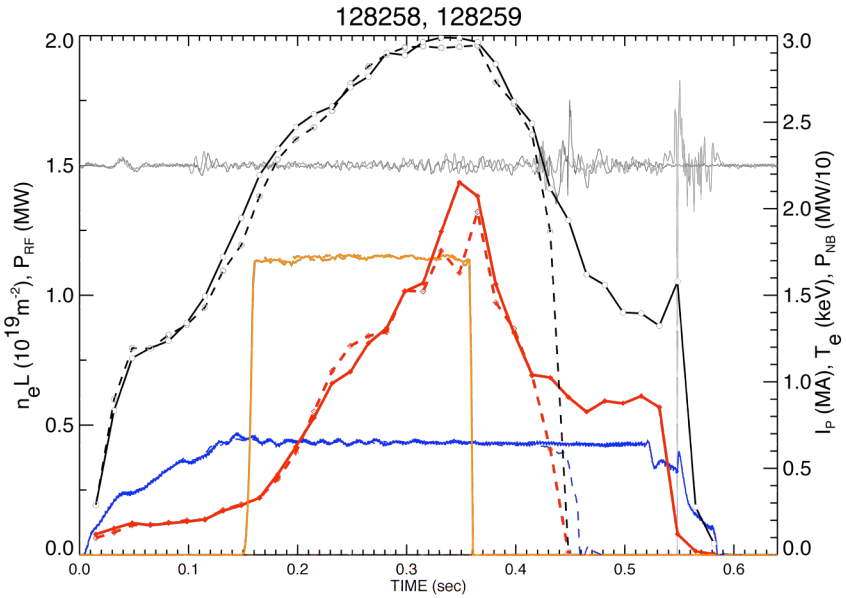


Deuterium April 3 (Ryan/Hosea XP817)

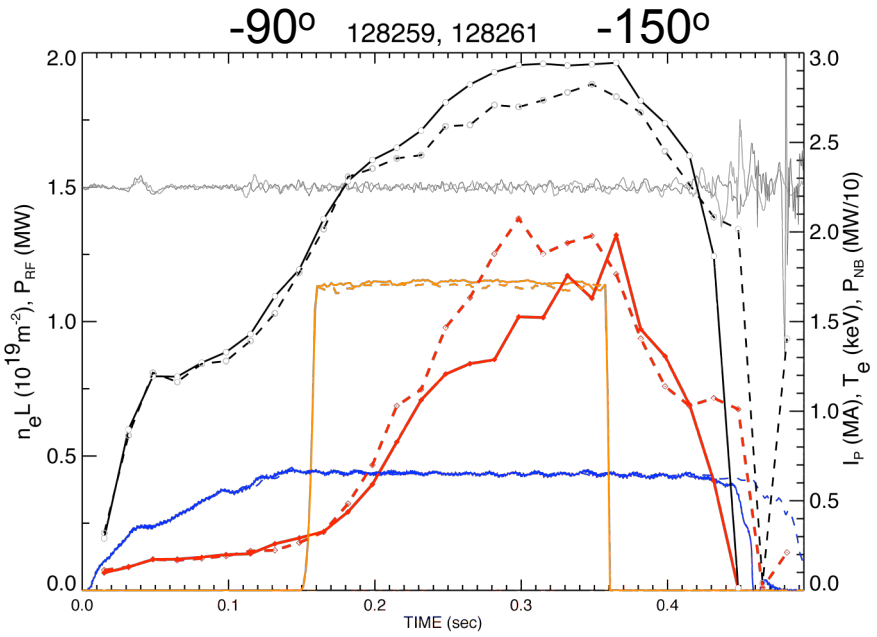
Two shots at -150° and P_{RF} = 1.2 MW

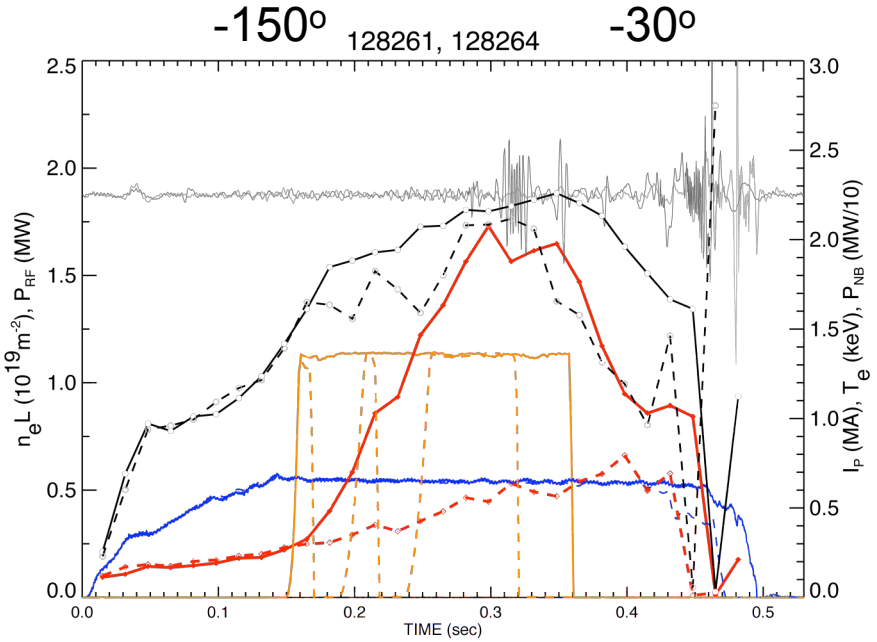




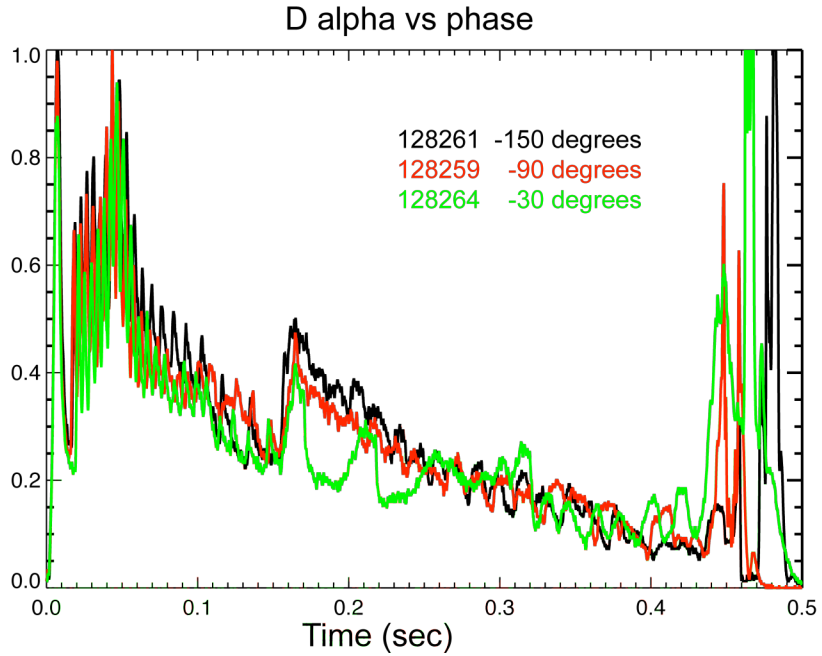


Two shots at -90° and P_{RF} = 1.2 MW



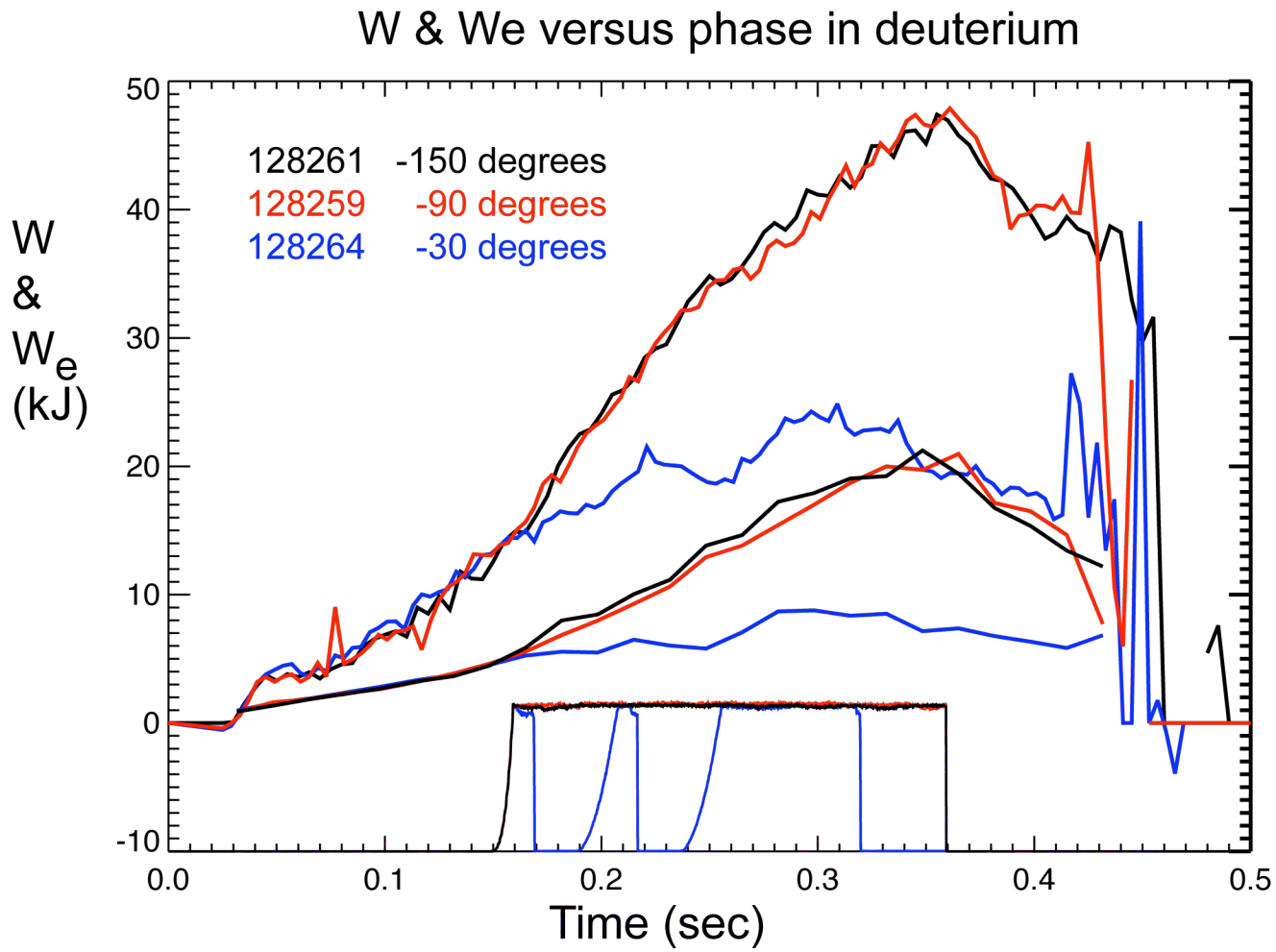


- Heating at -90º approaching that at -150º
- Very little heating at -30º



- D alpha similar for three phases
- Suggests linear ramp in $T_e(0)$ at -90º is due to gradual density decrease at edge

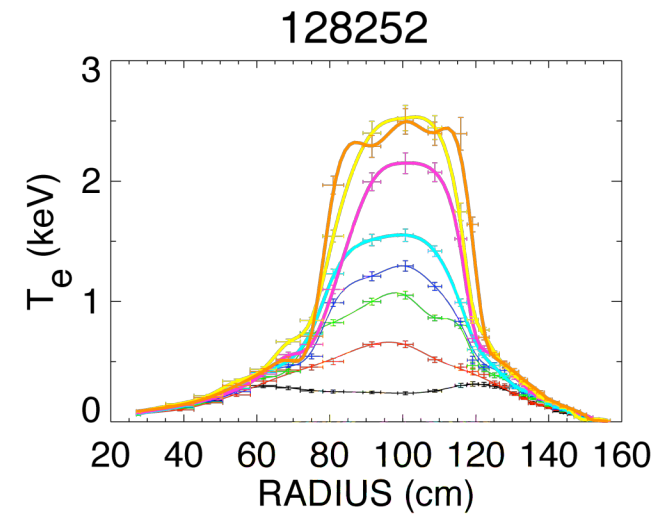
Heating at -90° comparable to that at -150° - heating at -30° much lower

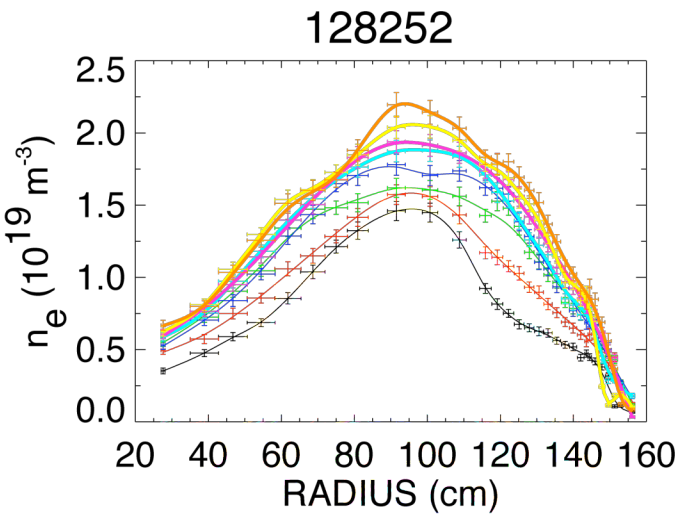


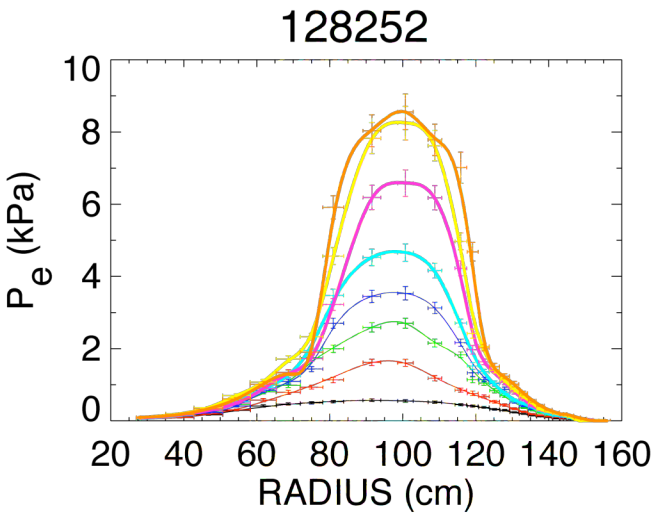
- Edge density held low enough for good penetration
  - T_e and n_e must differ during rise of energy
- Need higher power scan and longer pulse at - 30°

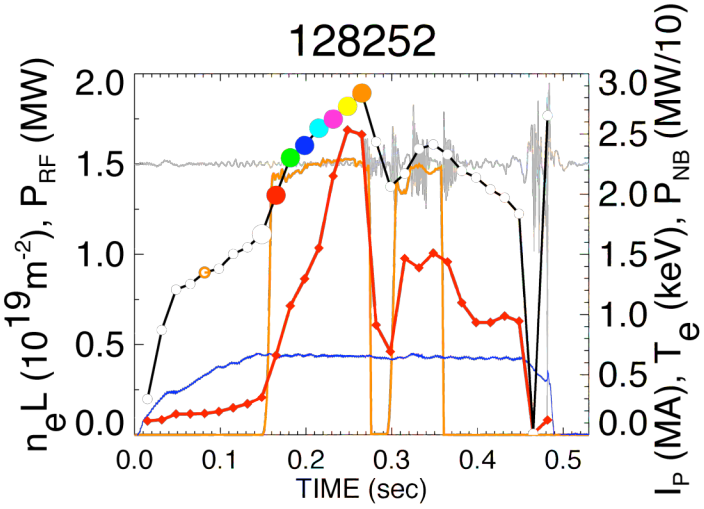
April 3 Steep T_e gradients for high k study in D_2

P_{RF} = 1.5 MW, ϕ = -150°



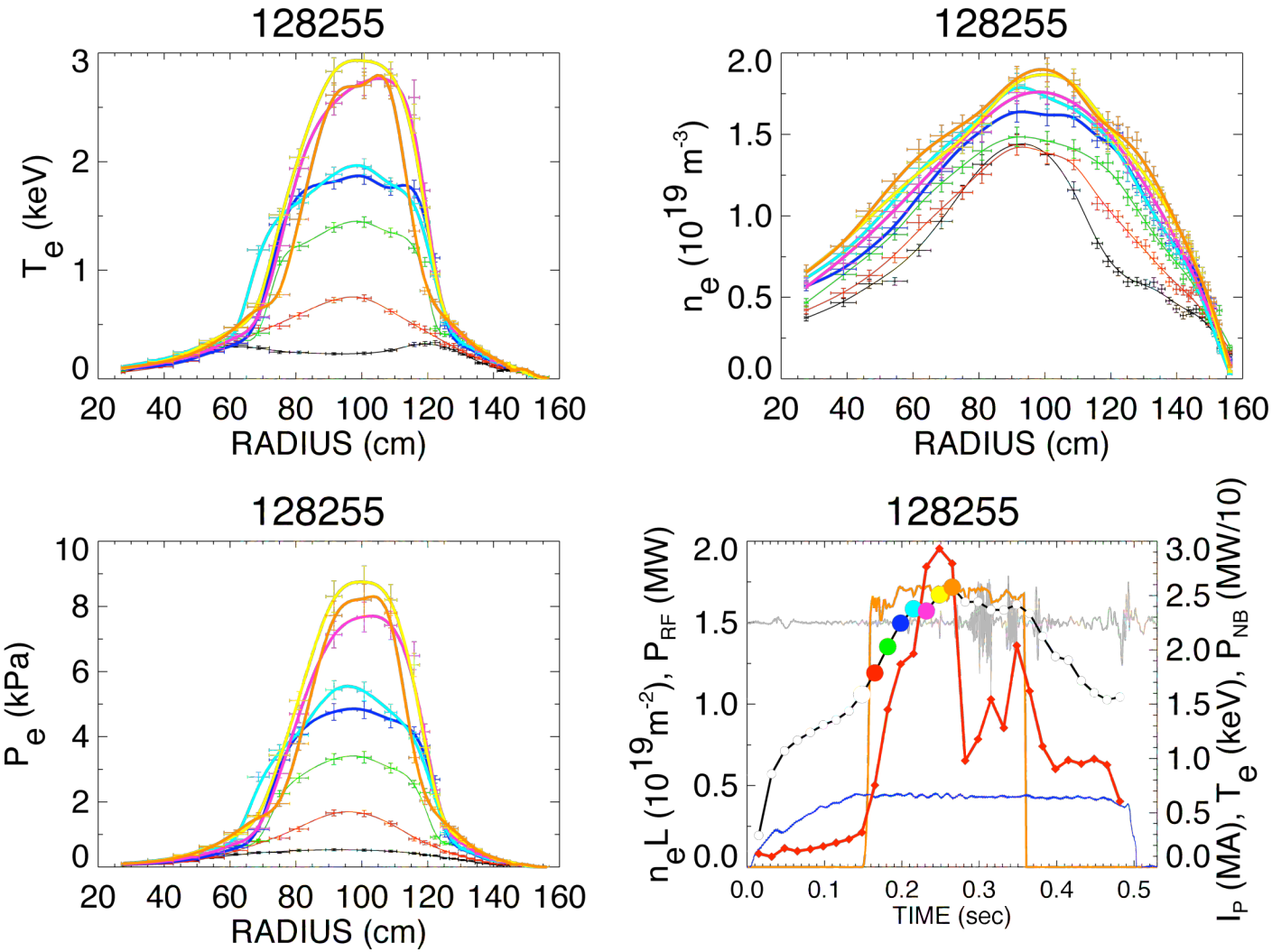






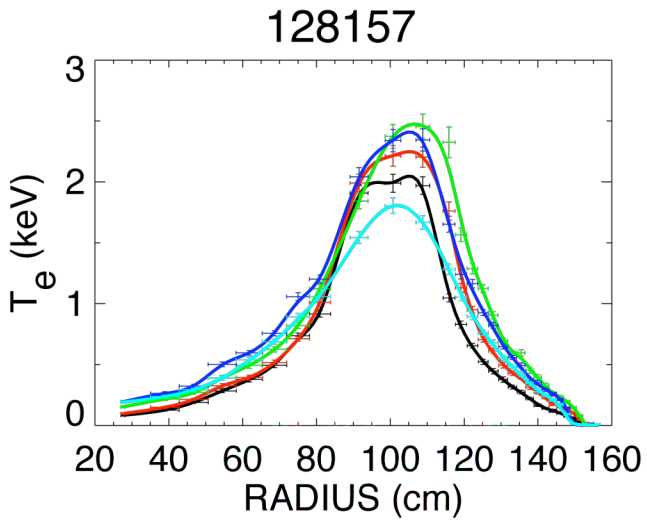
April 3 Steep T_e gradients for high k study in D_2 (continued)

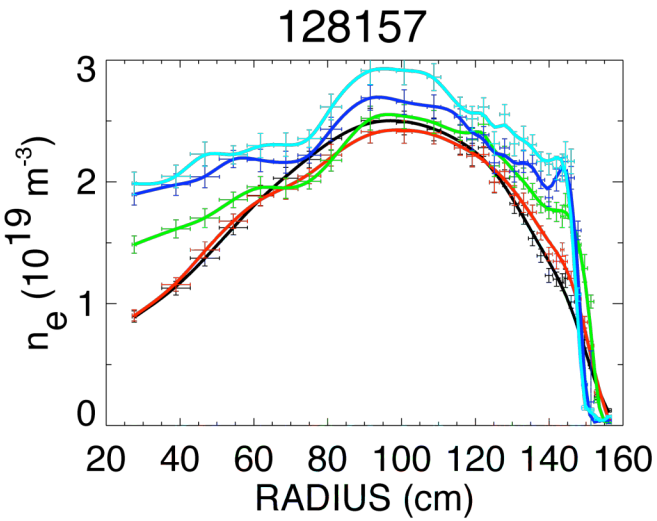
P_{RF} = 1.7 MW, ϕ = -150°

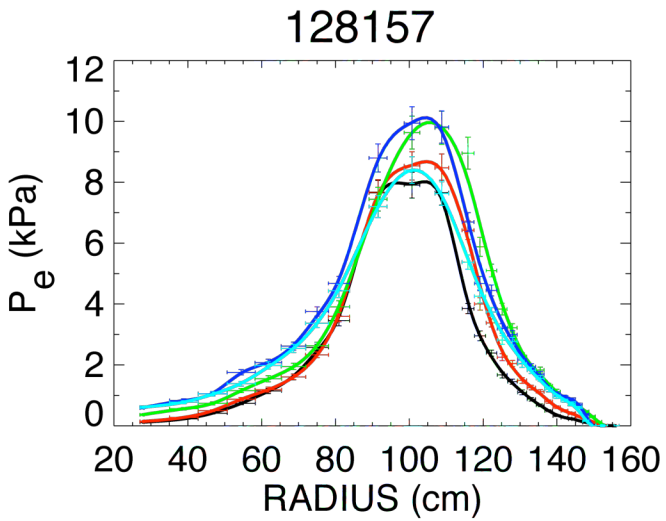


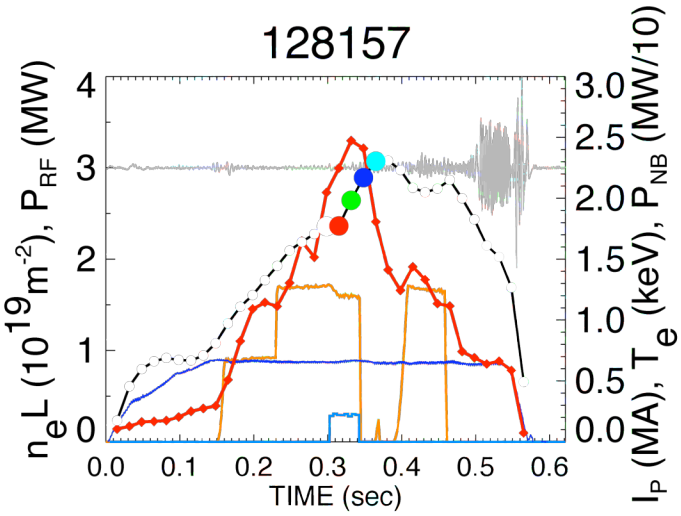
April 1 Coupling to H mode - 90 kV beam

H mode with 90 kV neutral beam

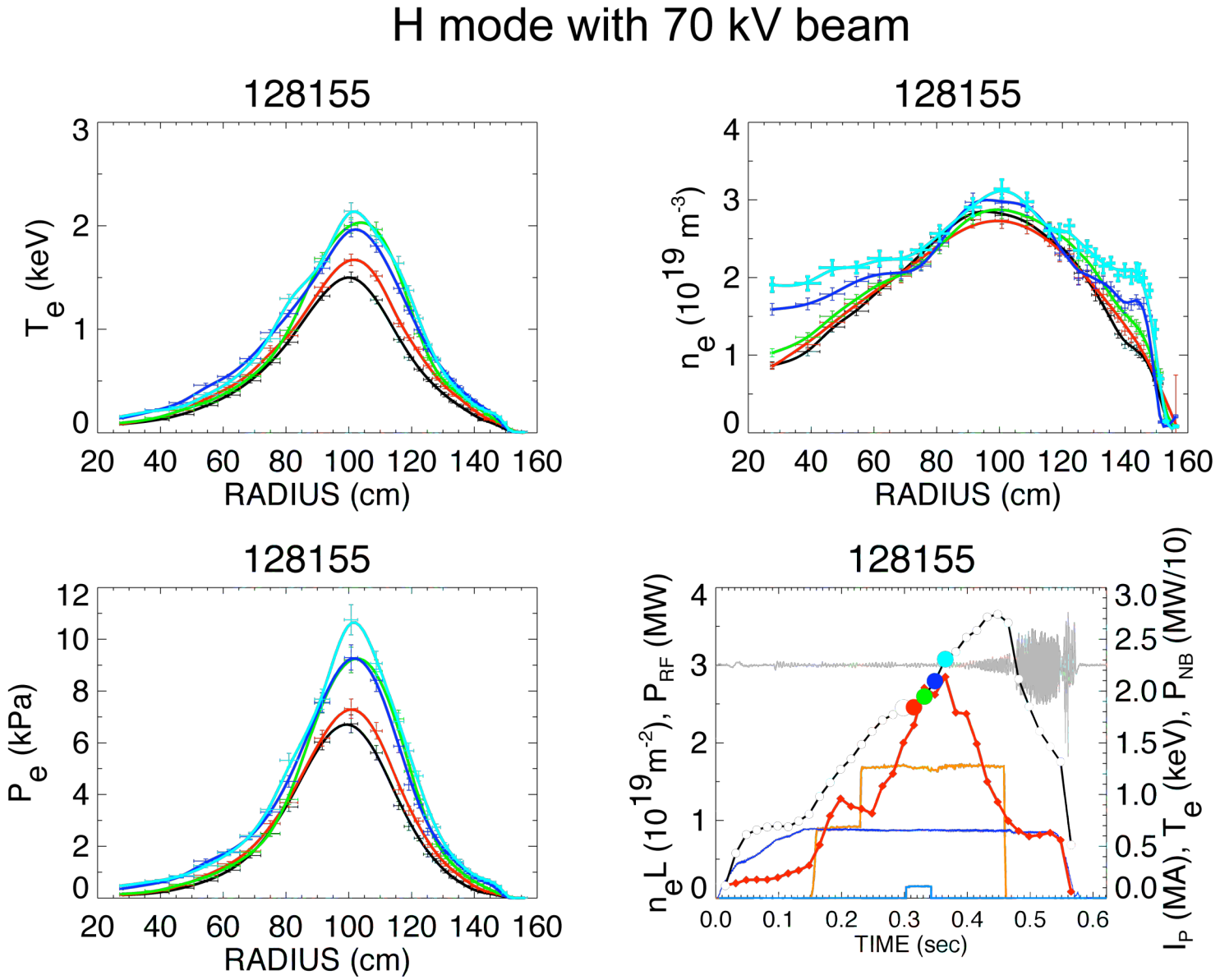




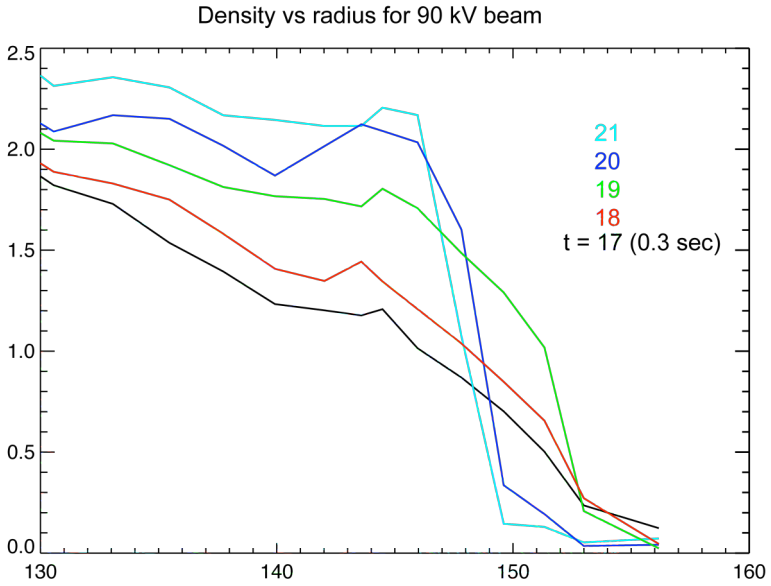


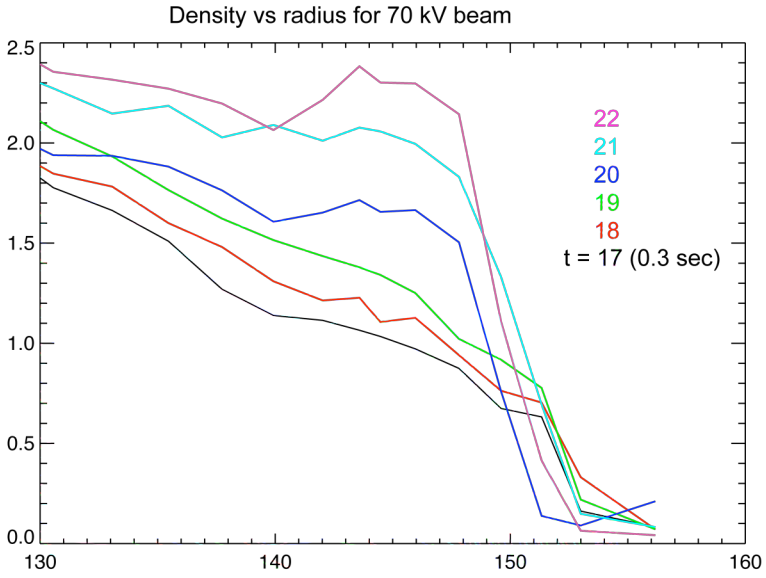


April 1 Coupling to H mode - 70 kV beam



Edge density appears to be pushed away more for higher beam voltage





- Caused by reaction of plasma control to beam?
- Do we need to increase edge density in H mode?