Hosea_June 4: XMP026 and XP825

XMP026: Conditioning in deuterium

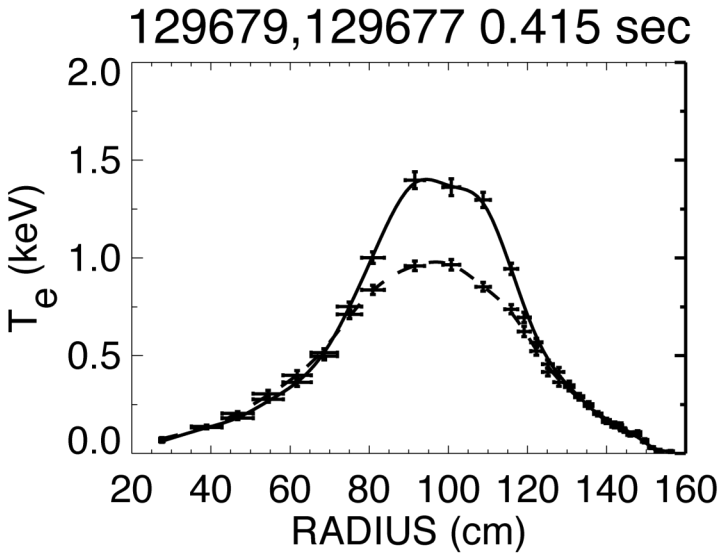
- Conditioned antennas up to 3 MW in deuterium.
  - heating deteriorated at -90 and -150 deg during morning consistent with an observed increase in edge density shot to shot. Pumping without NB was insufficient to keep edge density low.
  - heating was not evident at all at - 30 deg.
  - increasing the outer plasma-antenna gap did not reduce the edge density or improve the heating. Putting in lithium at a 5 mg/min rate for a few shots did not affect edge density as well.

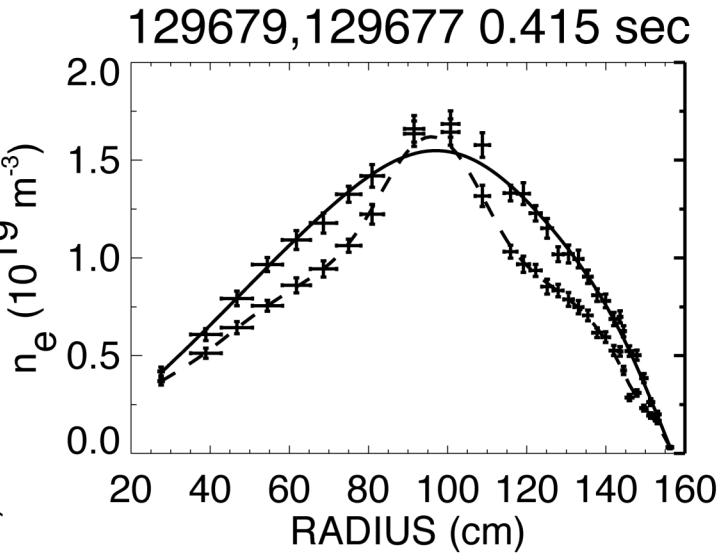
XP825: Heating for deuterium L-mode vs phase

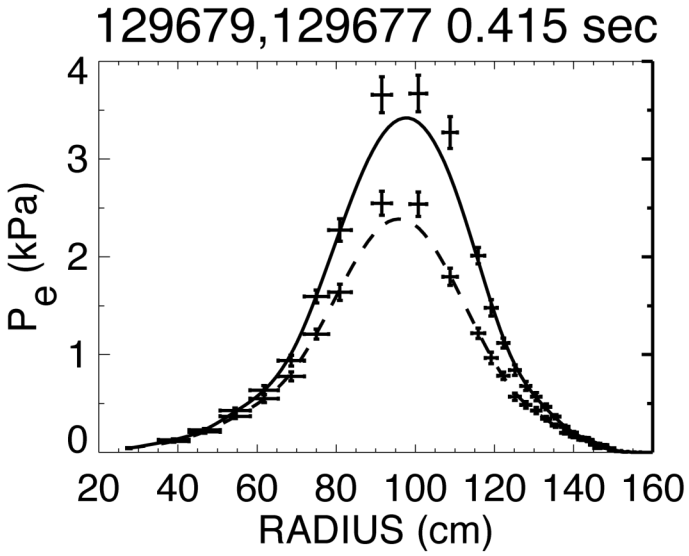
- Performed modulation heating experiments under XP825 to help determine efficiency.
  - Applied lithium at 20 mg/min rate and observed strong reduction of edge density. Recovered heating to ~ 3 keV at -150 and -90 deg.
  - Significant increase in electron temperature and stored energy observed at -30 deg for first time in deuterium.
  - Significant PDI impurity ion heating observed with ERD in the periphery of the plasma. Carbon and helium "hot" temperatures in the range of 400 eV. Also, lithium I and II energy distributions measured with "hot" temperature for lithium II up to ~ 400 ev. The rotation of the lithium ions was ~ - 80 km/s and the radial electric field indicated by the lithium ions was ~ - 20 kV/m.

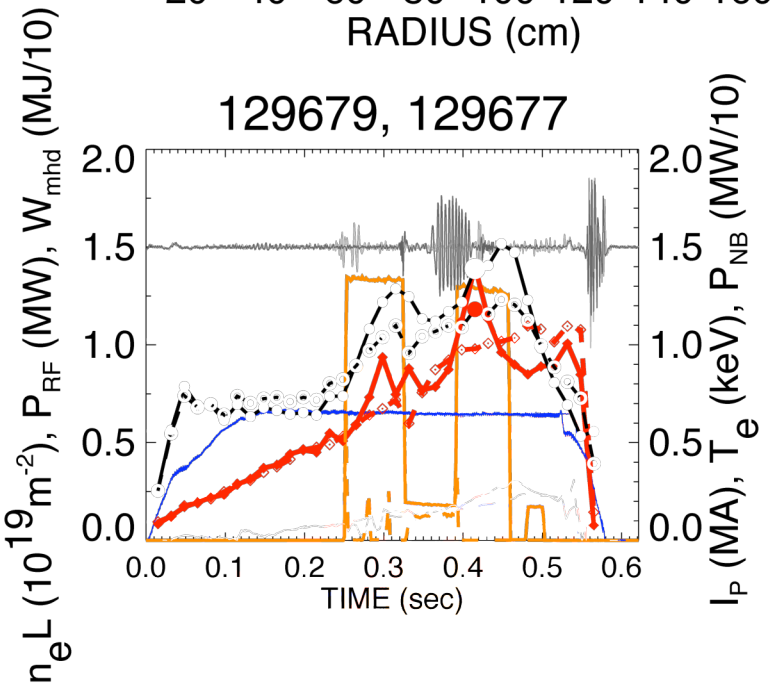
Heating at 30 deg - 0.415 sec

P_{RF} ~ 1.3 MW

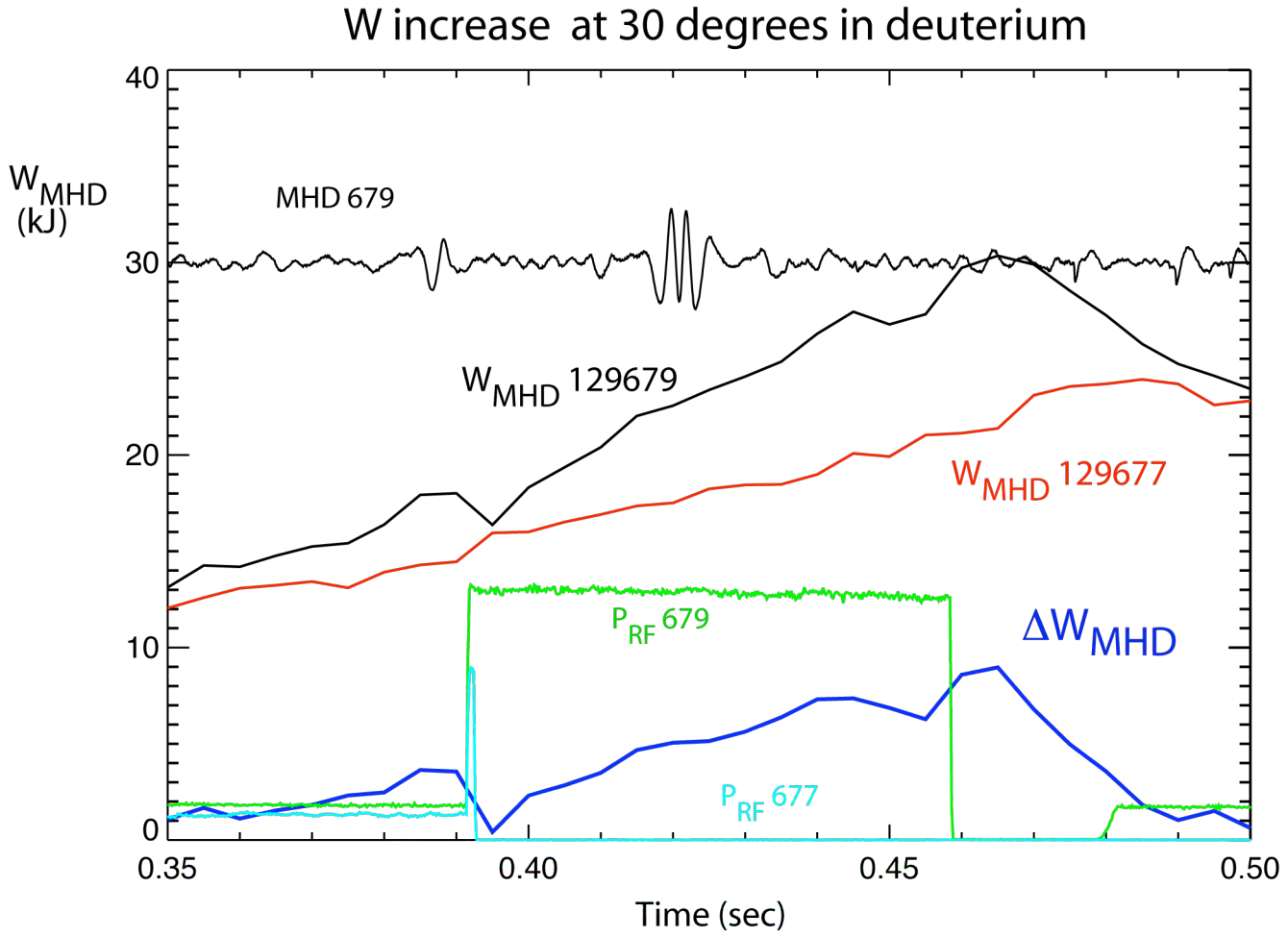








Stored energy increase at 30 deg in deuterium - with lithium injection to decrease edge density

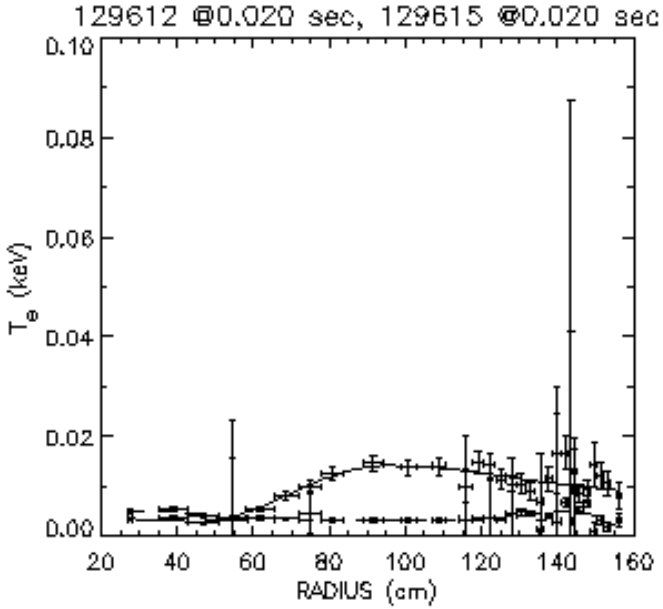


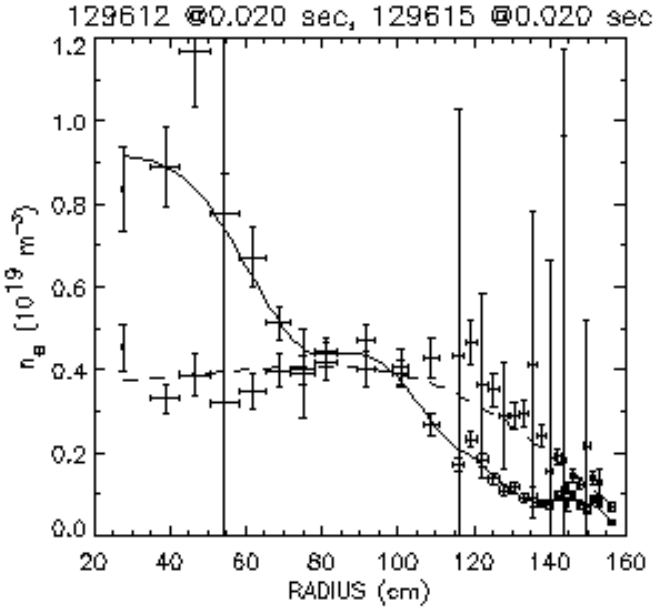
Hosea_June 2-3: XP817

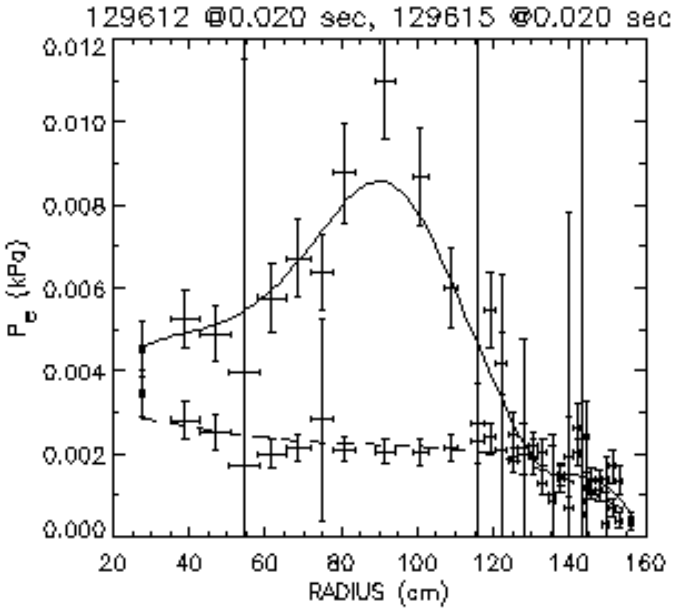
XP817: CHI Startup

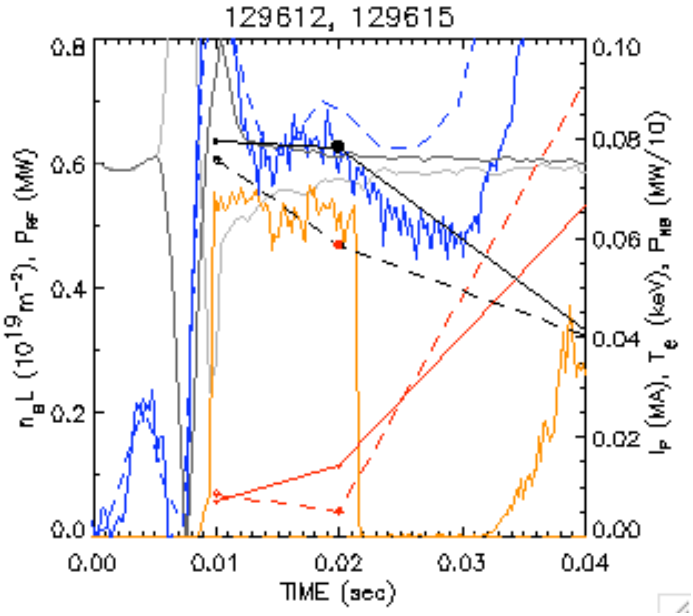
- HHFW applied to startup with CHI-Ohmic combo under XP817
  - Matched to CHI conditions at end of run on June 2.
  - Coupled power to CHI and OH phases on June 3.
    - Coupled ~ 550 kW to transition 10 to 22 msec and heated core from ~ 3 eV to ~ 15 eV at 20 ms.
    - Coupled ~ 550 kW to transition 18 to 64 ms and heated axis (hollow core) from ~ 3eV to ~ 33 eV.
    - Clear heating of ohmic phase. Coupled ~ 1.1 MW from ~ 65 to 120 ms and heated on axis from ~ 140 ev to ~ 700 eV at $n_e(0)$ ~ 6 and ~9 $x10^{+12}$ cm^{-3}, respectively. Suggests that ECH/HHFW could be used to heat up plasma during startup. Rampup in current needs to be simulated to see if it is feasible.

Heating at 20 msec



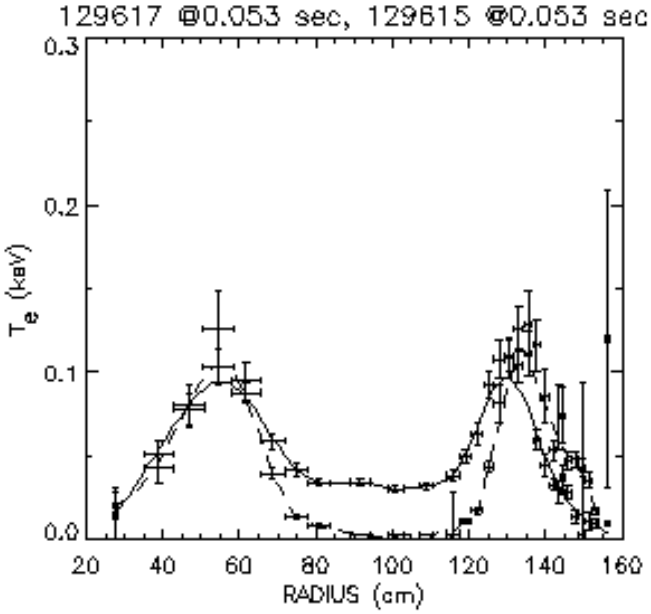


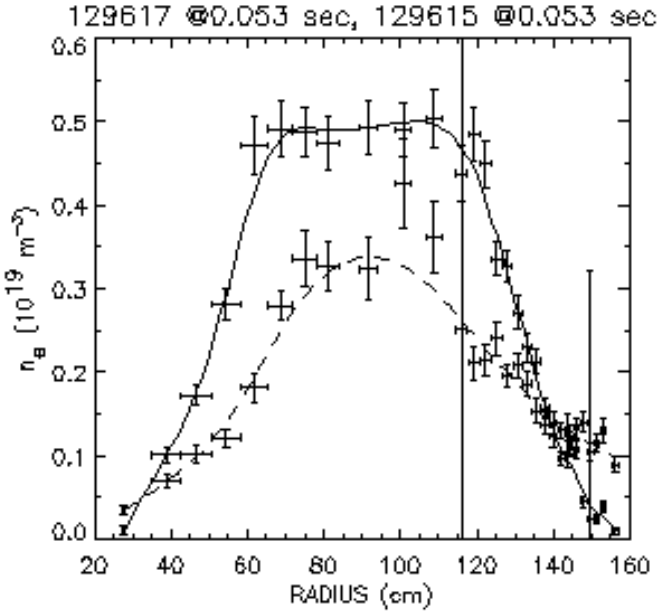


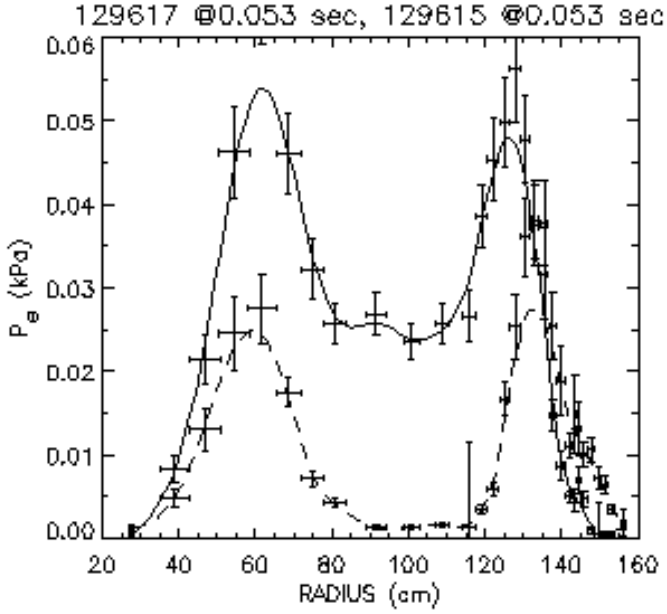


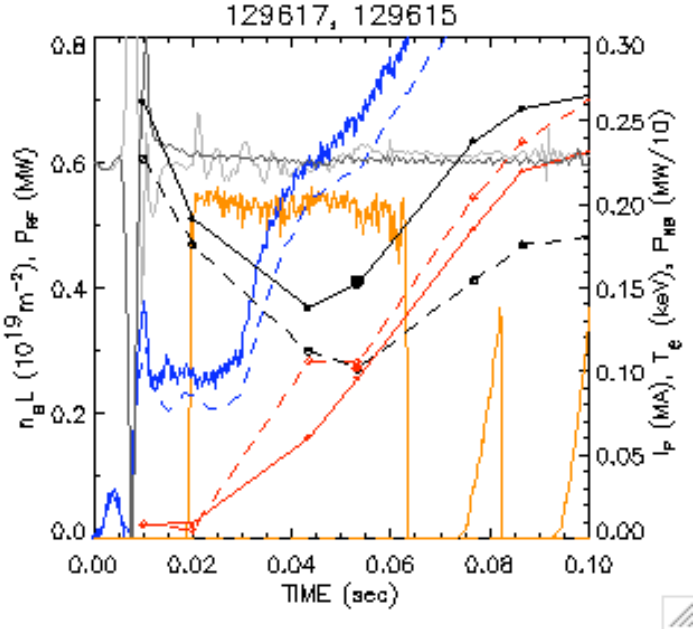
P_{RF} = 550 kW
9 - 22 msec

Heating at 53 msec



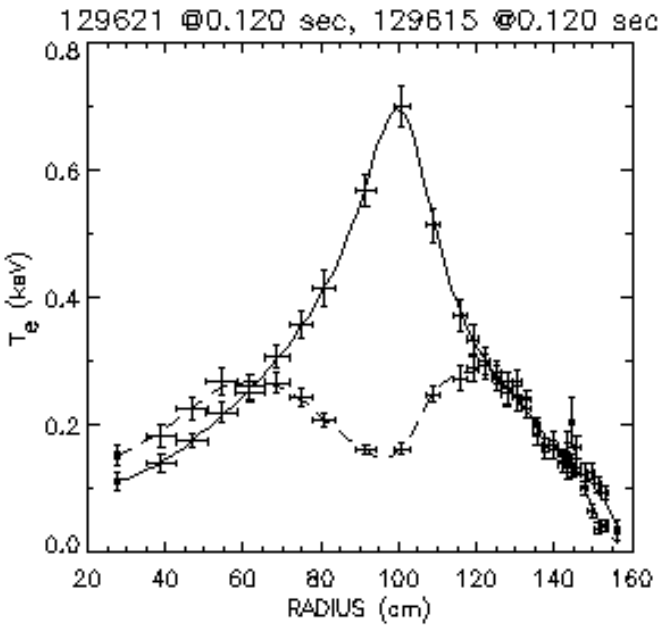


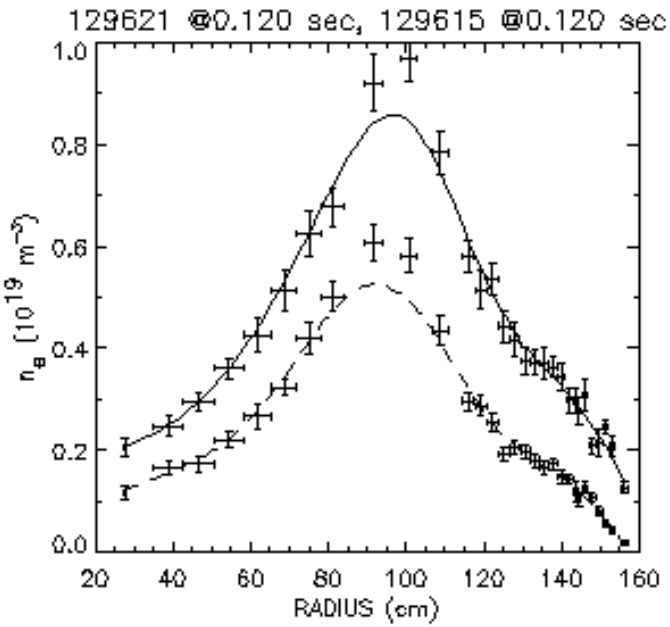


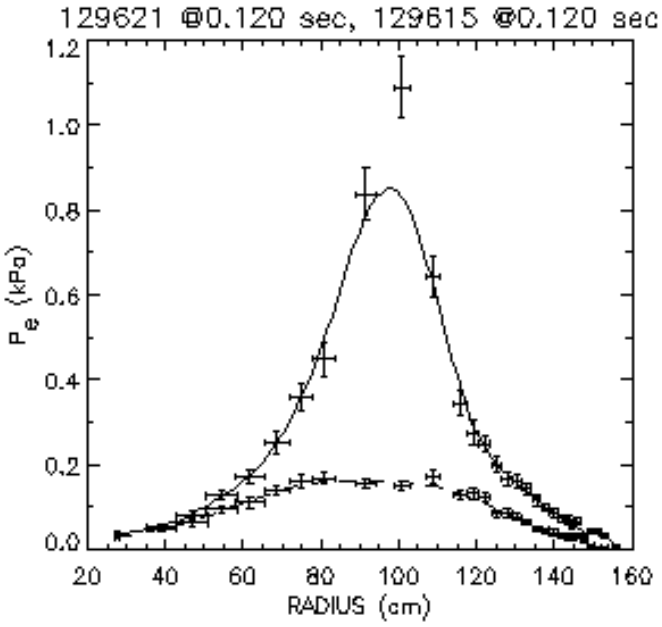


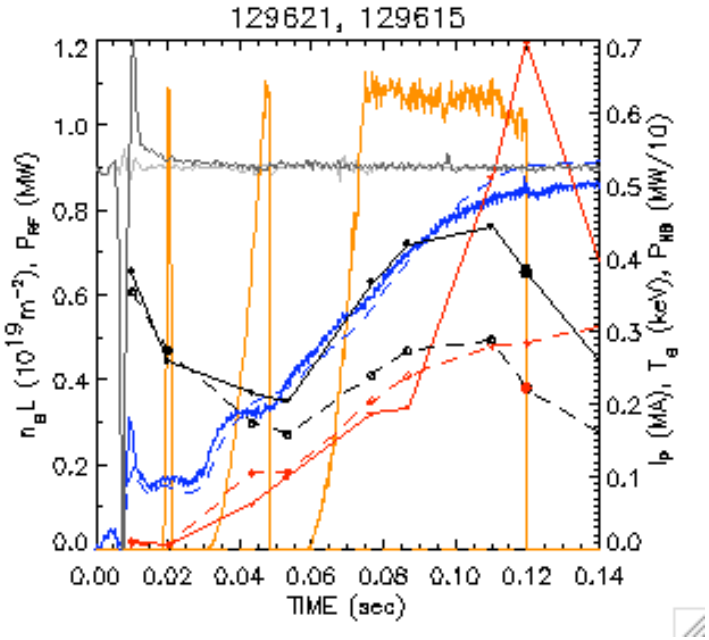
P_{RF} = 550 kW
20 - 64 msec

Heating at 120 msec









P_{RF} = 1.1 MW
65 - 120 msec