Investigation of Ion Transport with Neutral Beam Modulation
XP 737

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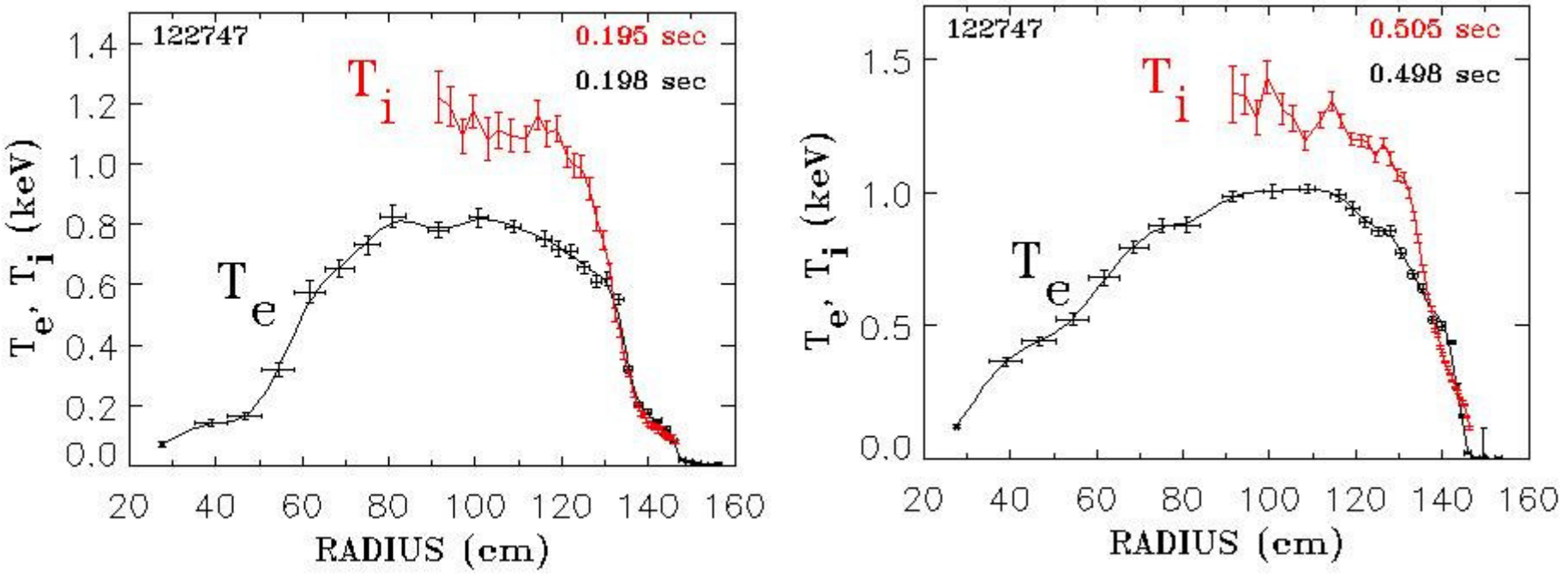
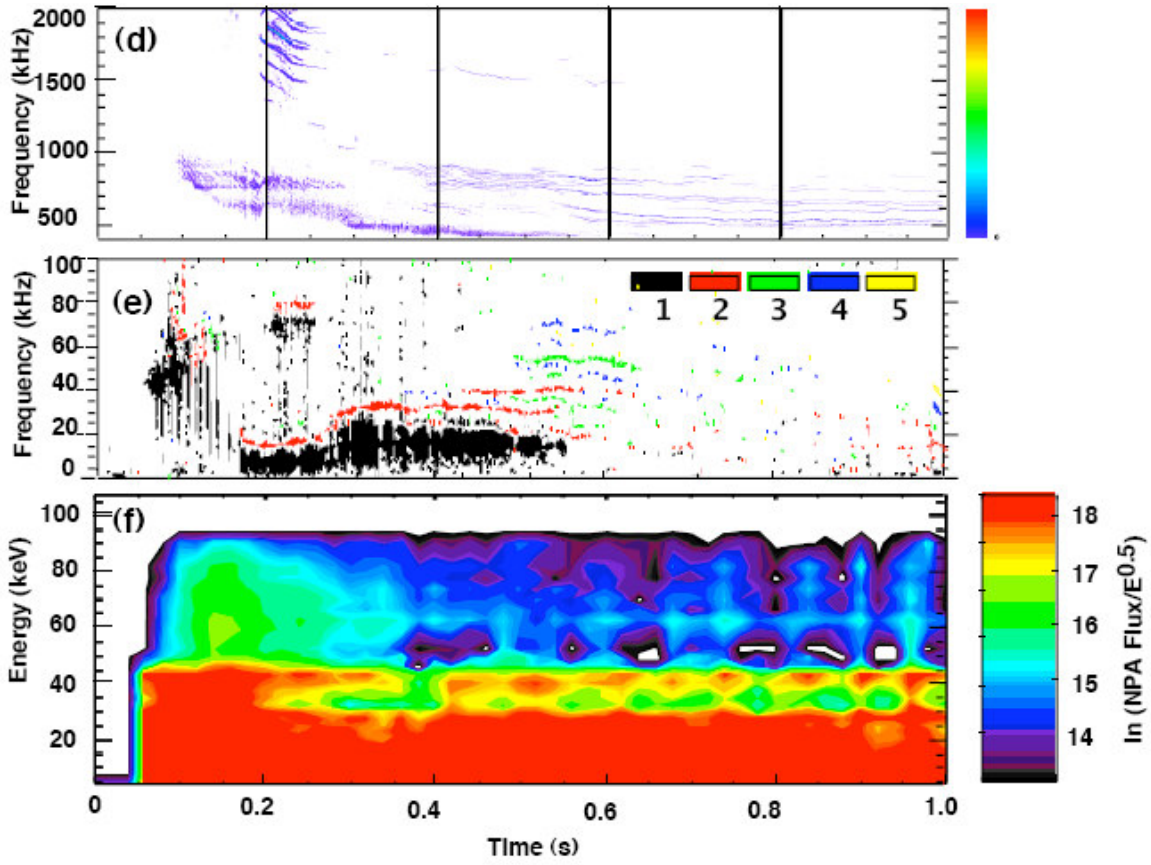
Goal of Experiment: Explain power balance issues in beam heated discharges



Shot 122747. Ti is about 50% higher than Te, and remains so for several hundred ms.

NPA shows holes in Fast Particle Distribution, and discrepancies with TRANSP



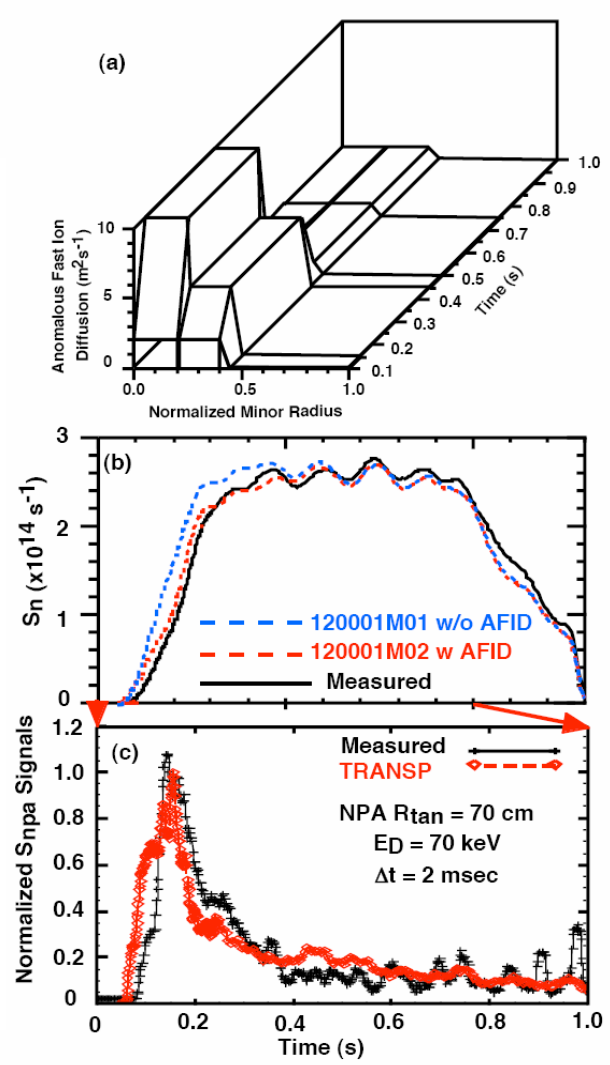


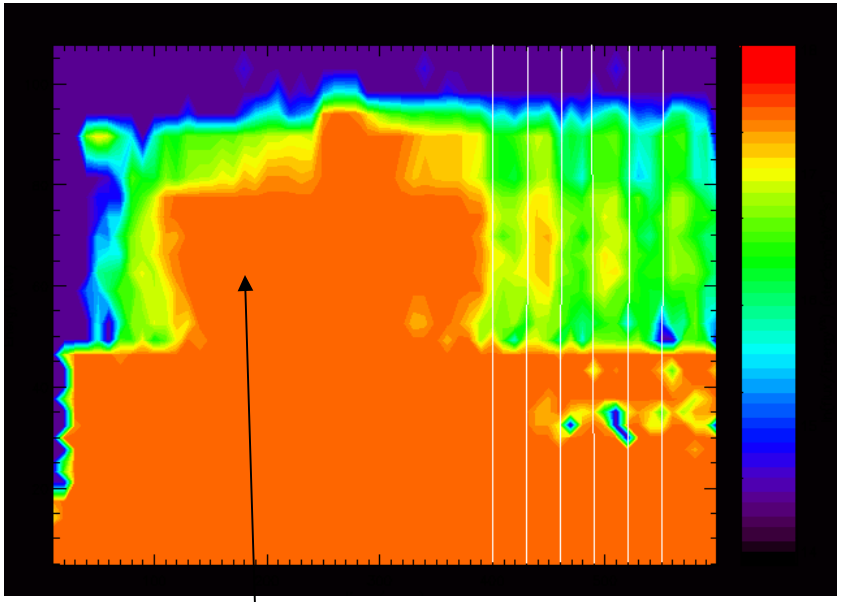
Fig. 27. TRANSP simulation of the neutron yield and NPA signal for SN120001.

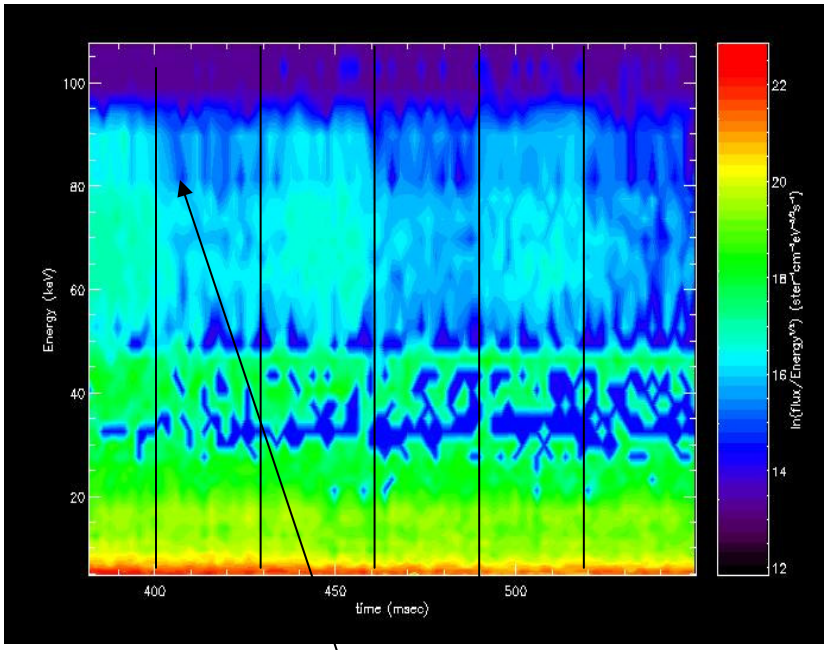
Desired Shot features:

- Early H-Mode
- Depleted NPA signal
- Modulate Source B
  - Initially had to modulate source A
    - (Bad because Source A is primary source for NPA signal)
  - Signal observed by NPA not as large as it should have been.
  - These shots did not have extremely high Ti.
    - May be due to absence of low frequency MHD

Preliminary Results, Modulating A

Shot 124111

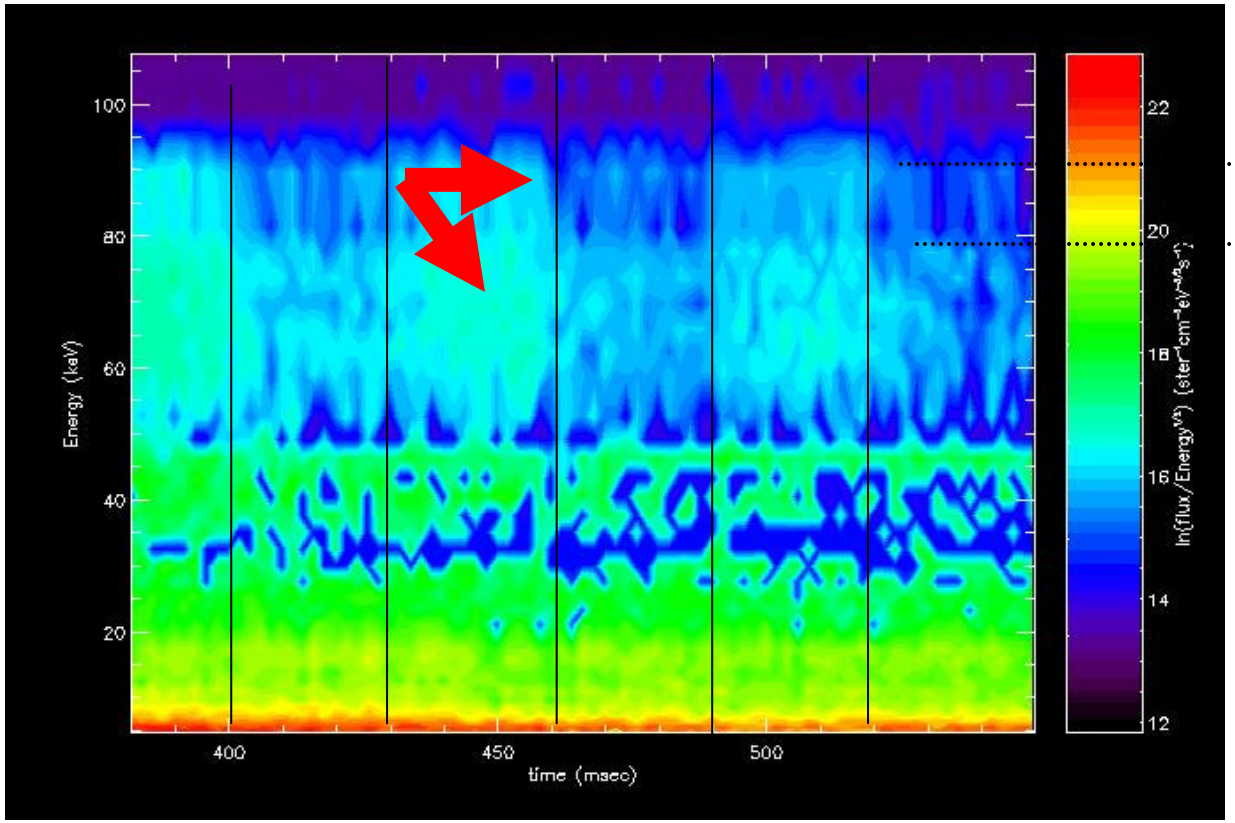




No obvious ‘hole’ in the fast ion distribution

The NPA signal is expected to die off slower when the beam is shut off as the beam ions slow down. (Part of this is due to the absence of source A neutrals.) Also, when the beams turn back on, there is no absence of lower energy signal.

We expected different characteristics from the NPA signal

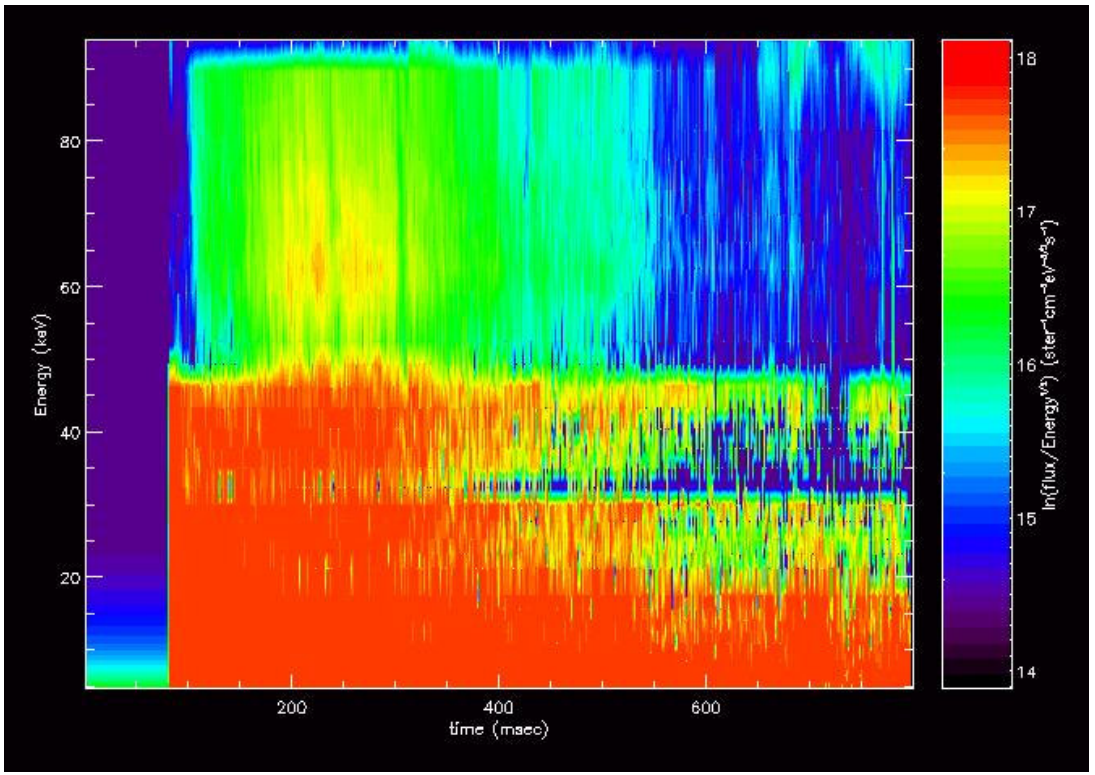


We expected to see the particles appear at the full energy (90 keV) and 'grow' to the lower energies as the source A particles slowed down. We also expected to see the opposite when Instead we see an immediate presence of all energies, and no strong indication of this growth. It is possible that this absence is due in part to the modulations begin faster than the slowing down time.

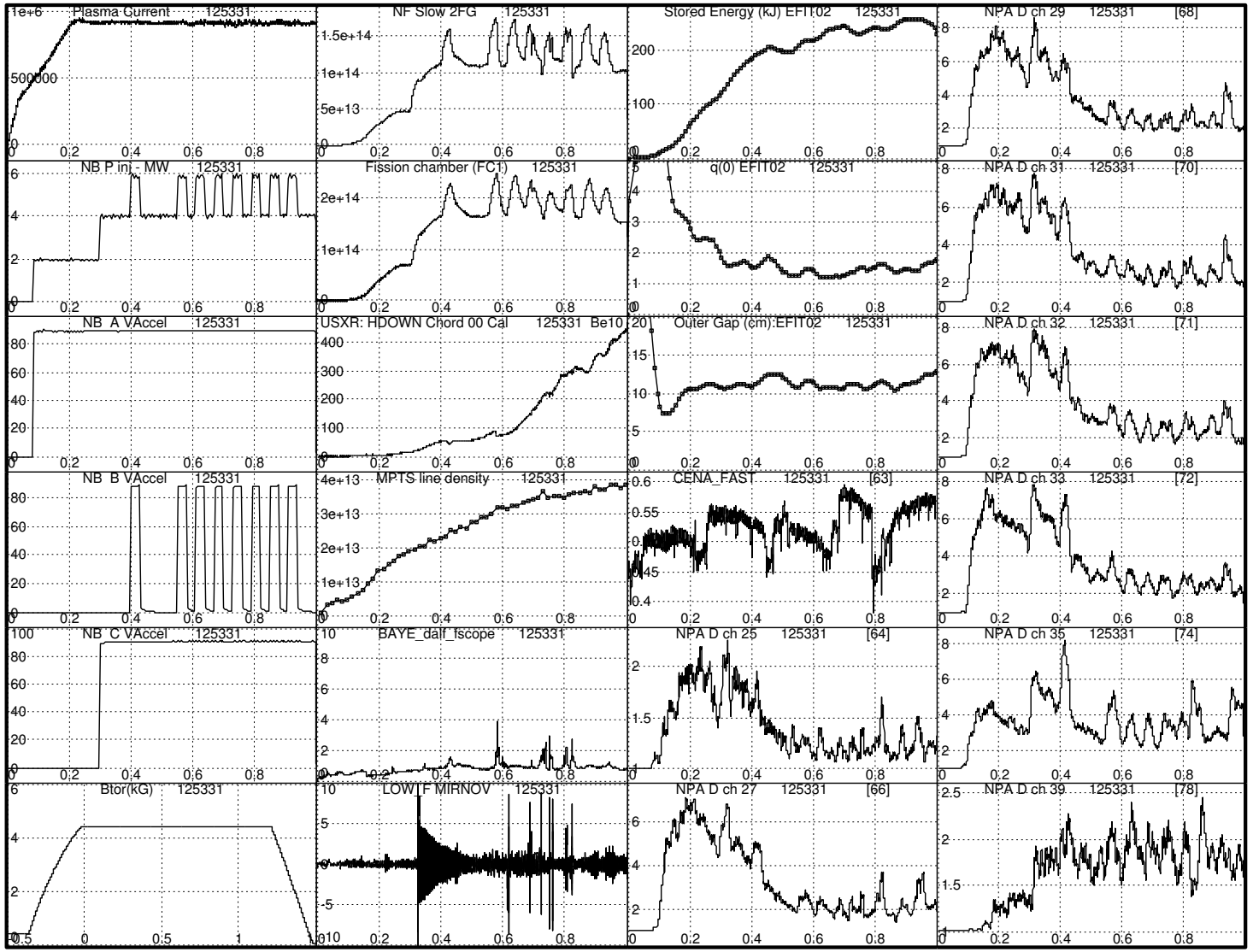
Shots do not show NPA features we thought they would

No obvious depletion, NPA signal dies off quickly with source B.

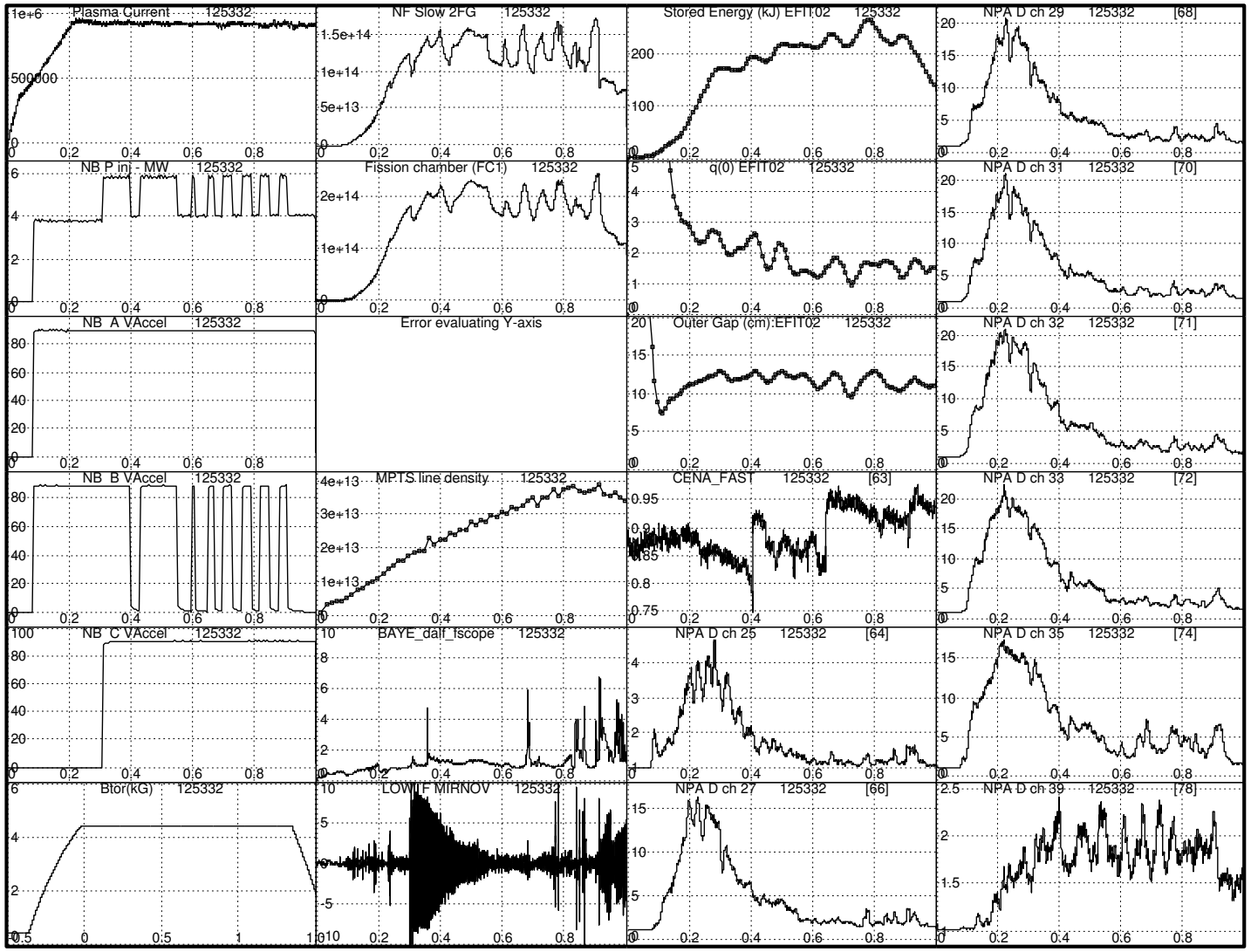
Signal does not grow when beam turned back ont



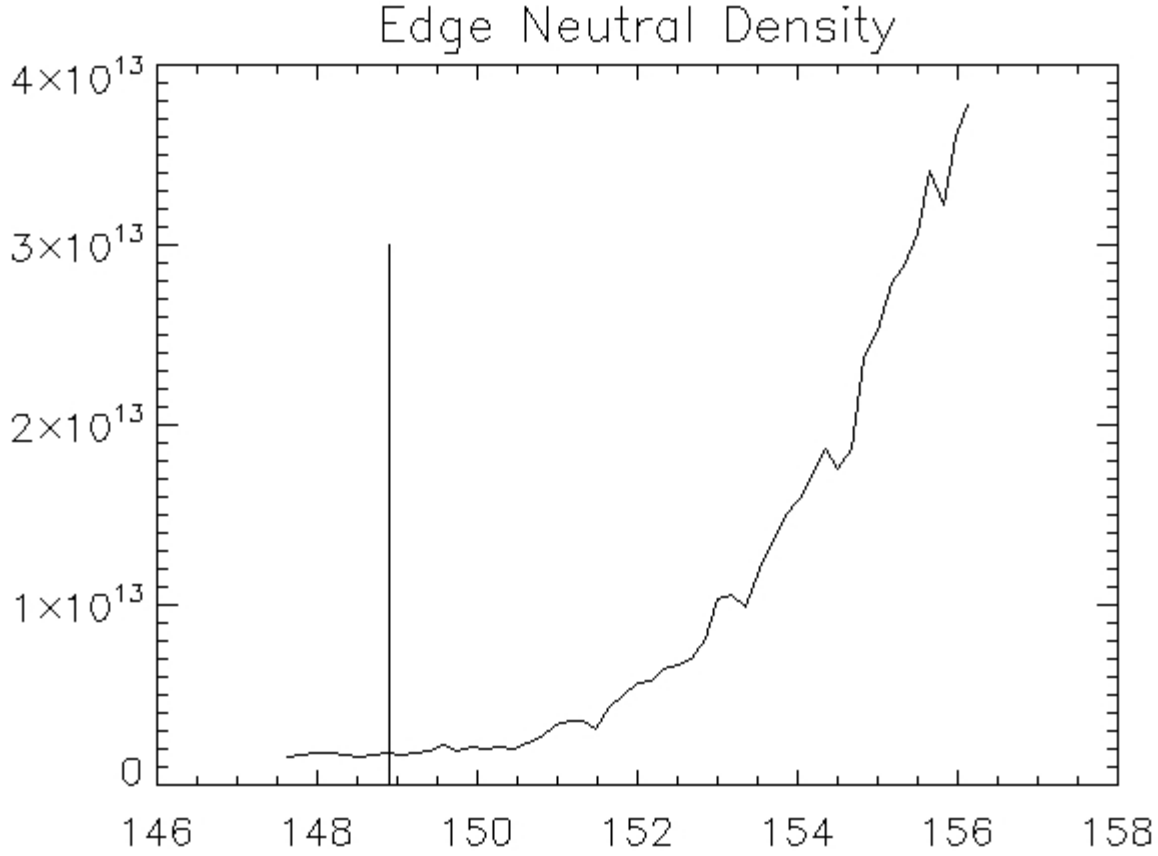
Beam ‘blip’ shots show modulation



Beam ‘notch’ shots have little modulation



Edge Neutral Density



Edge neutral densities from the ENDD are fairly high (TRANSP default value = 5e10). Also, densities are dependent on Thomson Scattering, and may change with the recalibration.