Characteristics of the Neutron Emission during High power Neutral Beam Injection

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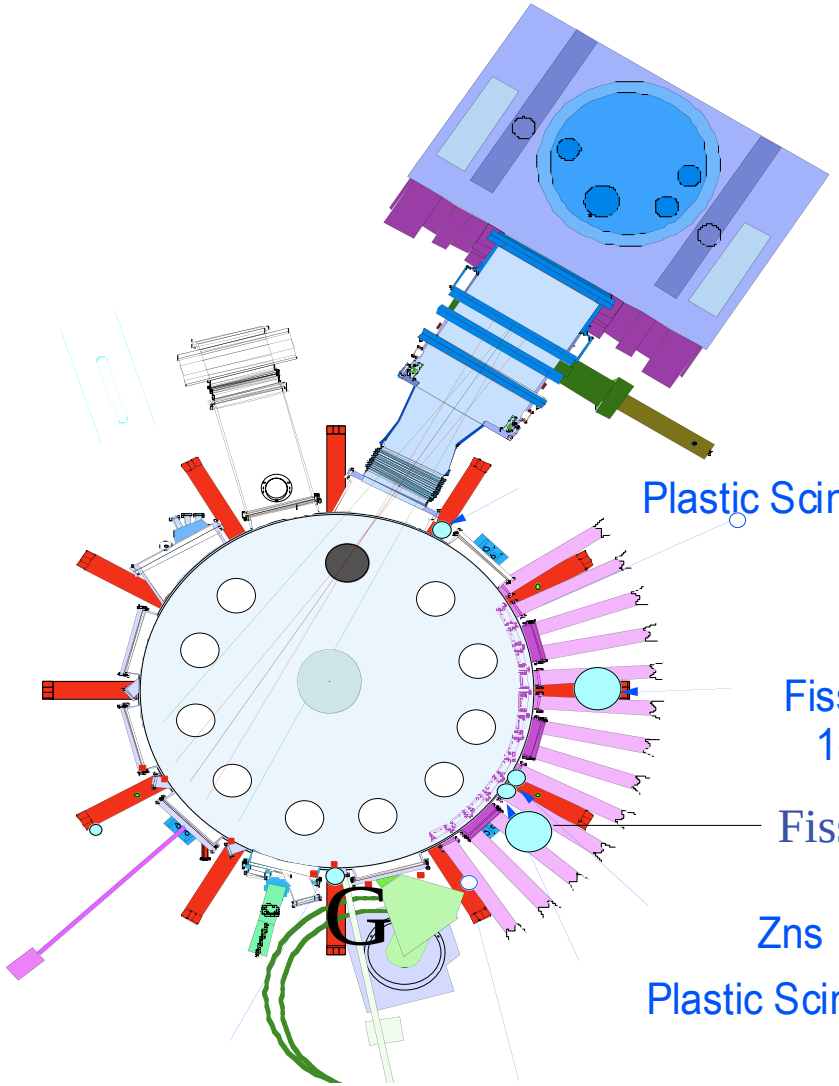
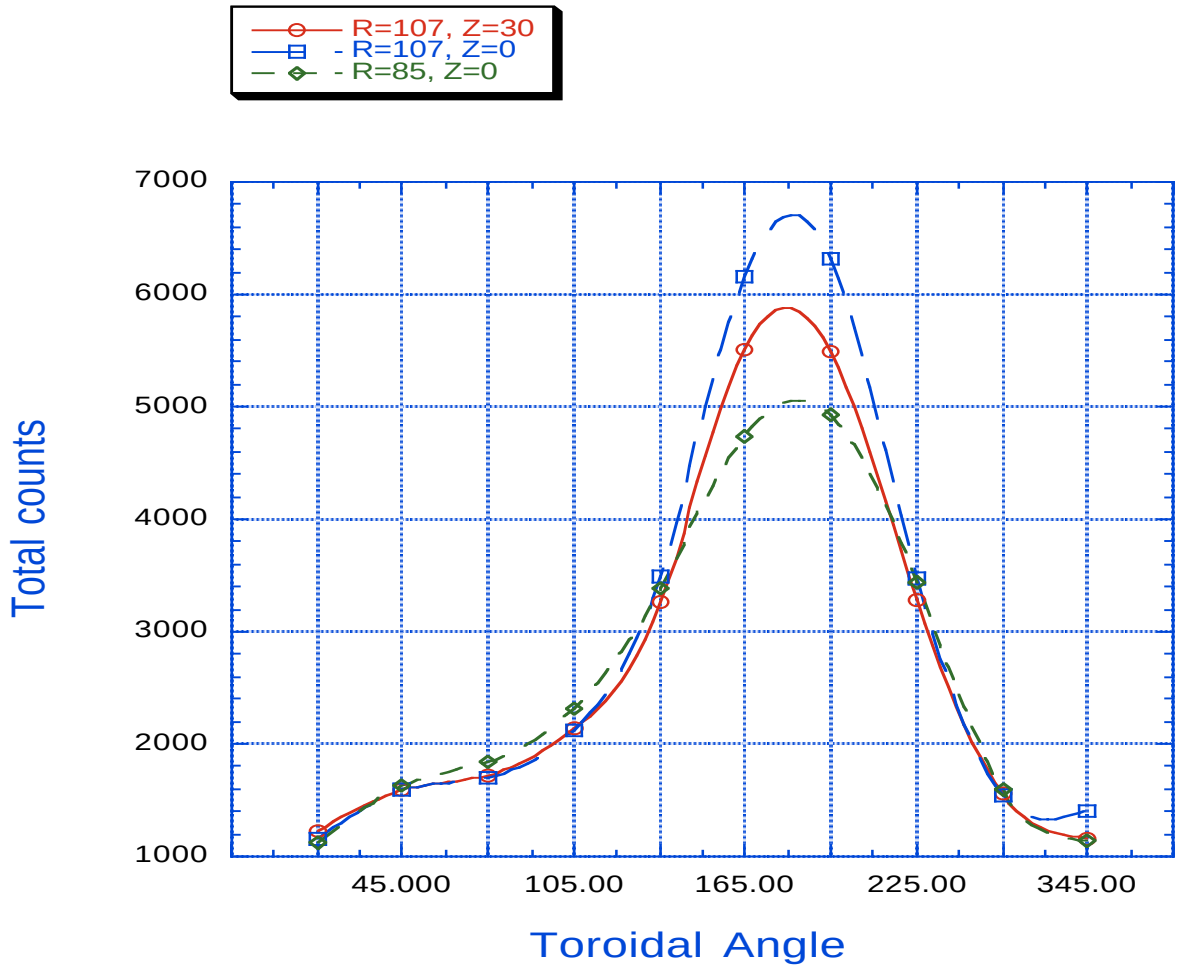
Neutron Detector Locations



Neutron Calibration Results

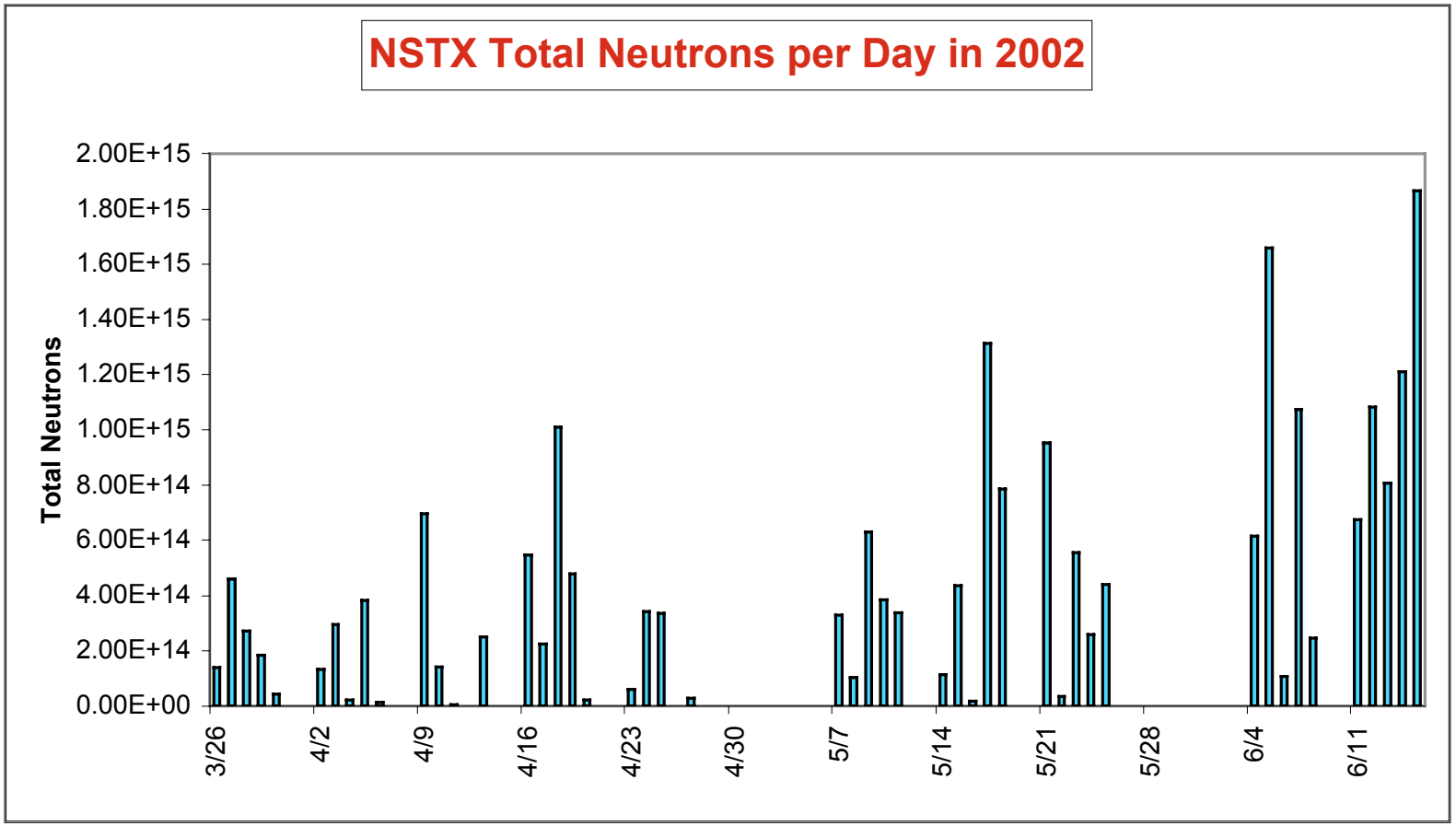


- Calibration consisted of 10 toroidal positions, each with two vertical and two horizontal locations.
- Differences are consistant with $1/R^2$ scaling.

Calibration Issues

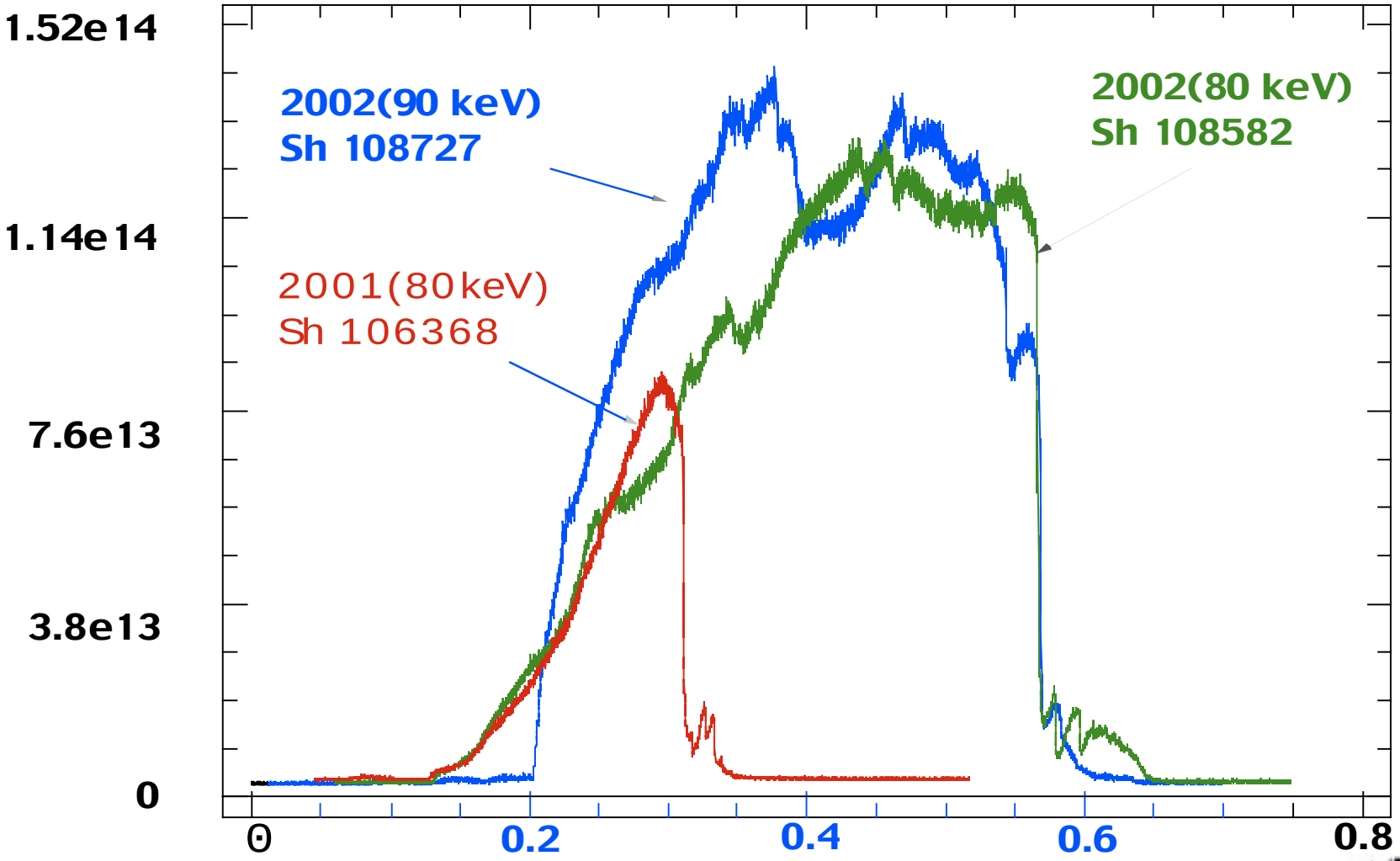
- 5 detectors with differing overlapping sensitivities for different neutron rates
- Cross-Calibration works for 90% of discharges but ratios may vary by 20% for selected shots.
- Abrupt changes in sensitivity in intermediate detector means that every shot must be examined.

NSTX Neutron Inventory 2002



- **2002 Total Yield = 2.3 X 10^{16} neutrons**
- **2001 Total Yield = 3.0 X 10^{15} neutrons**

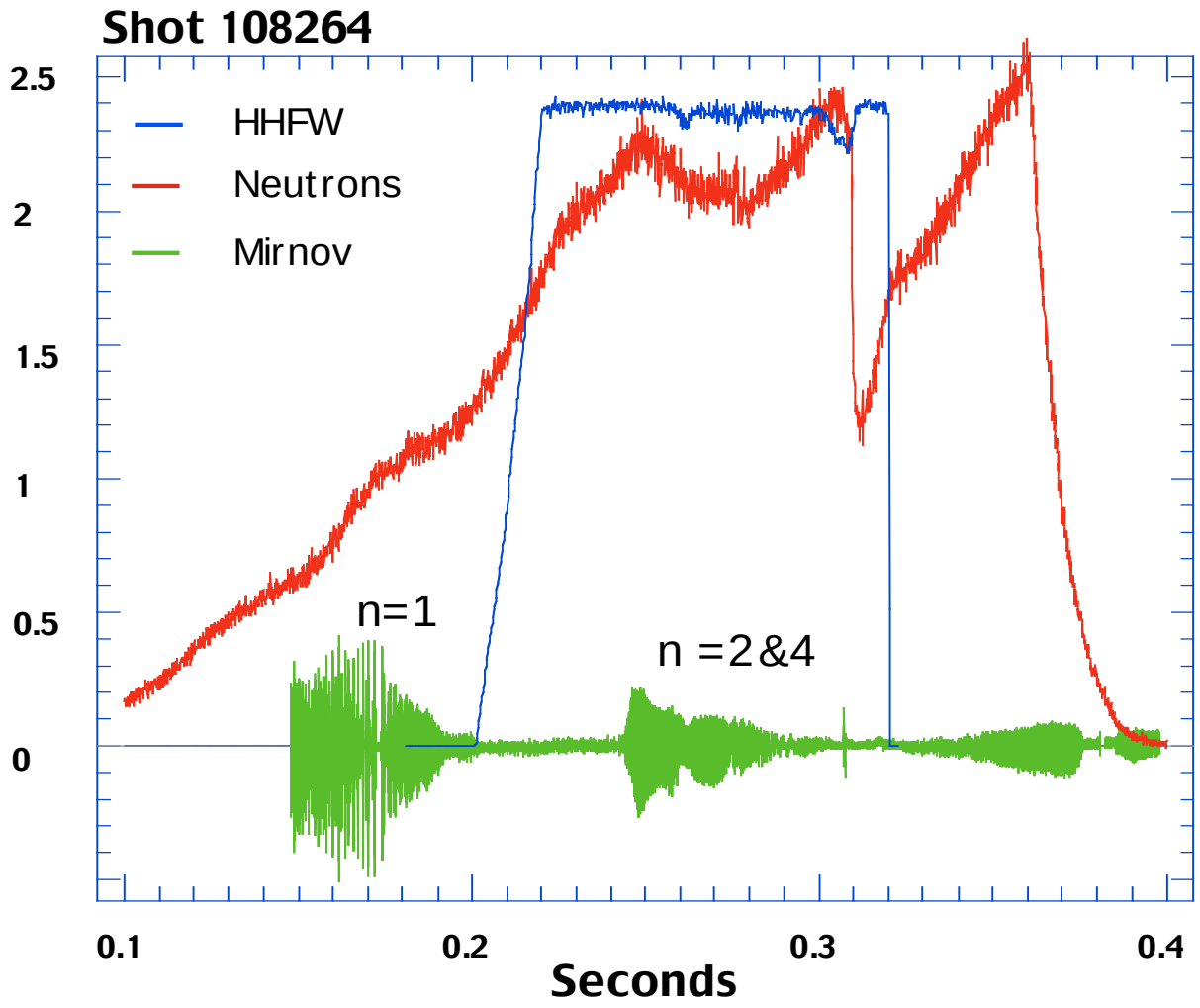
Best Performance with Single NB Source



Work in Progress

- Resolve remaining calibration issues. MCNP will resolve point source vs. distributed source issues.
- Re-visit orbit code predictions of fast ion loss fraction as function of Ip, Bt, injection angle.
- Continue to compare data with NPA and FLIP probe to get a consistent picture of IRE's, sawteeth, MHD,and HHFW effects.

HHFW, MHD effects on neutron signal



Inflection at HHFW turn-off. May be large effect

MHD causes rollover or abrupt drop in signal

Best Performance with 3-Source Injection