Second Run Polarized ^{3}He Target Performance

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October 03, 2003

- Field Gradients from Septum
- Target Calibration Status
- Target Tests and Performance
- Post Experiment Target Status

Field Gradients from Septum

Field Mapping

- Expected gradients from $\frac{dB_z}{dy}$ and $\frac{dB_y}{dz}$
- Field mapped all nine components and found that all components small for ($I_{Septum} < 300$ A)
- $\frac{dB_y}{dz}$ and$\frac{dB_z}{dy} > 20$ mG/cm ($I_{Septum} \geq 325$ A)
- Vertical coils rewired (Karl)
- Longitudnial and Transverse coils not needed

Notes on Gradient Plots

- For $\frac{dB_z}{dz}$ and $\frac{dB_y}{dz}$, 0 is closest to the Septum
- For $\frac{dB_z}{dy}$, 0 is highest in the scattering chamber
- For $\frac{dB_z}{dx}$, 0 is closest to the Right Spectrometer
- The center of the target in beamline is X = 26 cm, Y = 6 cm, Z = 26 cm

Figure 1: $\frac{dB_z}{dx}$ at various Septum Currents

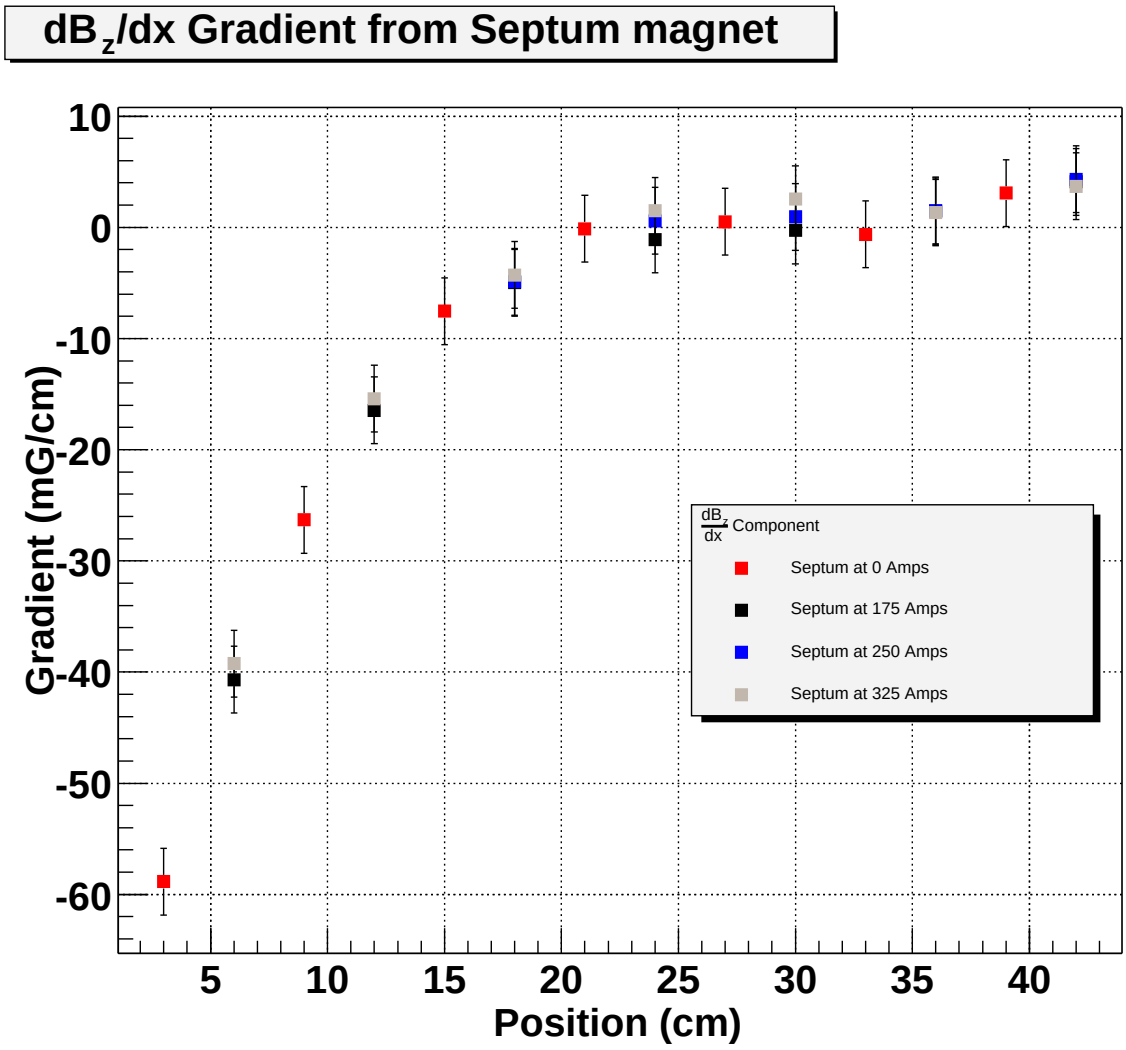


Figure 2: $\frac{dB_z}{dz}$ at various Septum Currents

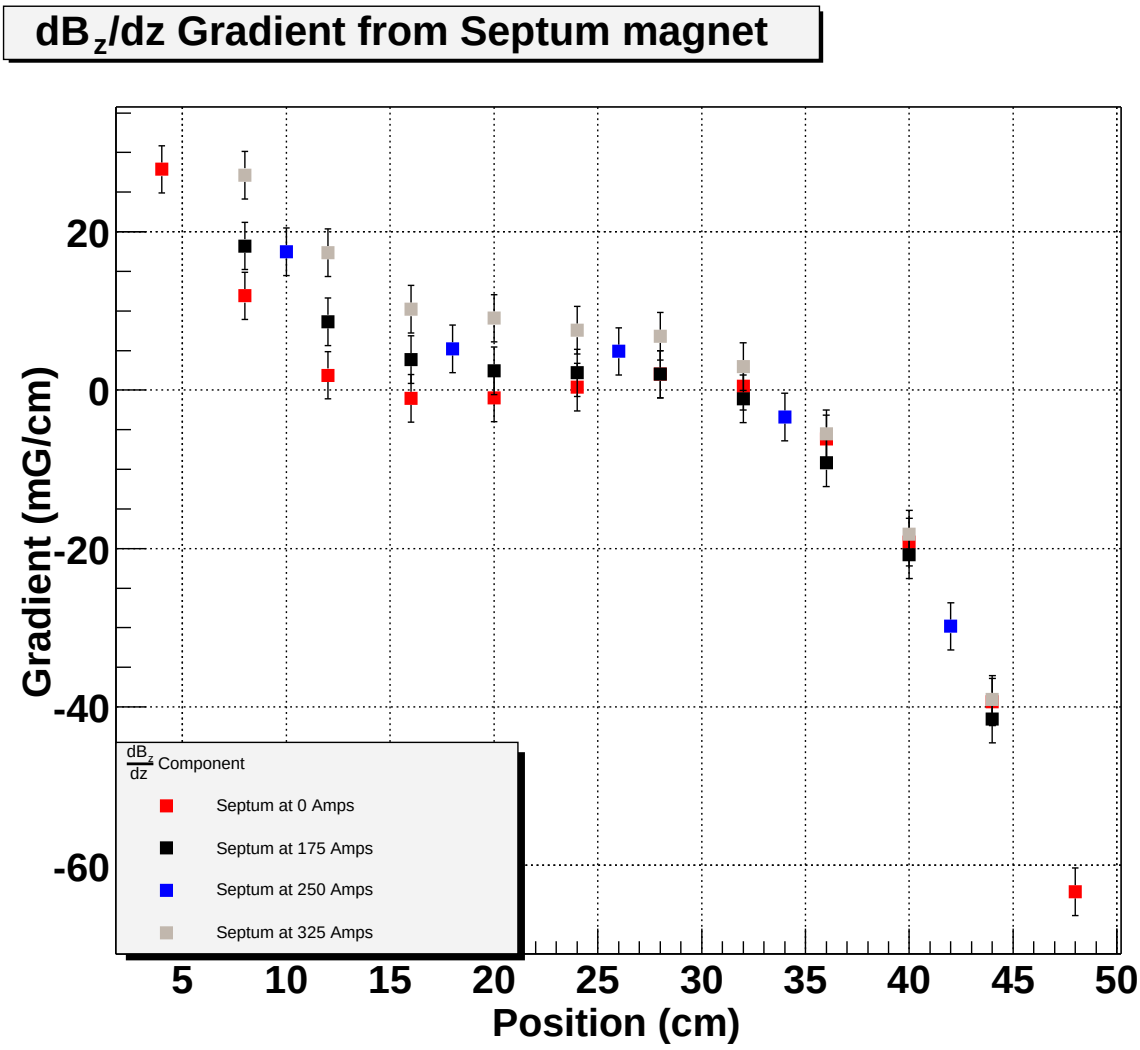


Figure 3: $\frac{dB_z}{dy}$ at various Septum Currents

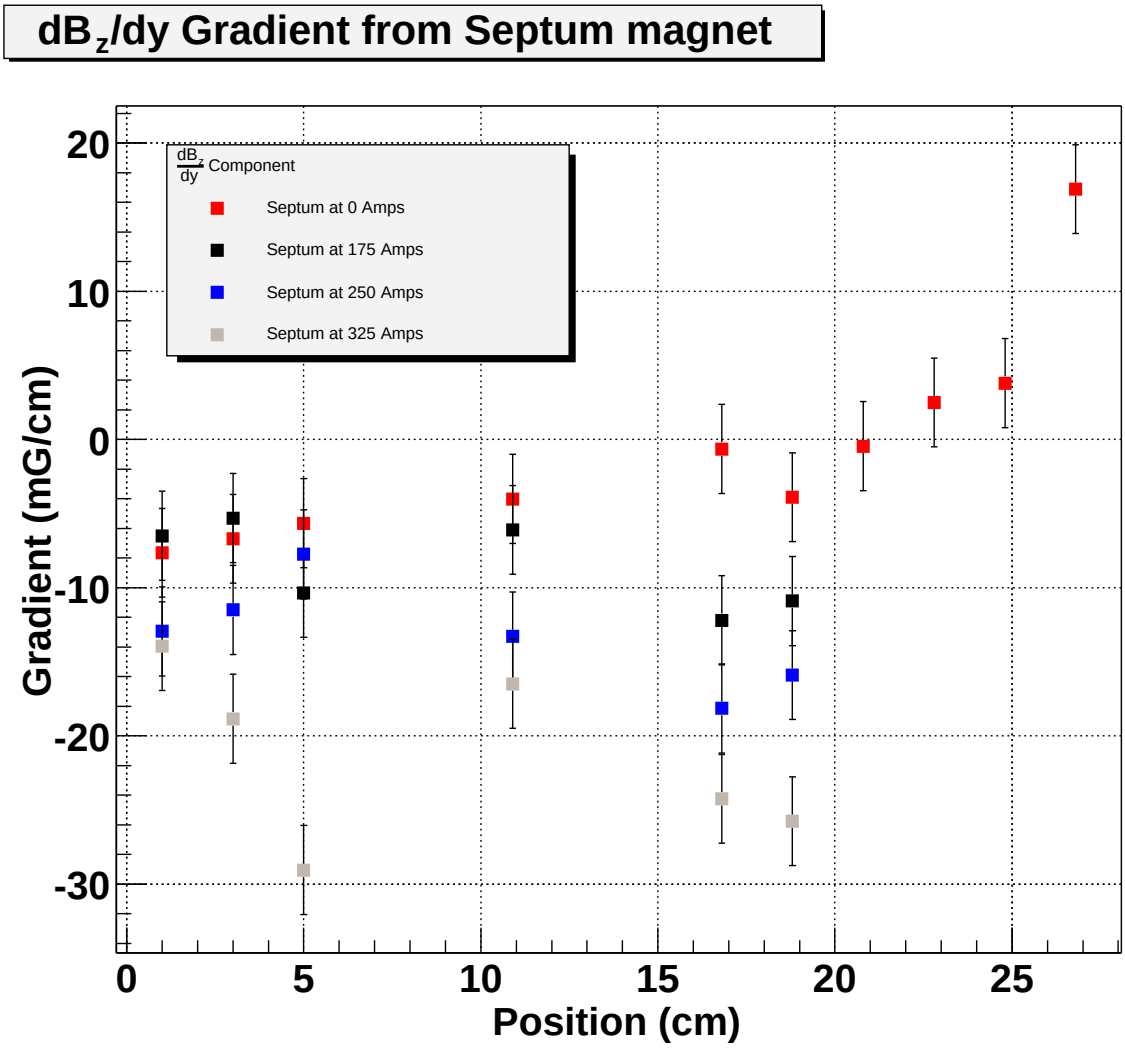
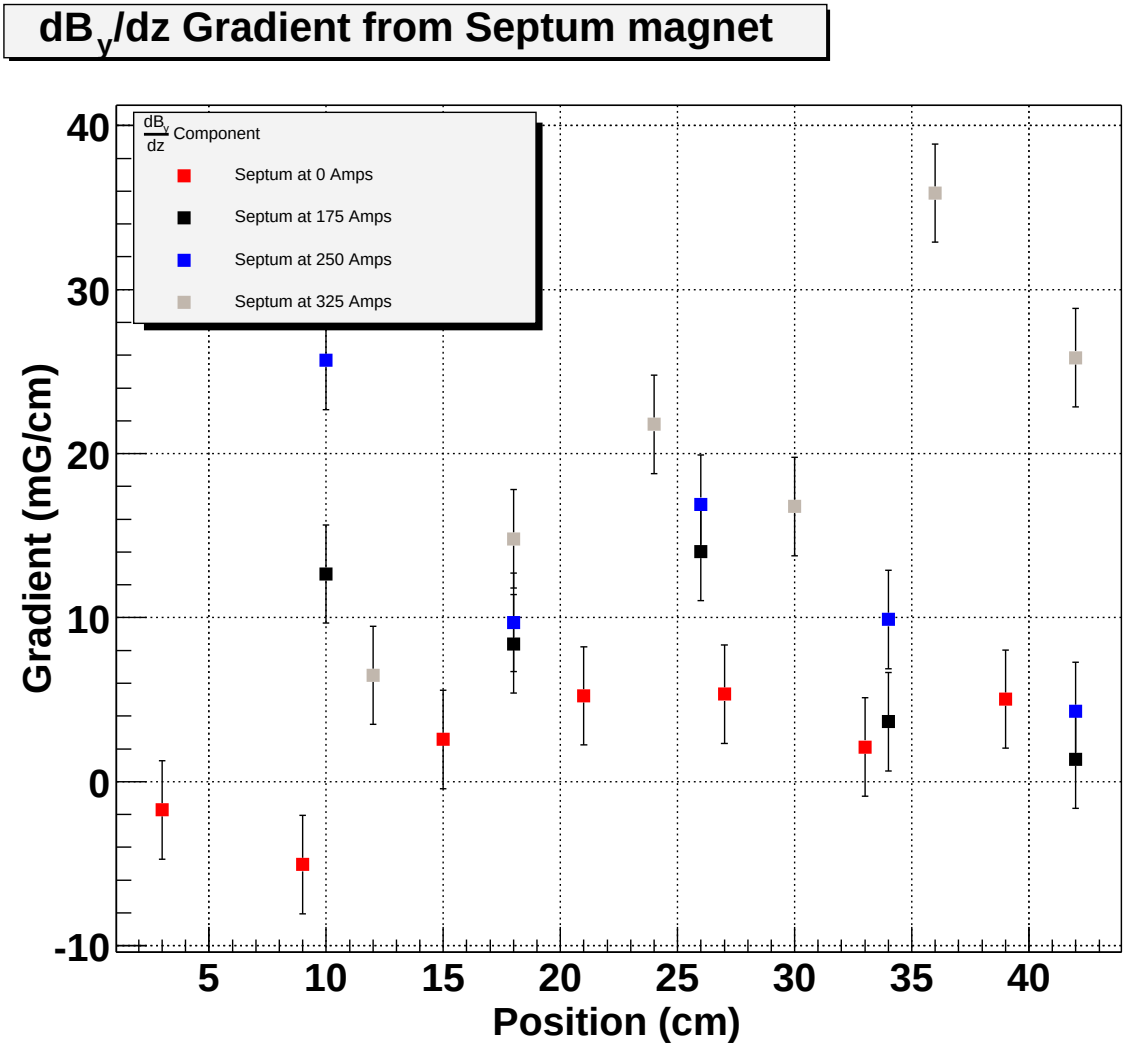


Figure 4: $\frac{dB_y}{dz}$ at various Septum Currents

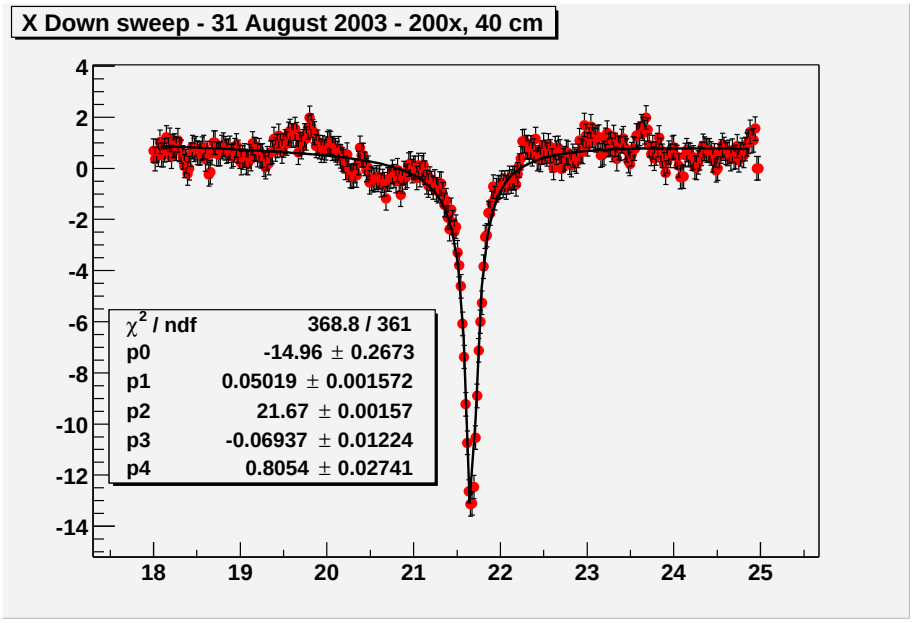


Target Calibration Status

Water Calibrations

- One good calibration pre-second run
- Four good calibrations post experiment
- RF background typically good
- Background sensitive to vertical correction coils

Figure 5: Post-experiment water signal



EPR-NMR Calibrations

- One calibration for Penelope
- Four calibrations for Priapus
- Post experiment calibration had cooling jets off

Target Tests and Performance

Target Tests:

- AFP loss tests at various Septum Currents
- Temperature Tests with 1, 3 and 4 lasers

AFP Loss Results

Septum Current(A)	NMR Rel. loss/sweep (%)	EPR Rel. loss/sweep (%)
201.5	0.15	0.53
309.0	0.29	1.40
278.8	0.28	1.02
348.5	0.44	N/A
348.5	N/A	0.59
397.8	0.43	2.33
397.8	N/A	0.69

The set of EPR AFP-loss measurements at 348.5 and the second set at 397.8A were done with the vertical corrections coils on.

Target Performance:

- Penelope ruptured on July 23, 2003 (only 4 days of beam)
- Priapus lasted from July 23, 2003 until the end (August 29, 2003)
- EPR AFP-loss increased with Septum current
- NMR AFP-loss small, slight Septum current dependence
- Vertical correction coils used above $I_{sep} = 300$A to reduce the loss during EPR, approx. 7 measurements
- August 22, 2003, Unexplained loss of polarization (20% in 8 hours)
- Kin. 12.10, runs 3891-3902
- Kin 12.11-12.14, 28% $<$ polarization $<$ 35%
- Polarization (see Jaideep's talk)

Post Experiment Target Status

Post Experiment Work:

- Polarized ^{3}He Target disassembled and moved to EEL
- Target Lab Setup and Tests (Kathy McCormick, Jing Yuan, Ameya Kolarkar)

Equipment:

- Repair Coherent # 1 power supply
- Repair DS345 FG GPIB interface