Magnetic Field Axis Determination for the CPET Magnet

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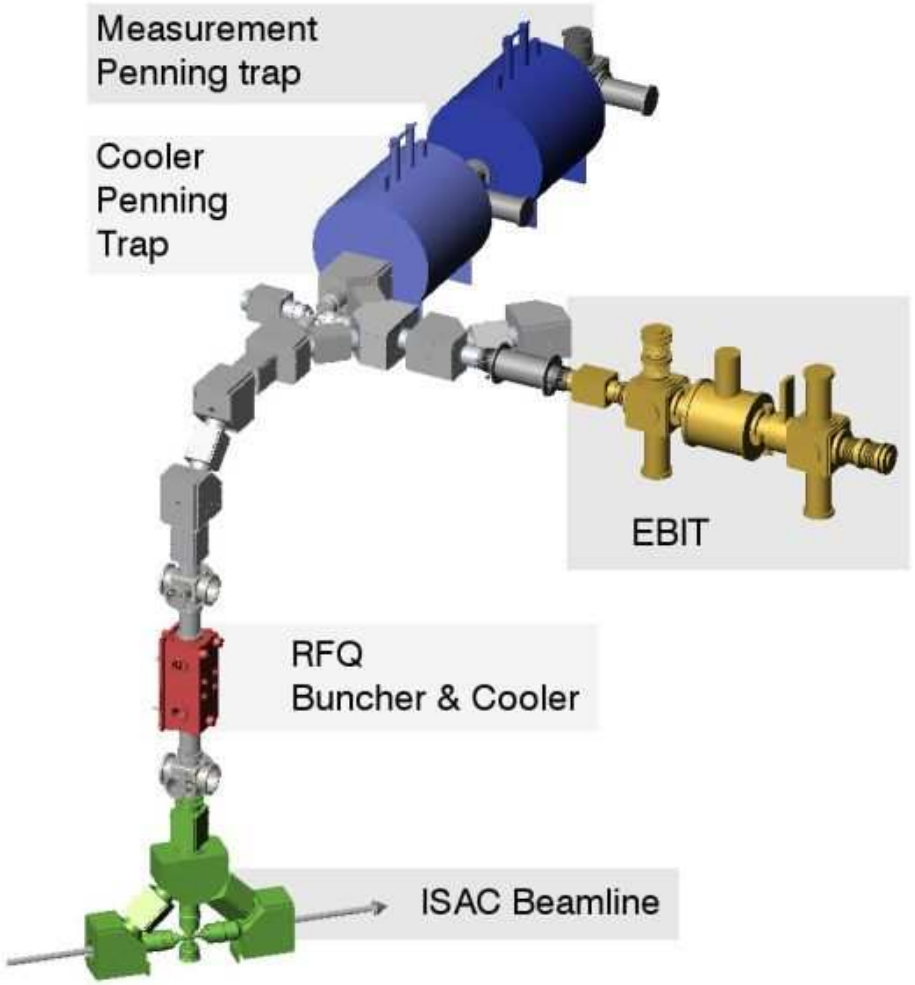
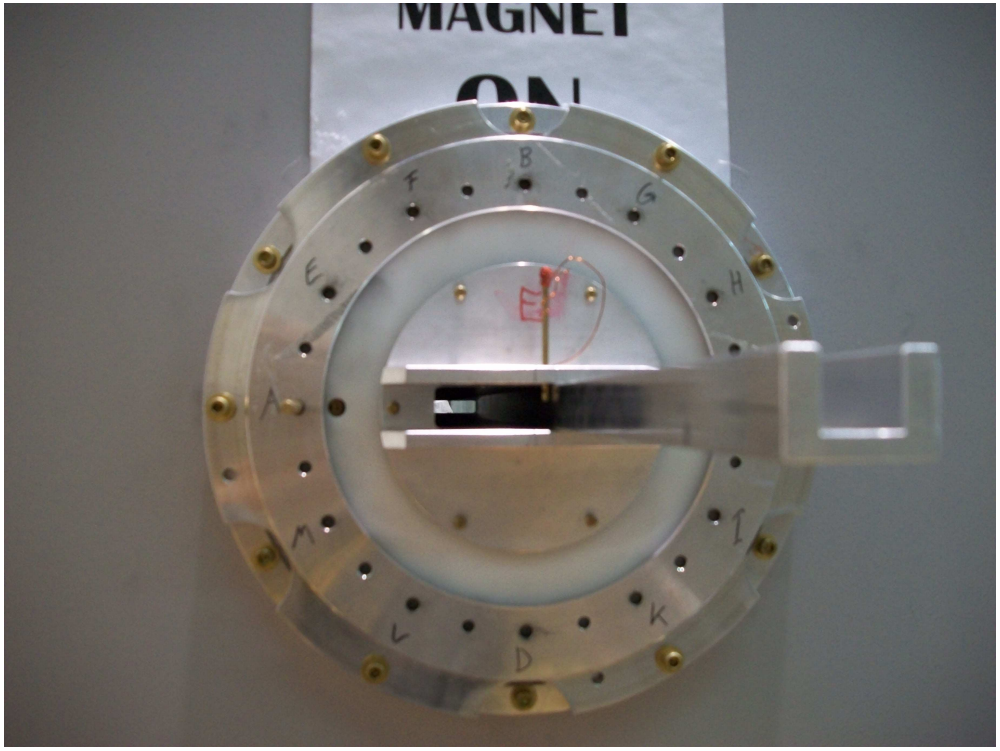
Introduction



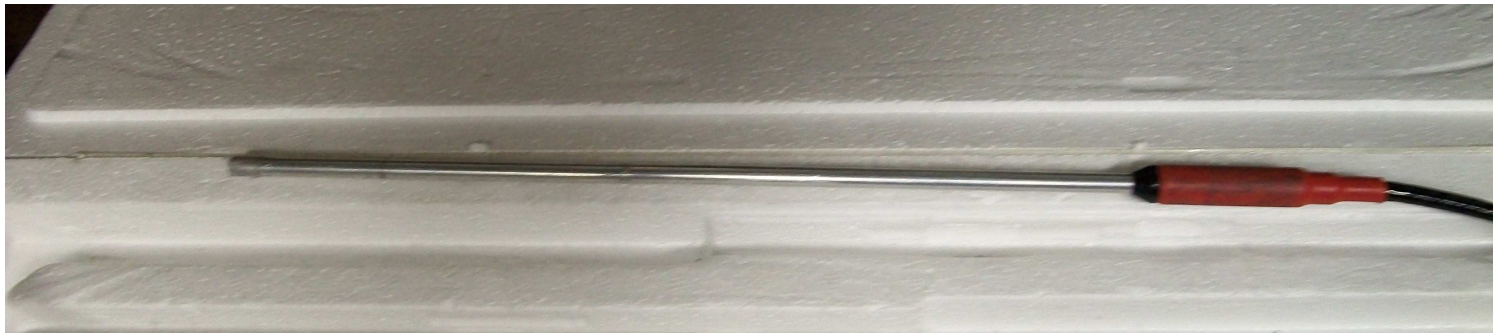
Measurements

- Magnetic Field Axis relative to the magnet's mechanical axis



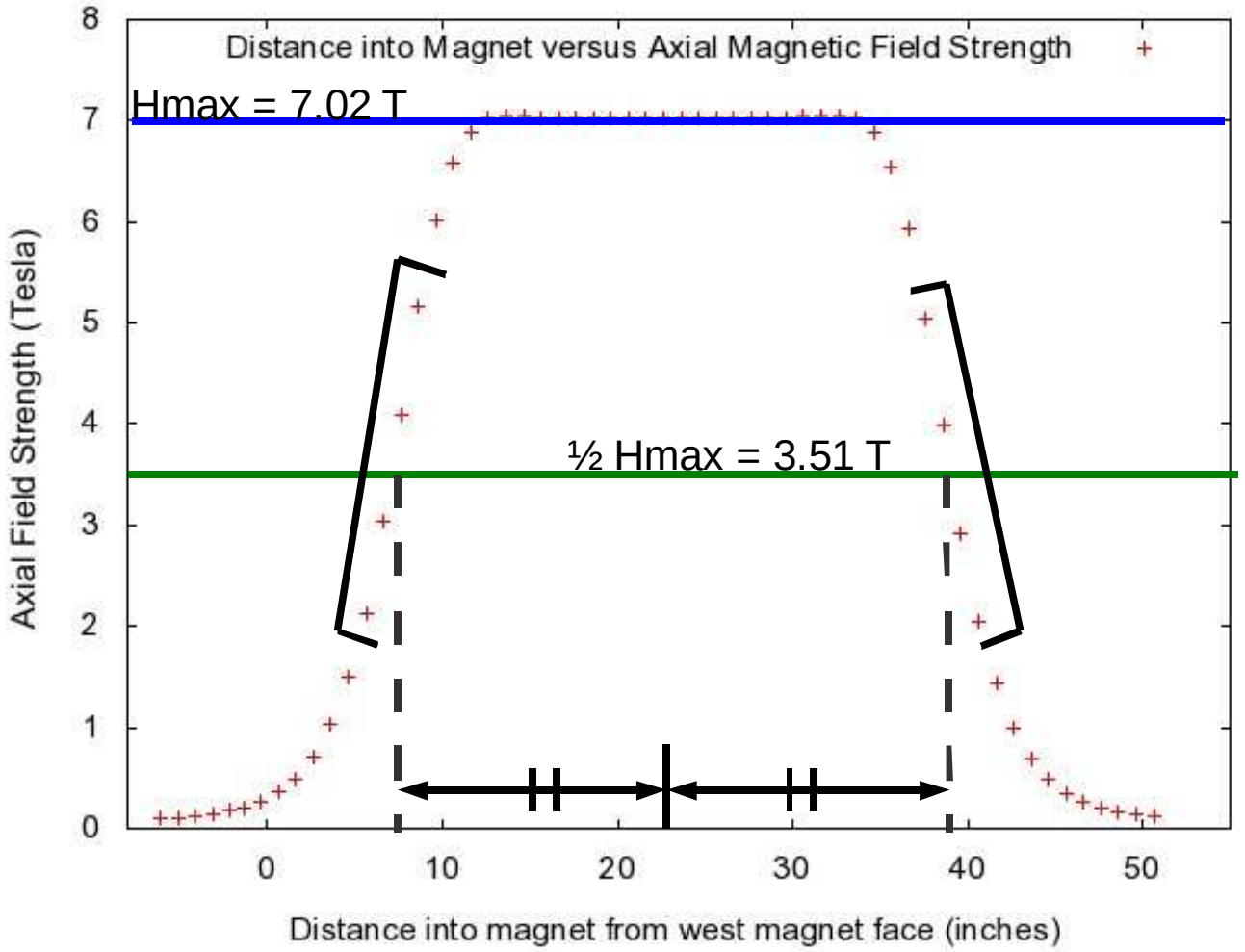
Measurements – Hall Probes

- Axial Probe



- Transverse Probe

Axial Magnetic Field

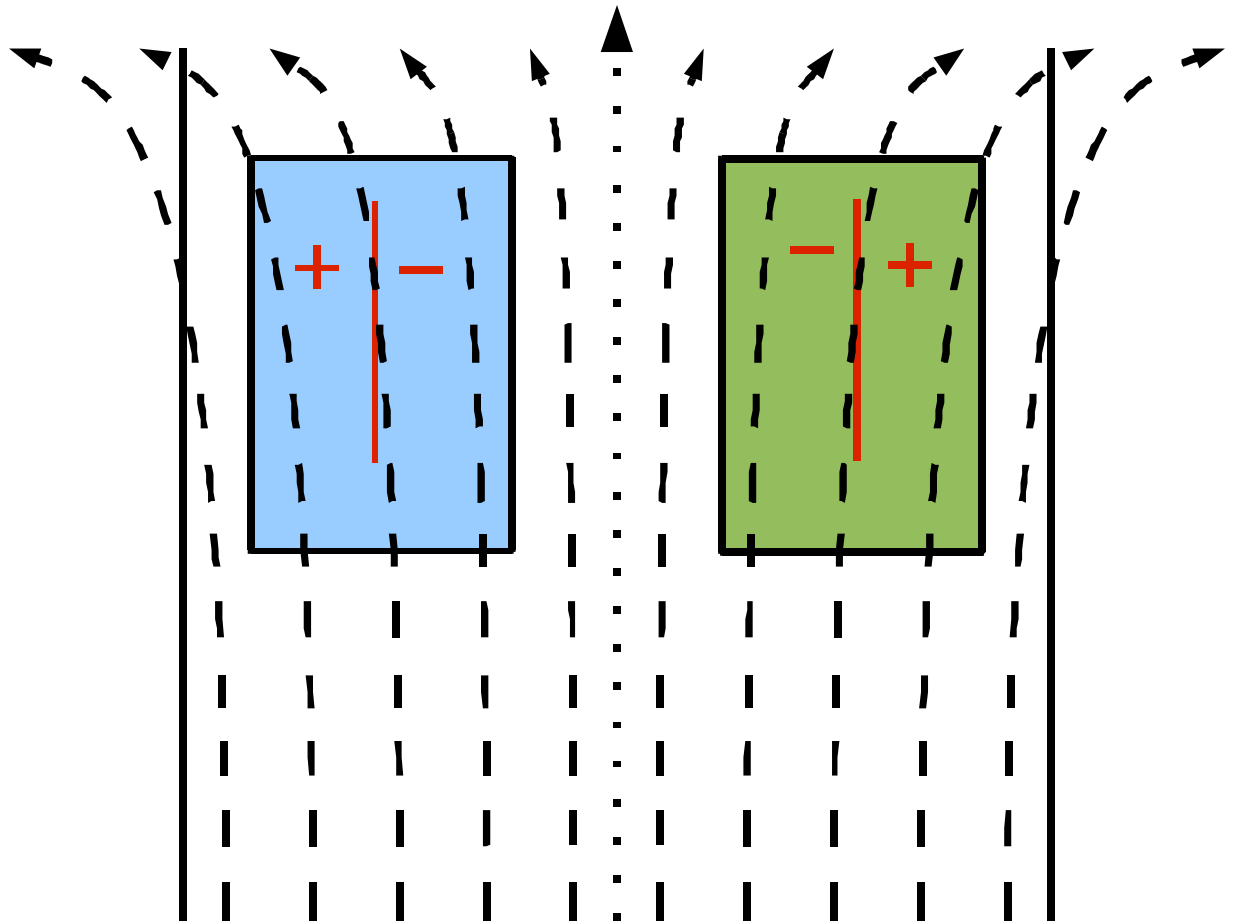


Axial Magnetic Field

- Half field positions were 7.029±0.027” and 39.100 ±0.036” from west magnet face respectively
- Magnetic centre 23.064±0.045” from west magnet face
- Differs from mechanical centre by 0.033” or 0.838 mm

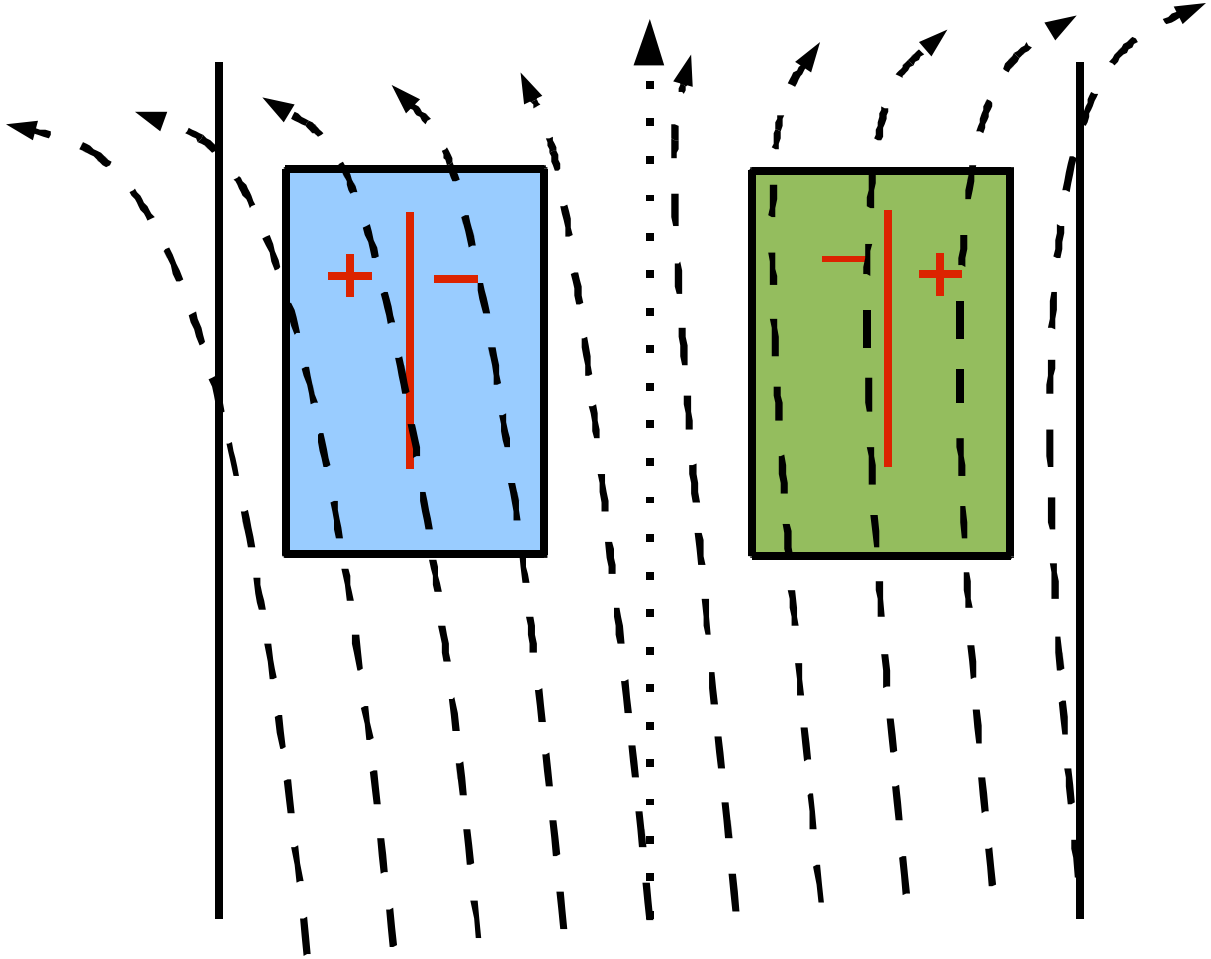
Radial Magnetic Field

Field Axis = Rotation Axis

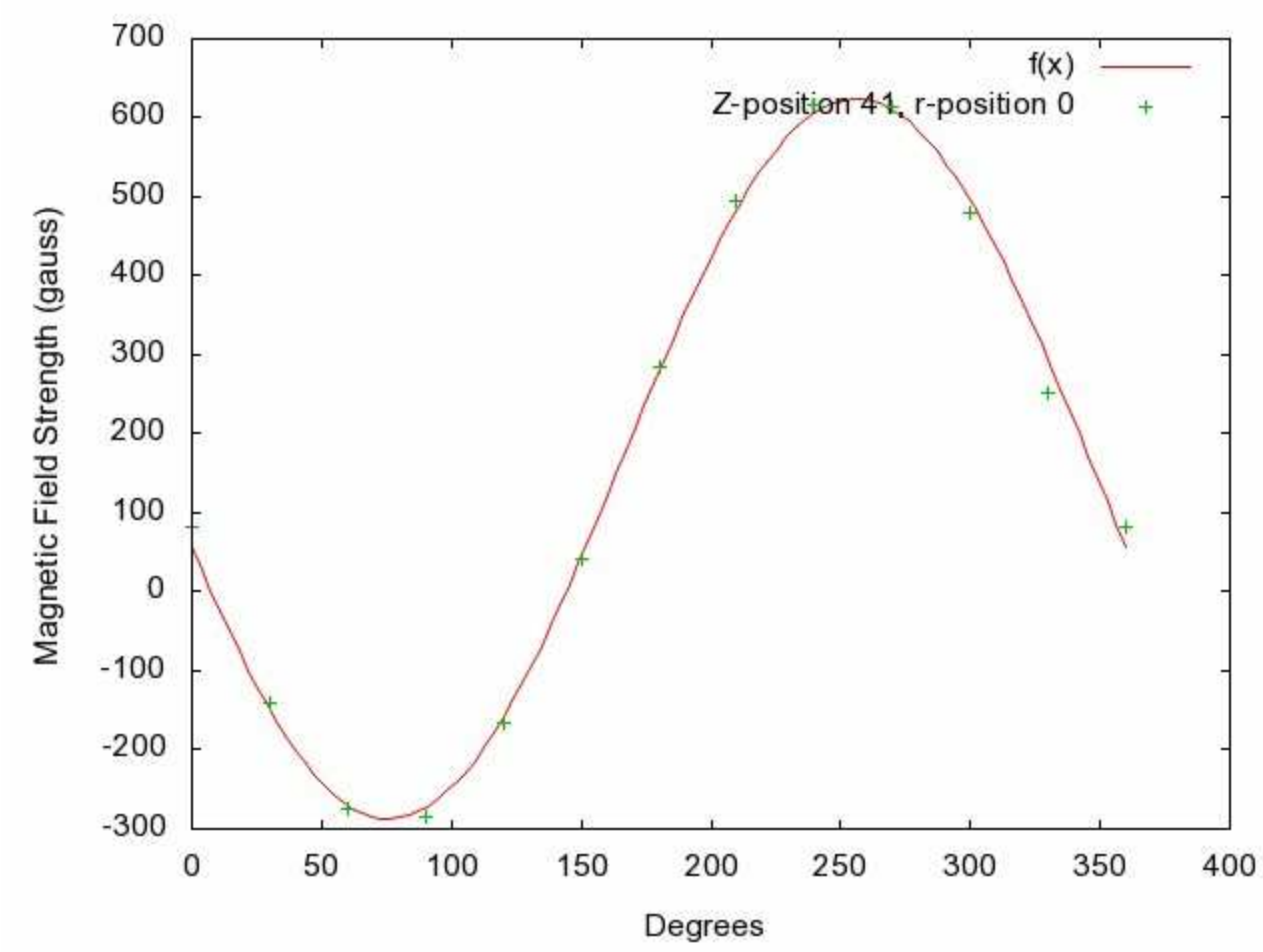


Radial Magnetic Field

Observed Field

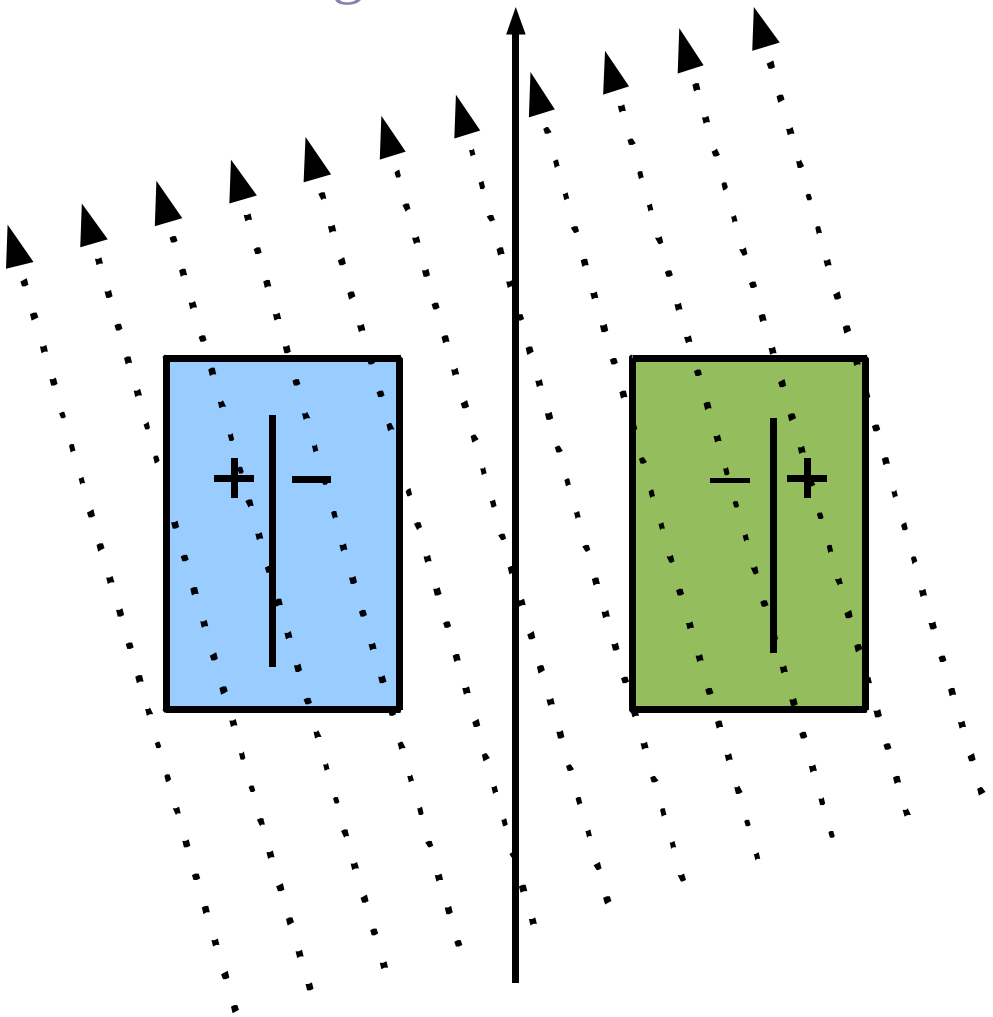


Radial Magnetic Field

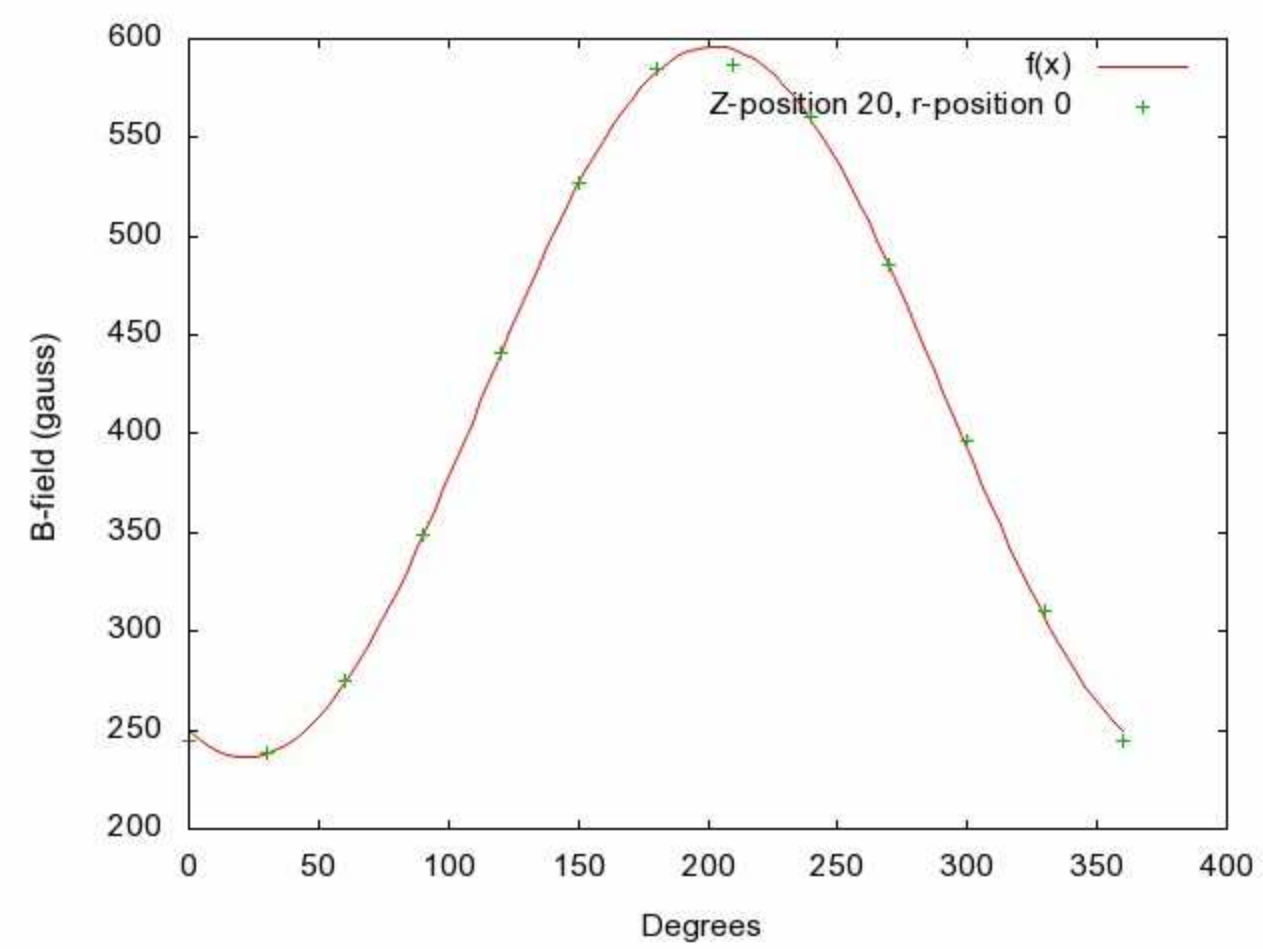


Radial Magnetic Field

Rotation and magnetic fields non-collinear

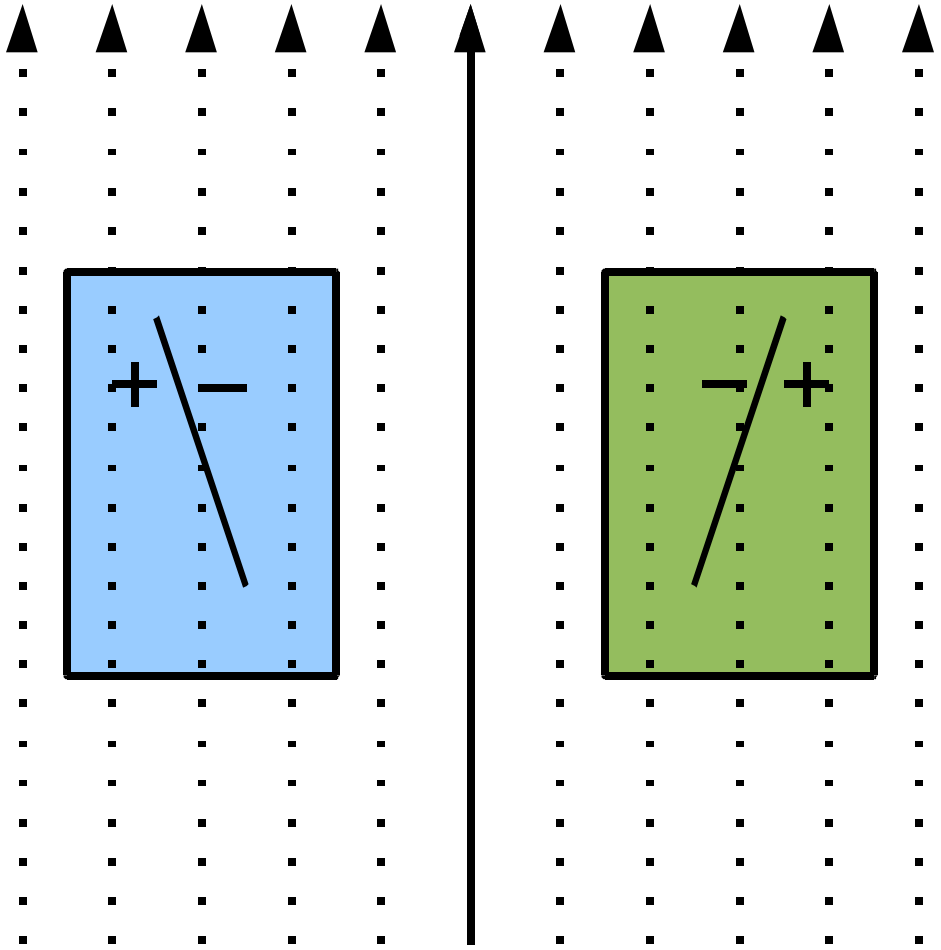


Radial Field Measurements



Radial Magnetic Field

Misalignment of probe

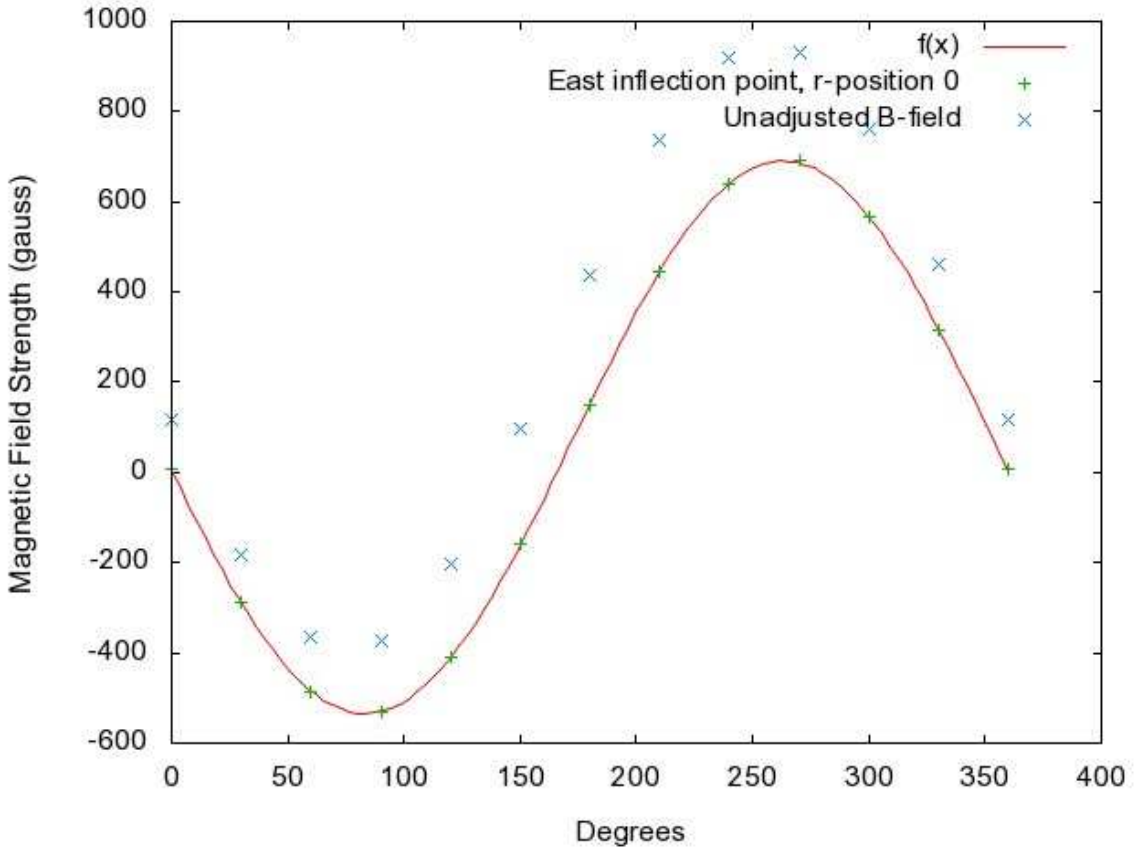


Constant spurious signal due to non-perfect probe mounting

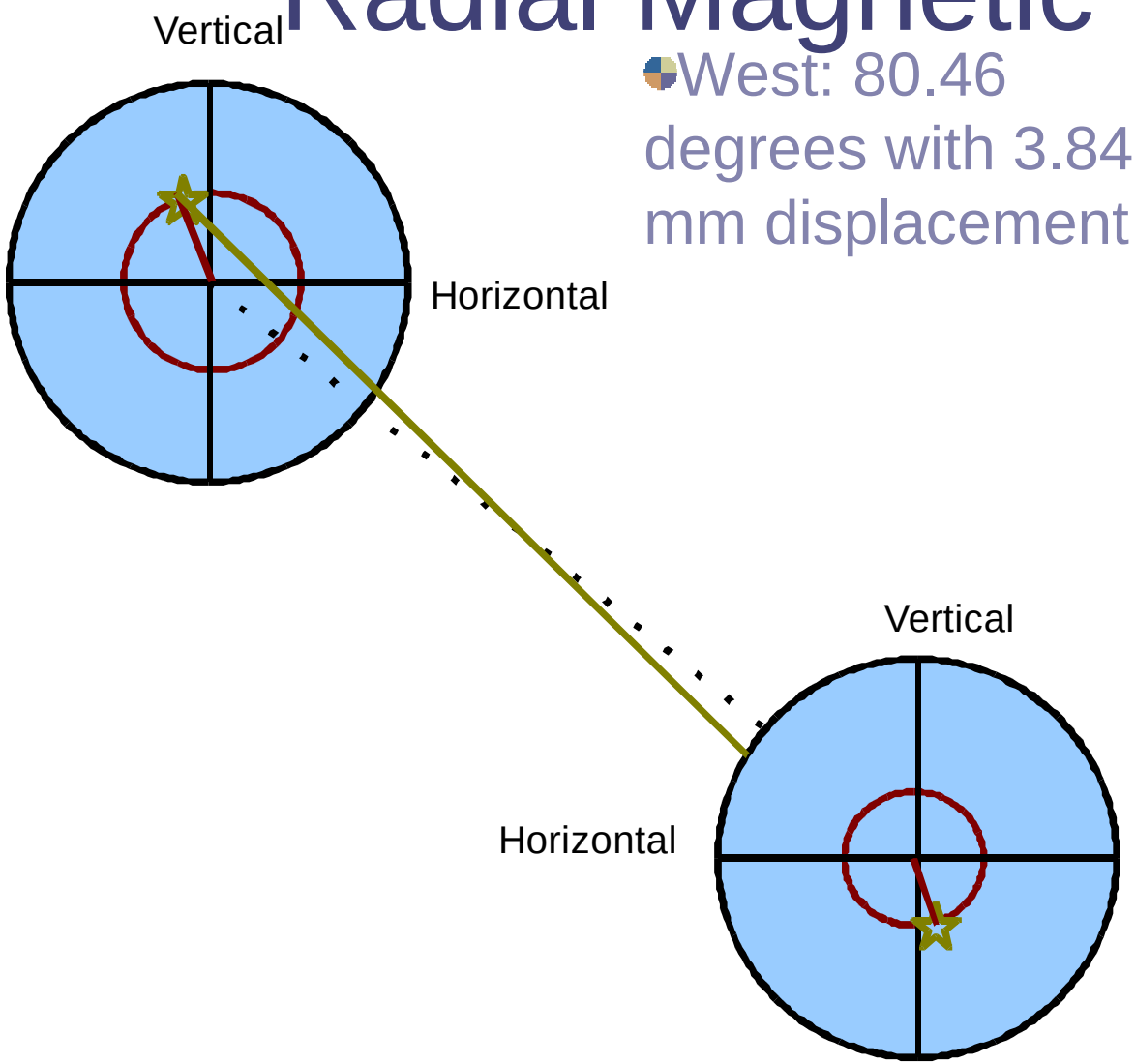
Radial Magnetic Field

- Both spurious components are proportional to the axial field
- Corrections to the radial field were made at each location according to the strength of their axial field counterparts

Radial Magnetic Field



Radial Magnetic Field



- West: 80.46 degrees with 3.84 mm displacement
- East: 282.85 degrees with 2.73 mm displacement

Conclusion

- Field axis determined through central region of the magnet
  - Effects of correction coils unknown
- Field map created onto a three dimensional one inch grid