# BigBite Fringe Field Measurements

Xiaofeng Zhu
Duke University
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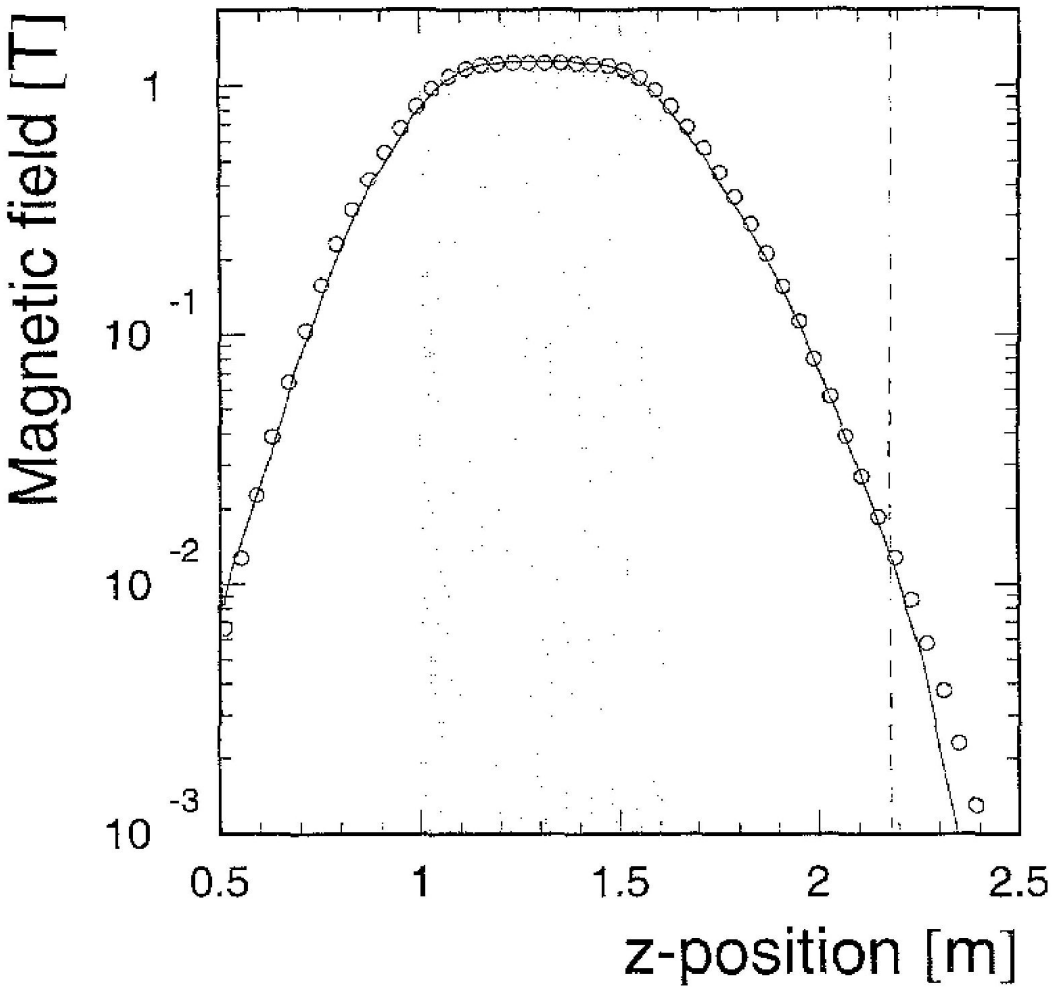
# Finge Field of BigBite Magnet From NIMA(1998)

- Fringe field from BigBite magnet is not negligible~ a few gauss
- Fringe field deviated from theoretical calculation

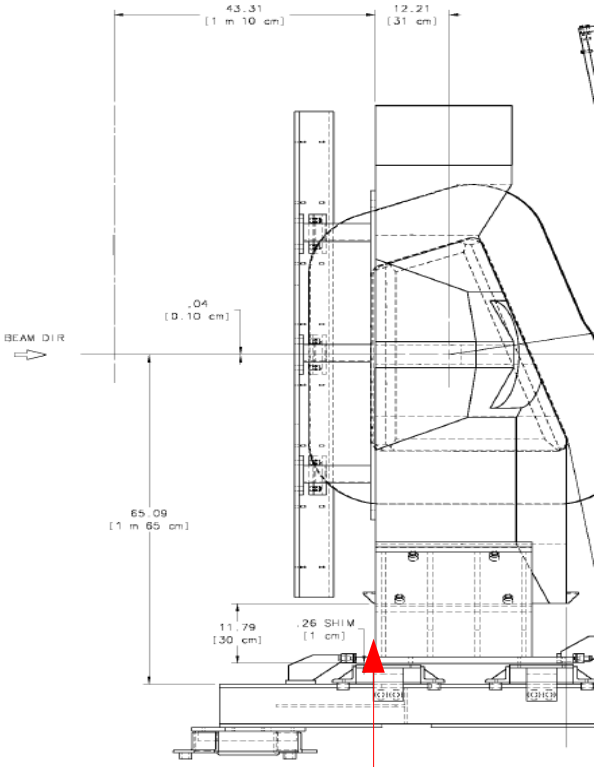


# Effects of BigBite Magnets on Polarized 3He Target

- Fringe field will affect the direction of 34 Gauss holding field
- Fringe field gradients should be small
  - a long cell  polarization life time
    - Field gradient< 20mGauss/cm, related polarization life time>500 hours
  - small polarization loss during spin rotation
  - inhomogeneous field decreases transverse relaxation time T2

# Target and bigbite Magnet configuration

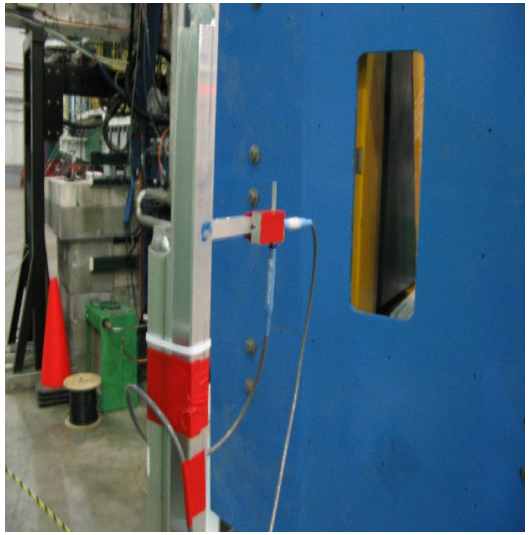
- Polarized 3He target will be 1.5m away from the BigBite
- BigBite location angles
  - Transversity: -30 deg.
  - g2/d2: -45 deg.
  - (e,e'd): -72.8 deg.




1.5 m start from here

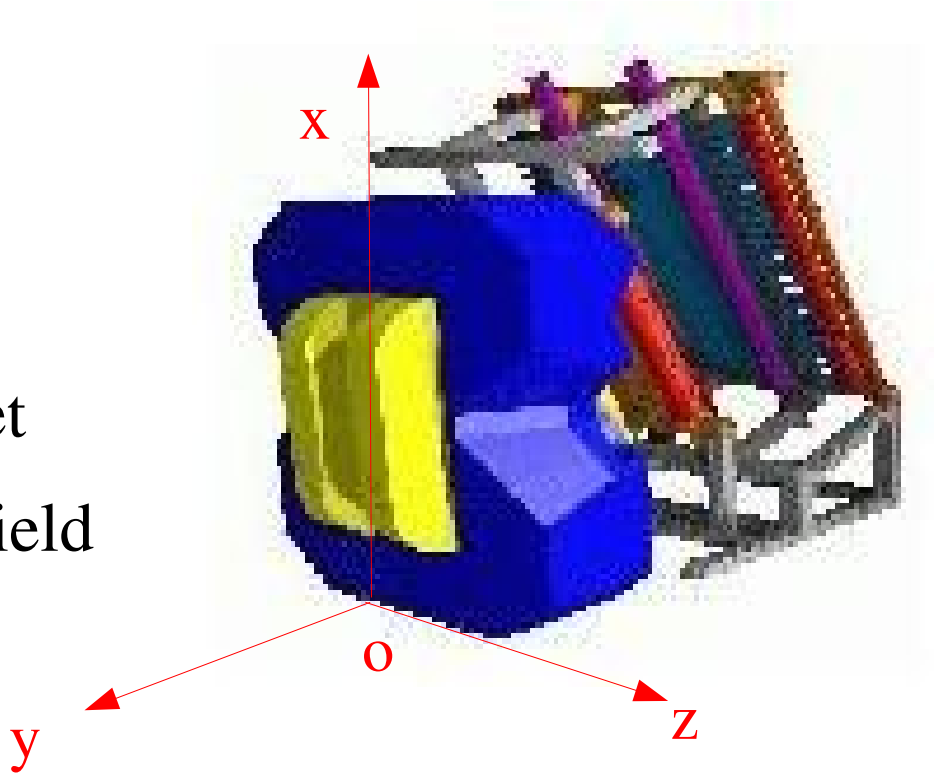
# Field mapping tools

- BigBite current set at 710A
- Lakeshore 475/450 gaussmeter
  - systematic error: 1.0 mGauss
- mapping table

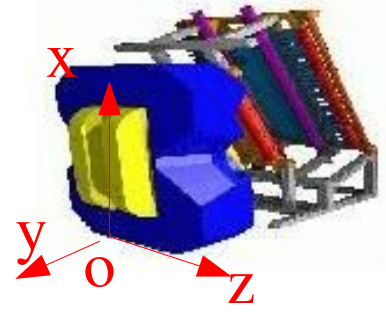


# Axis definition and reference point

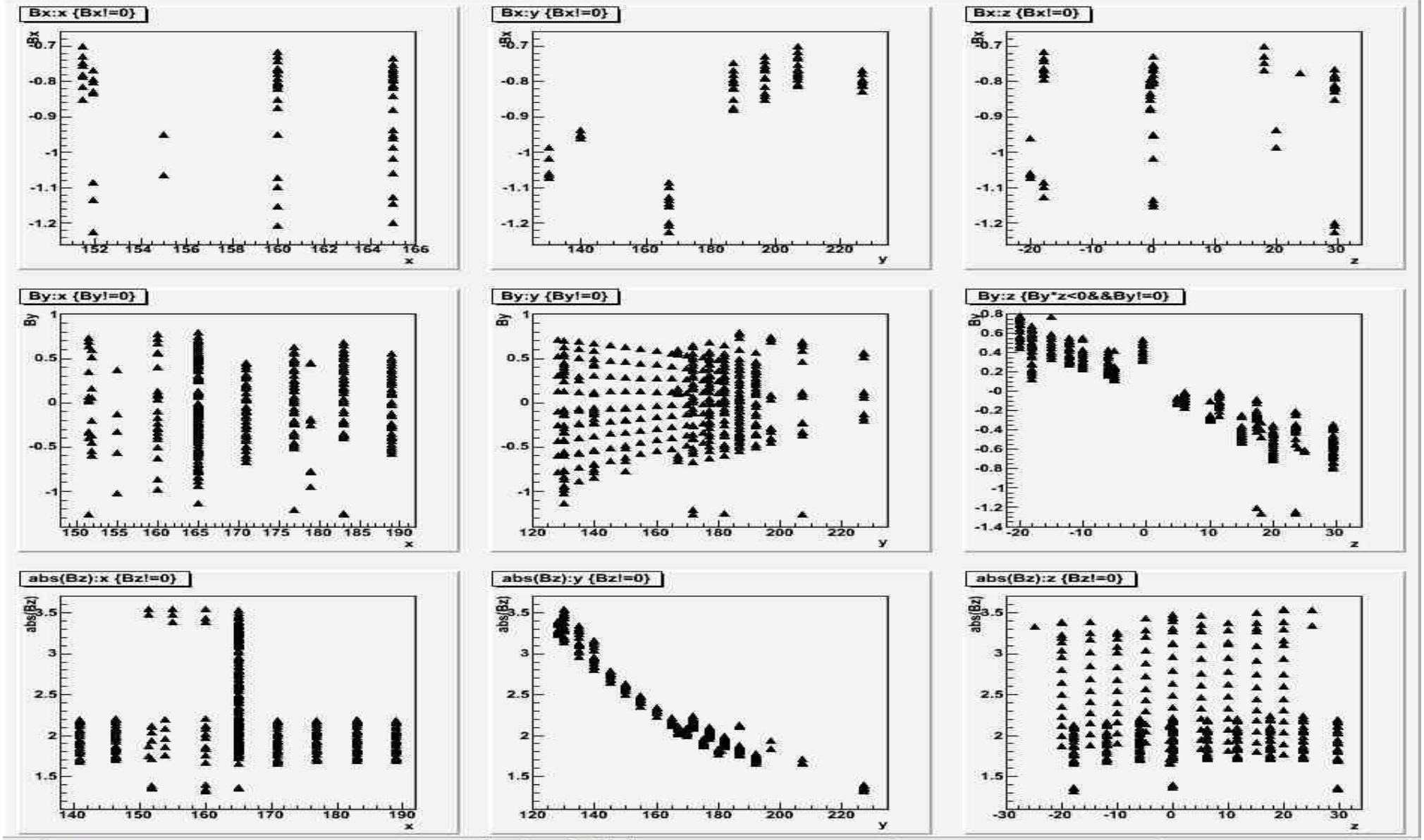
- Reference point on the floor: O (0,0,0)
- x-y plane is the central plane of BigBite
- Axis
  - x: vertical up
  - y: away from the magnet
  - z: parallel to magnetic field
- Target center (165,150,0) unit:cm



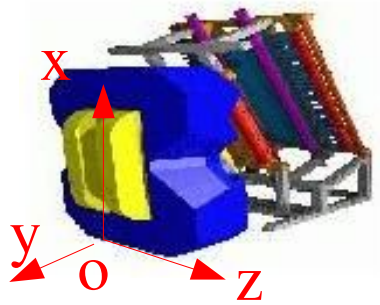
# Field mapping (unit: Gauss)



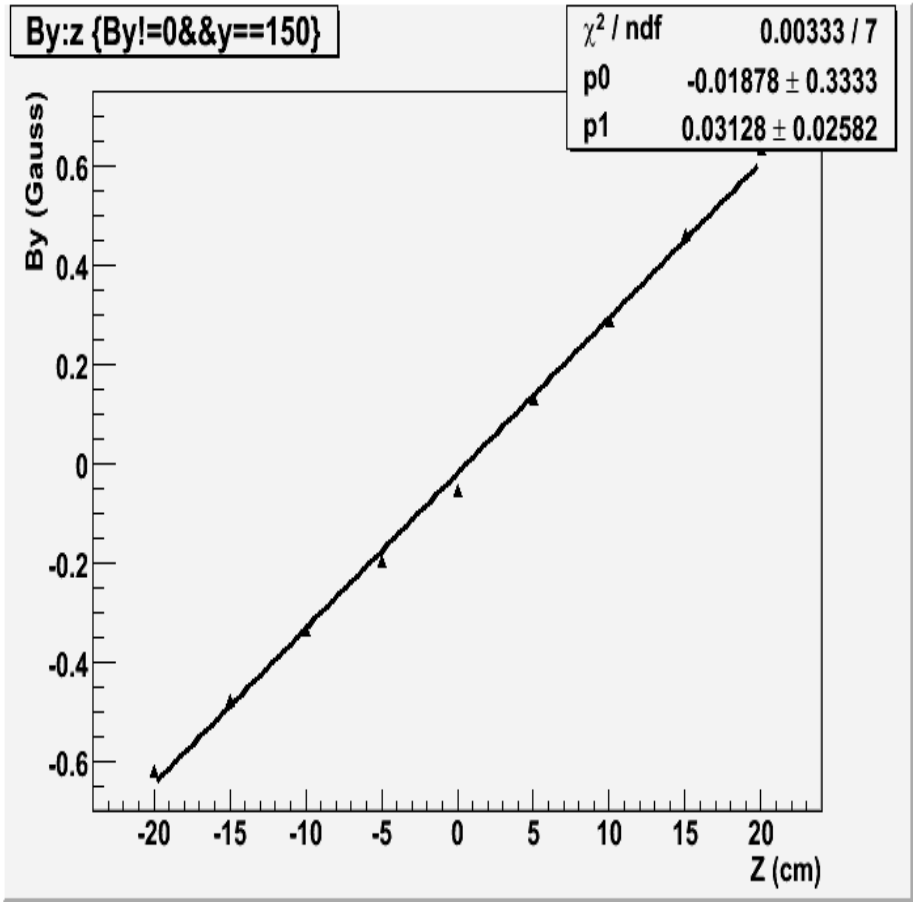

- Target center : x=165, y=150,z= 0 Unit(cm)

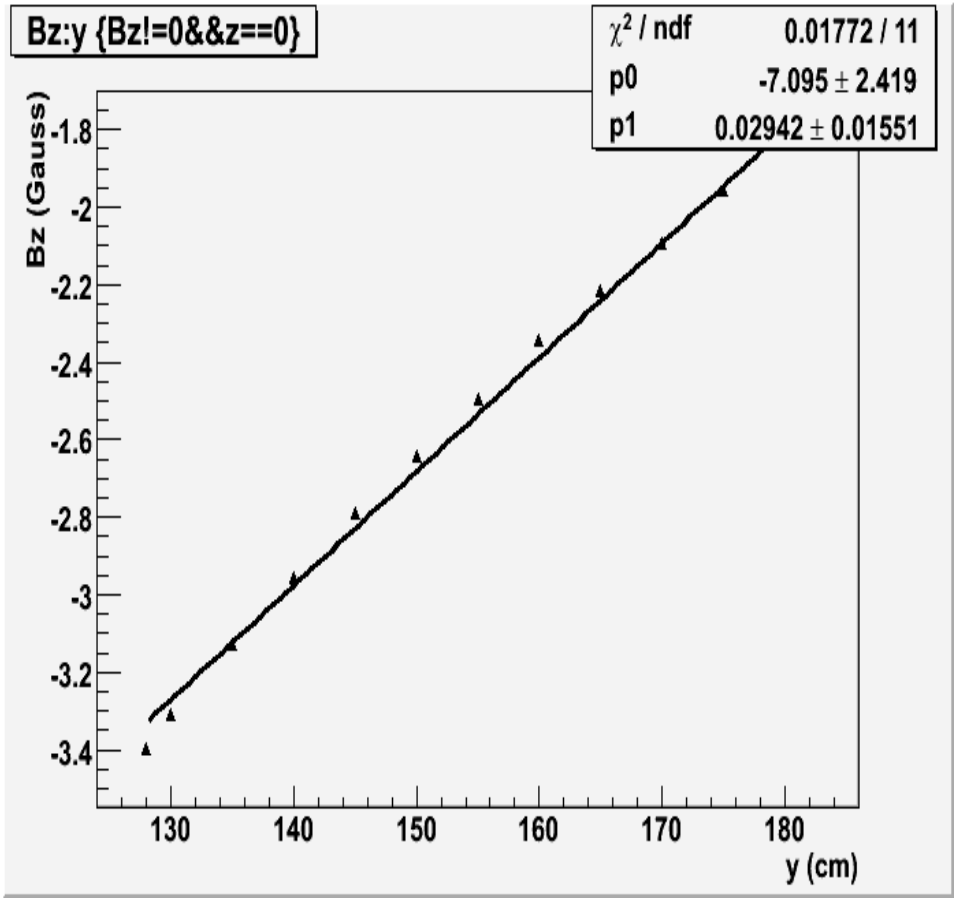


# Field Gradients



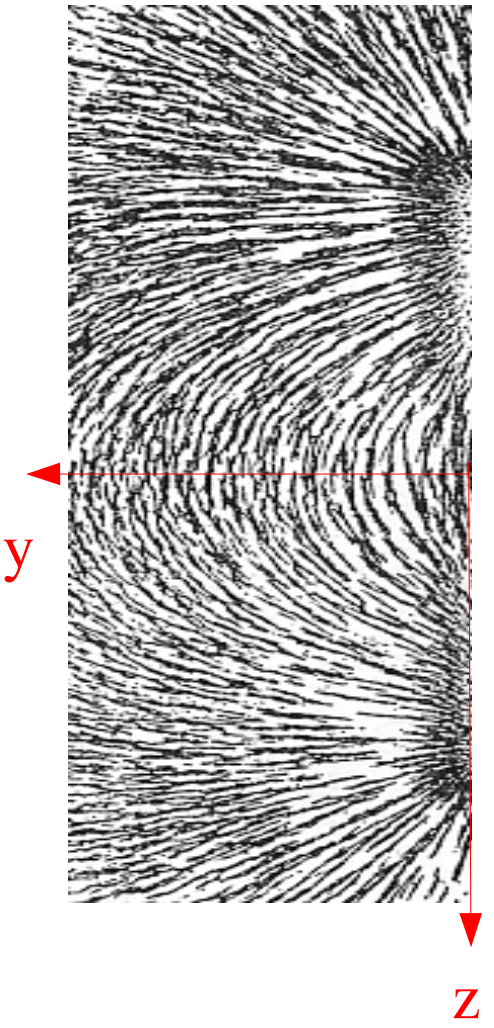

- d(By/z)= 31mG/cm
- d(Bz/y)= 29mG/cm



# How to reduce the gradient field?

- Options
  - Adding field clamp
  - Using compensation coil
  - Reducing BigBite current



Thanks!