## **NPS Fringe Field Considerations**

Deflection = 0.3 x Bdl / E with Bdl in Tm and E in GeV

Impact on beam halo after beam-target interaction1000 Gcm = 0.001 Tm0.3 Bdl / E  $\rightarrow$  0.0003 / E  $\rightarrow$  0.3 mr / EFront of dump tunnel @ distance of ~30m  $\rightarrow$  0.9 cm / EAssume want to stay in say 8" flange $\rightarrow$  +/- 10 cm $\rightarrow$  down to E = 100 MeV stays within flangeConclusion: 1000 Gcm is safe as fringe field for beam halo after beam-target interaction

Impact on HMS optics

200 G at the HMS vacuum snout

- ightarrow 0.01 Tm (snout is bout 50 cm long)
- $\rightarrow$  1 mr deflection @ 3 GeV/c

This seems too much, need to reduce to say 1000 Gcm  $\rightarrow$  0.1 mr deflection @ 3 GeV/c.

How close to HMS Q1 can one put iron shell around snout without impacting HMS optics? Bore of Q1 = 20.5 cm radius = 41 cm diameter Typical rule of thumb: field dies out at 3 times the bore diameter away from quad entrance at 2 times the bore diameter away from quad entrance effect a few % Distance(pivot – Q1 magnetic field edge) = 1.76 m Distance(pivot – front slits) = 1.26 m, or to front of slit chamber = 1.20 m → Would prefer to not have iron "last 30 cm" of vacuum snout

