Agenda for 1:45 pm meeting

1. Alina 15' nTMM analysis update
2. Cary 5' update on finishing the paper 2024/2021 paper
3. Yuri 10' First preliminary results from UT mu-metal prototype test
4. Mubi 10' UKY mu-metal news. How field COMSOL reconstruction will work.
5. Linus 10' Update from LU.
6. Evan 5' Finishing coordinates reconstruction of mag. field measurements

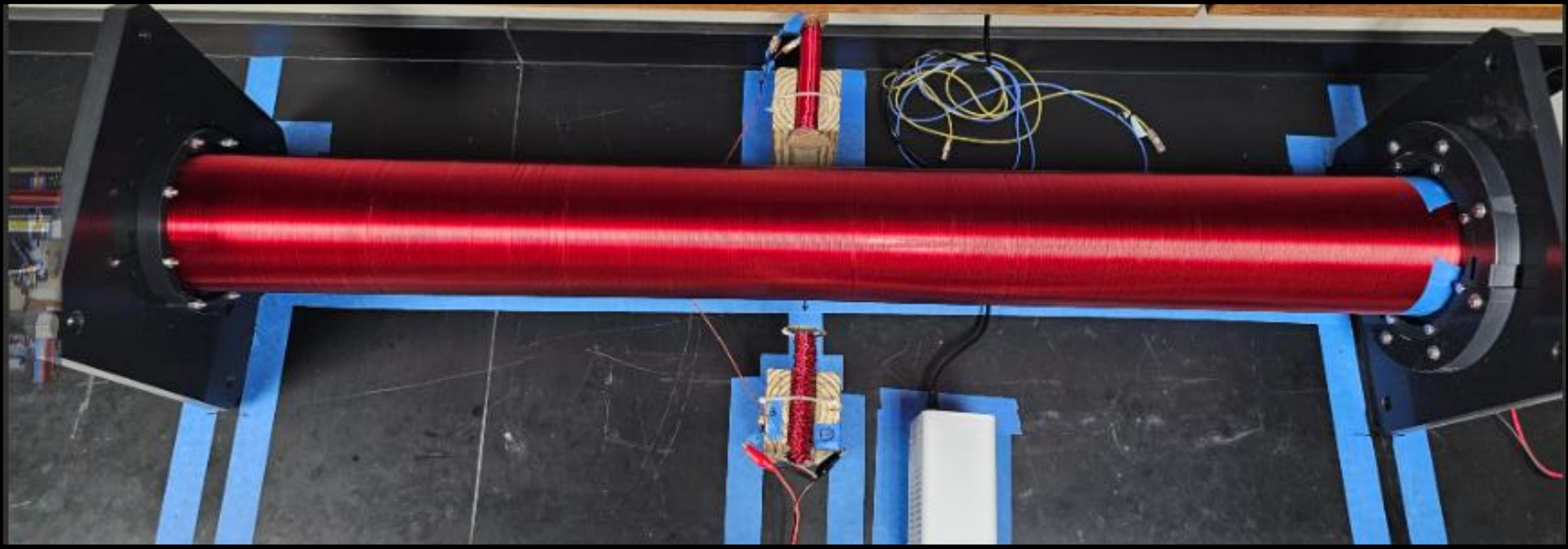
Initial measurement with μ-prototype at UT

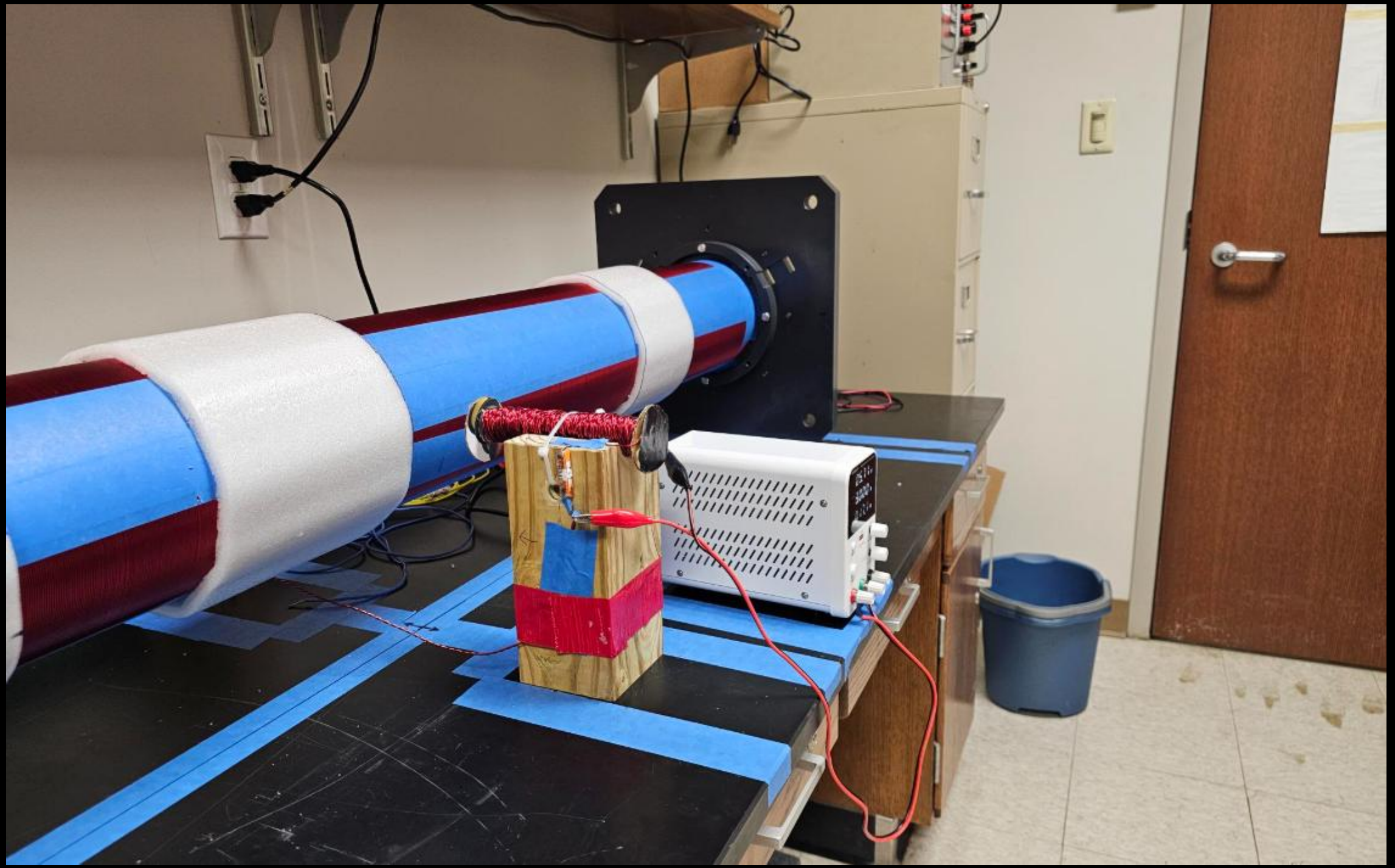
What was measured

1. magnet no μ-metal, with/without perturbation

2. magnet with 0.3 mm μ shield with/without perturbation

length 60” , coil diameter 6.5”

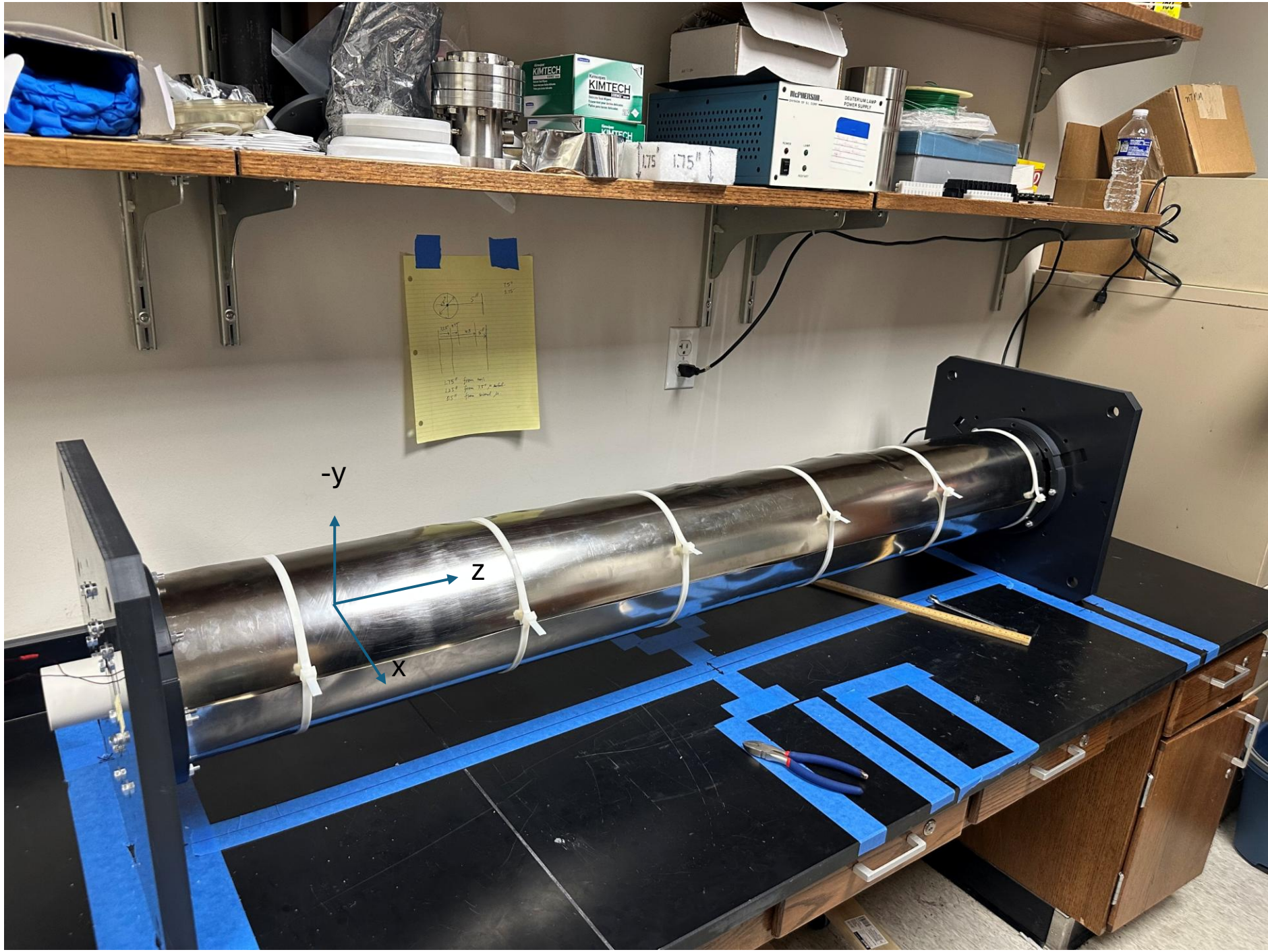




μ-metal shield 0.3 mm installed by Evan, Connor, and Shaun on 11/14/2025

Coil Current 0.5 A produces solenoidal z-field ~ 10 Gauss

Perturbation 3.0A produces transversal field B_x ~ 5 Gauss



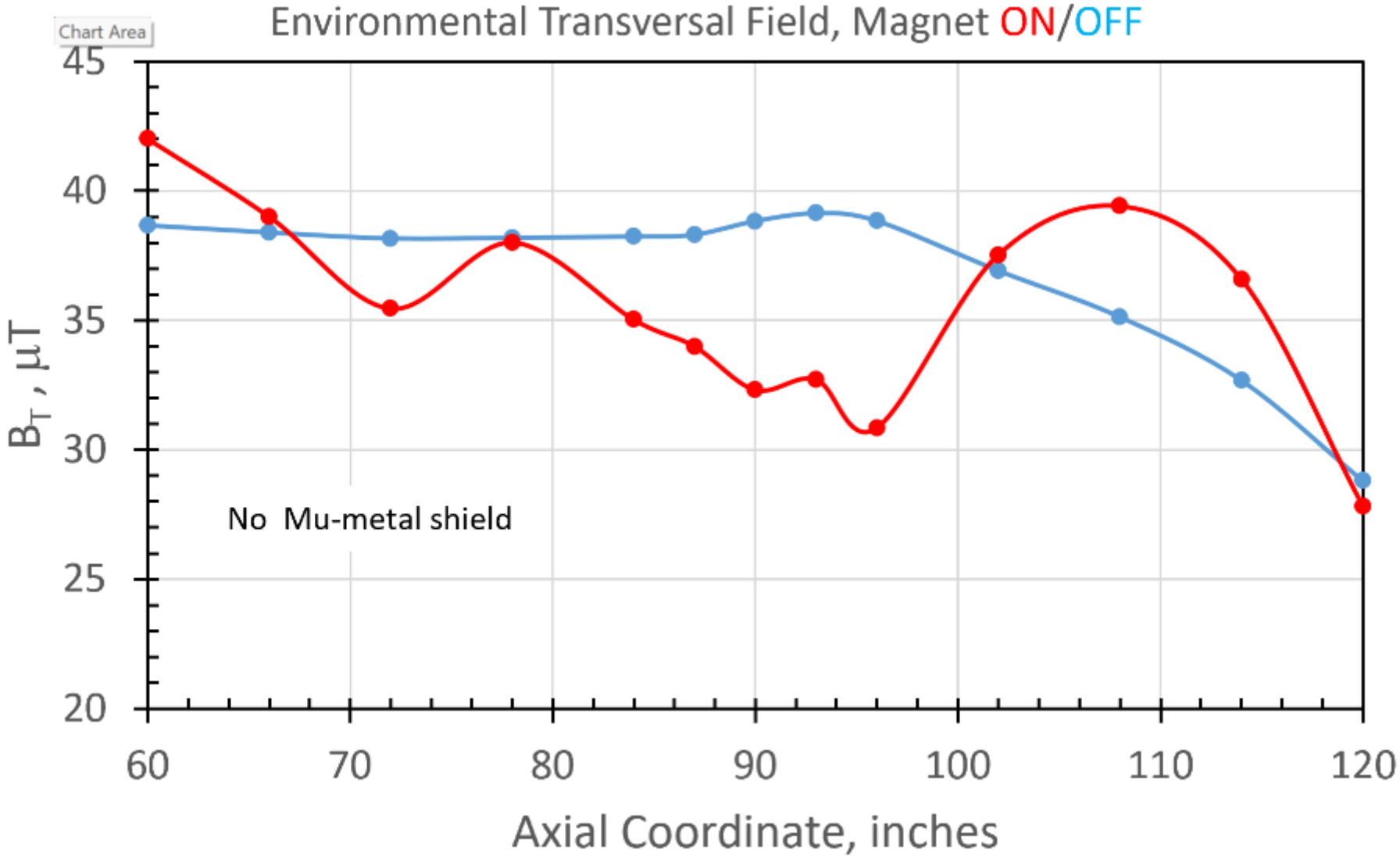
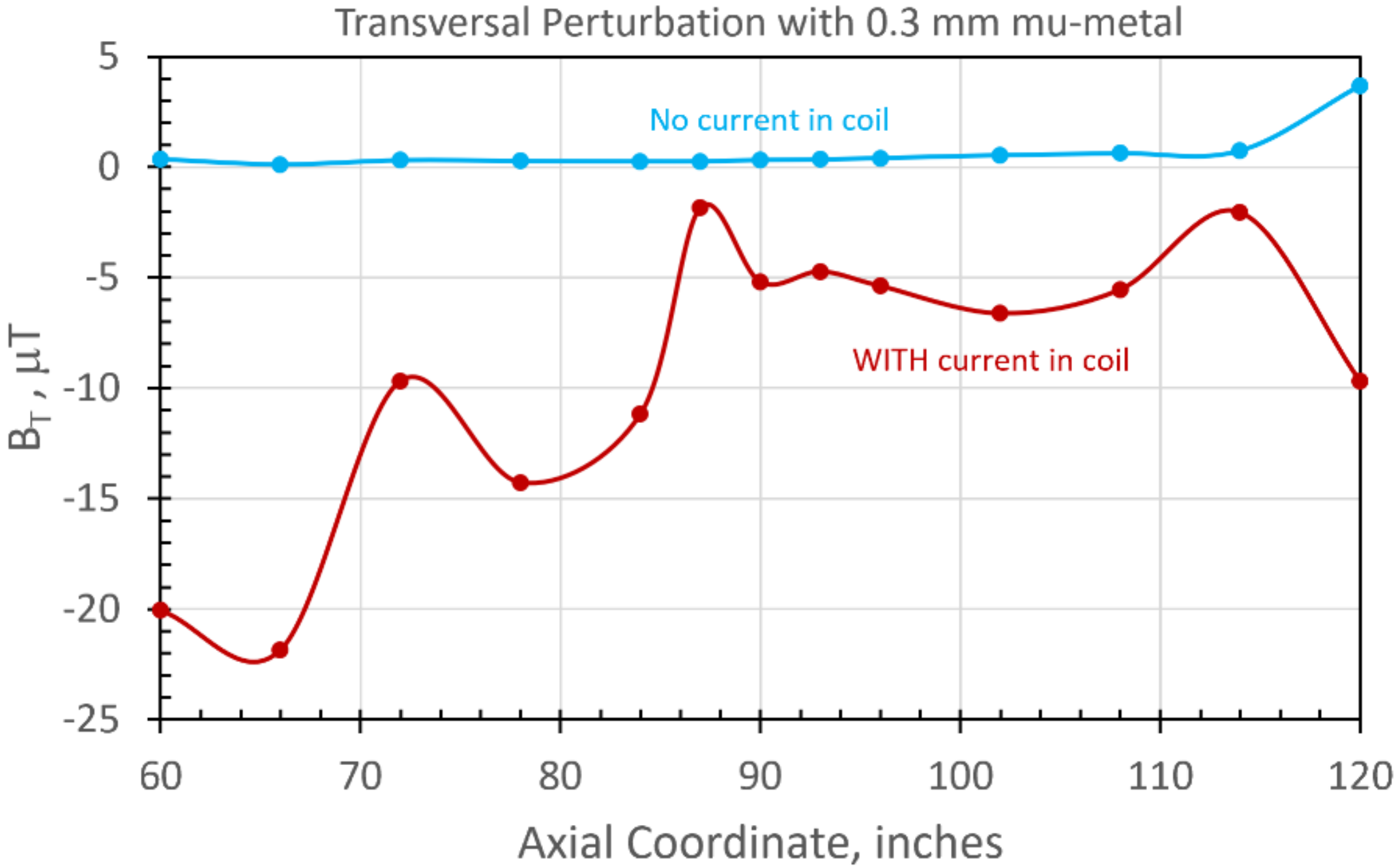
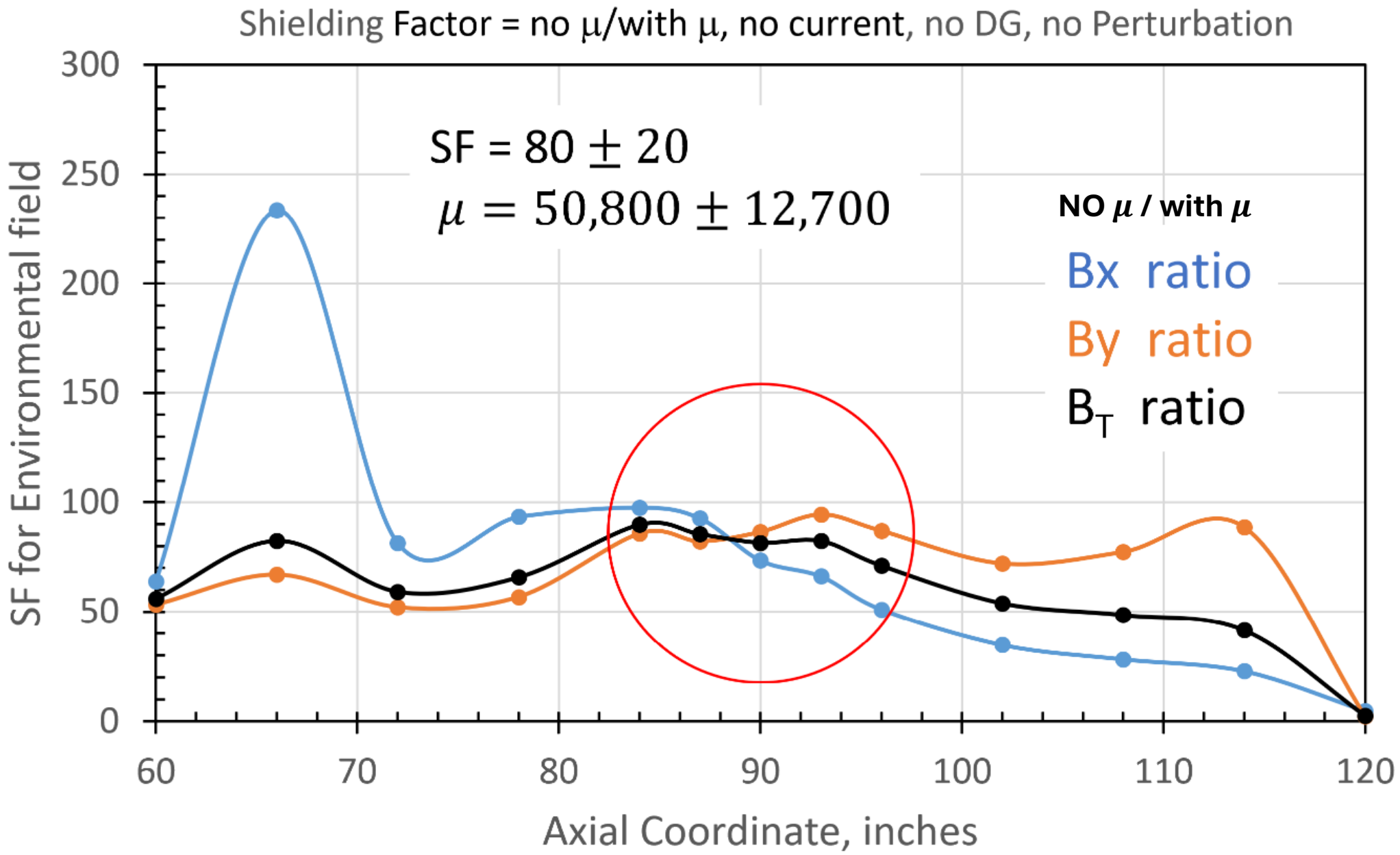
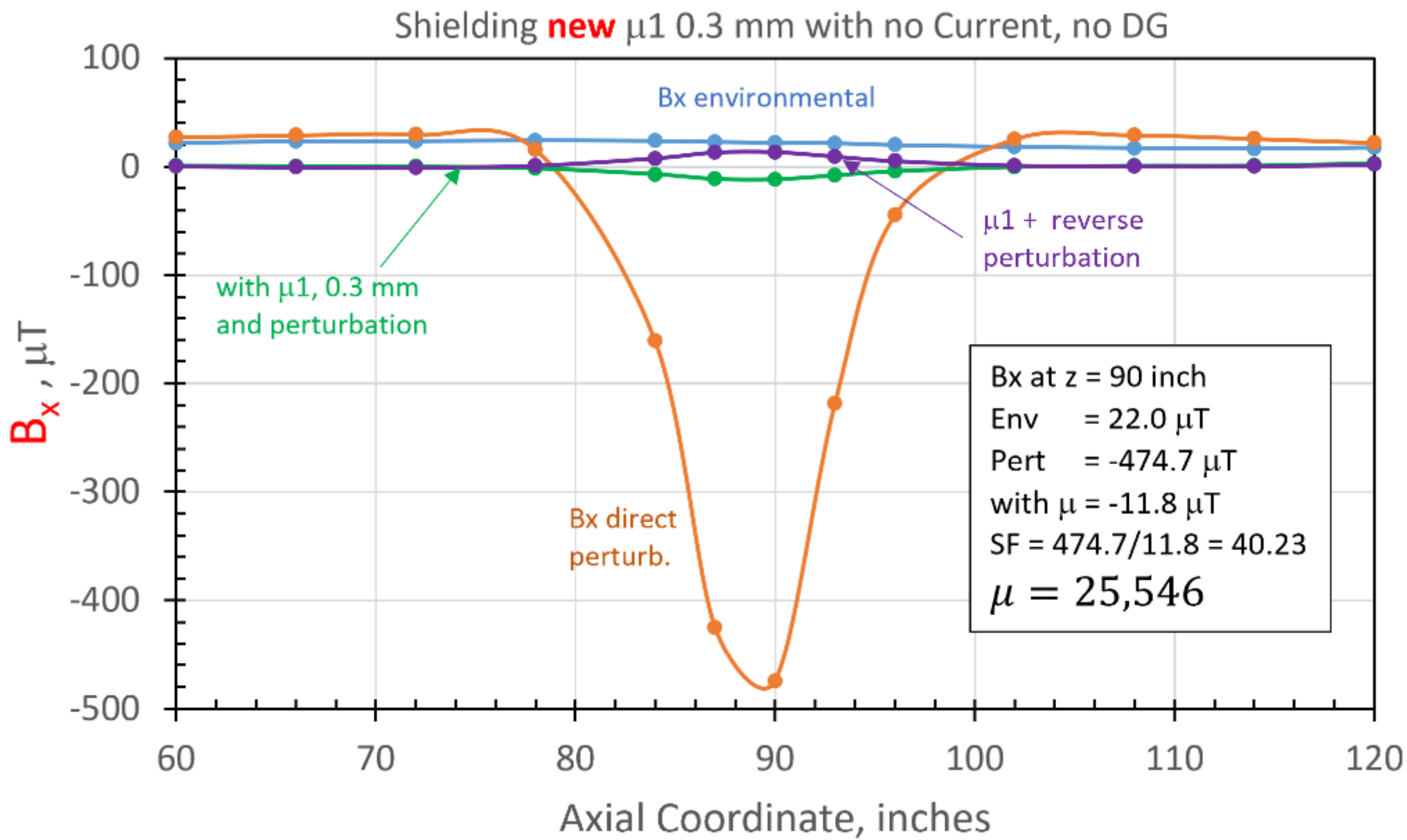


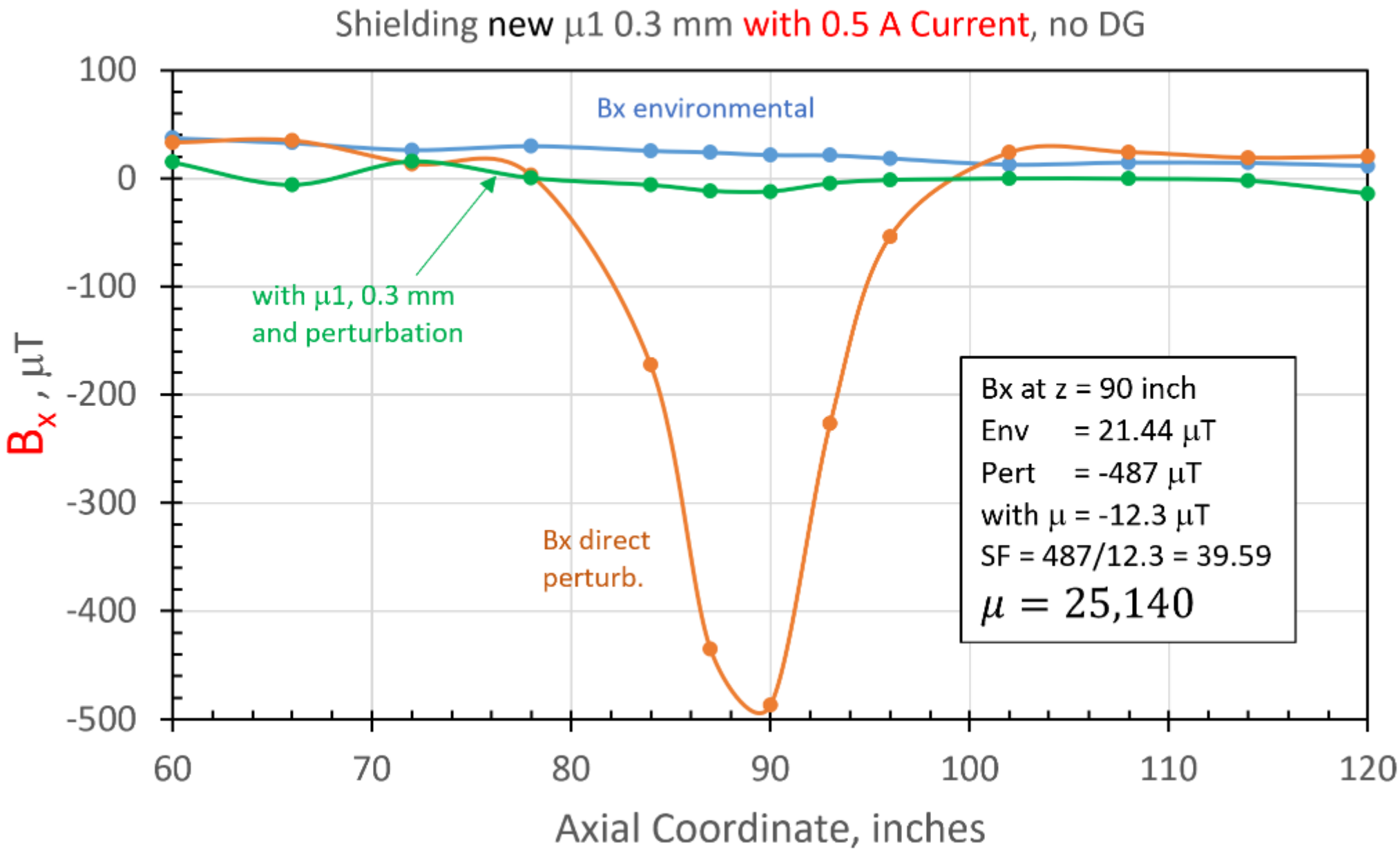
Chart Area
Environmental Transversal Field, Magnet ON/OFF
45
40
35
30
25
20
B_T , μT
No Mu-metal shield
60
70
80
90
100
110
120
Axial Coordinate, inches


Transversal Perturbation with 0.3 mm mu-metal
No current in coil
WITH current in coil
B_T , μT
5
0
-5
-10
-15
-20
-25
60
70
80
90
100
110
120
Axial Coordinate, inches

Shielding factor for environmental field, no current




Shielding new μ1 0.3 mm with no Current, no DG
Bx environmental
with μ1, 0.3 mm
and perturbation
μ1 + reverse
perturbation
Bx direct
perturb.
Bx at z = 90 inch
Env = 22.0 μT
Pert = -474.7 μT
with μ = -11.8 μT
SF = 474.7/11.8 = 40.23
$\mu = 25{,}546$
B_x , μT
100
0
-100
-200
-300
-400
-500
60
70
80
90
100
110
120
Axial Coordinate, inches



Preliminary: degaussing can give additional factor of~ 4

Some preliminary observations

- We see μ ~ 25,000 with one 0.3 mm mu-shield. Shielding factor ~ 40.
- It confirms Mubi's previous measurements.
- with 0.6 mm (like in experiment) shielding factor should be ~ x2 = 80
- Second layer should produce additional shielding factor ~ 32
- 80 x 32 ≈ 2,500, so perturbation of 8 Gauss should produce effect of 0.003 Gauss
- Our step in nTMM measurements was ~ 0.04 Gauss

- We should start any measurements with Degaussing. We did not.
- It seems that Degaussing should be done after all environmental magnetic configuration is set and will not change
- Will study SF vs coil current and vs perturbation magnitude
- How SF changes after slow change of current in coil (like in nTMM scan)