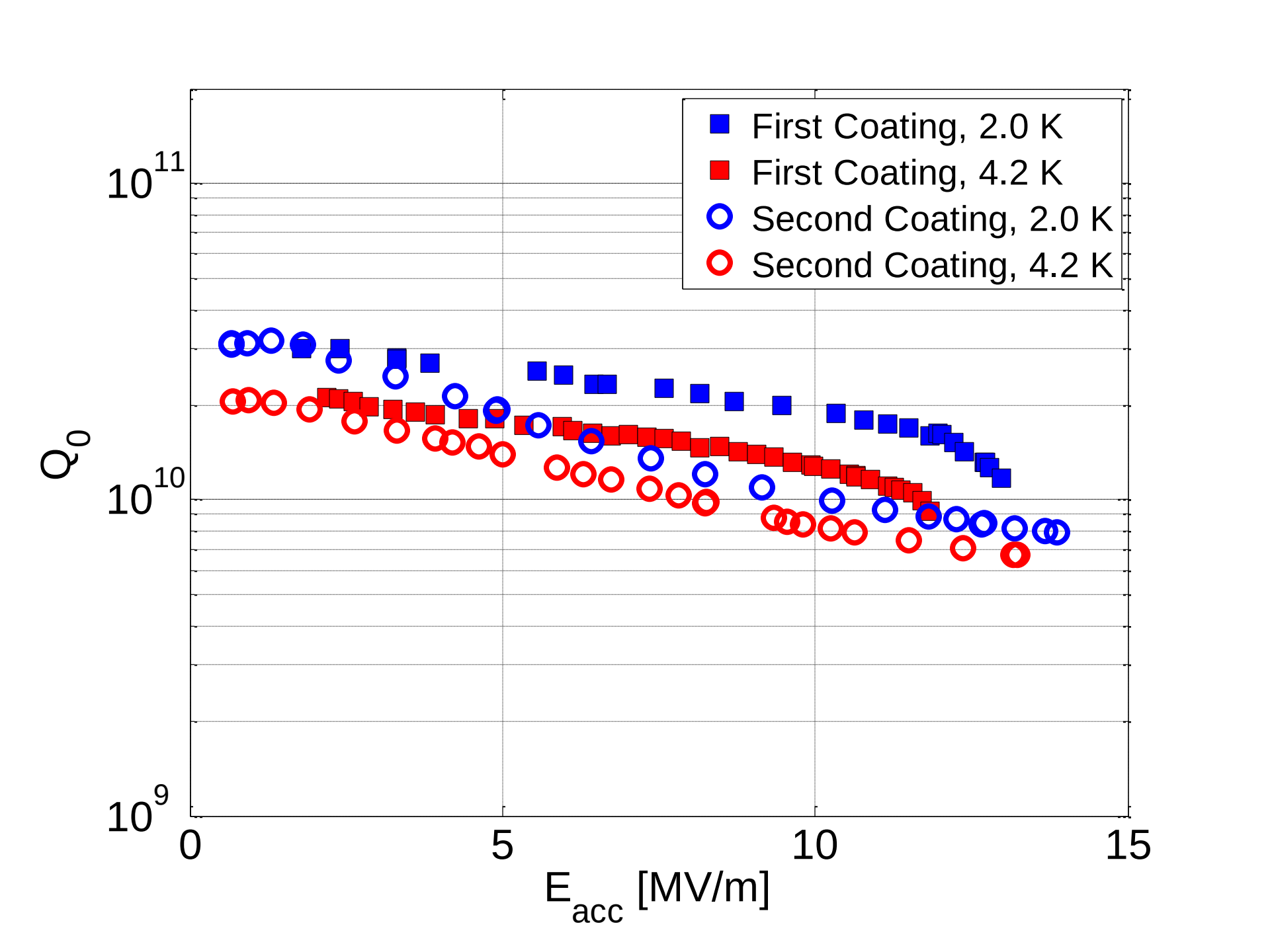
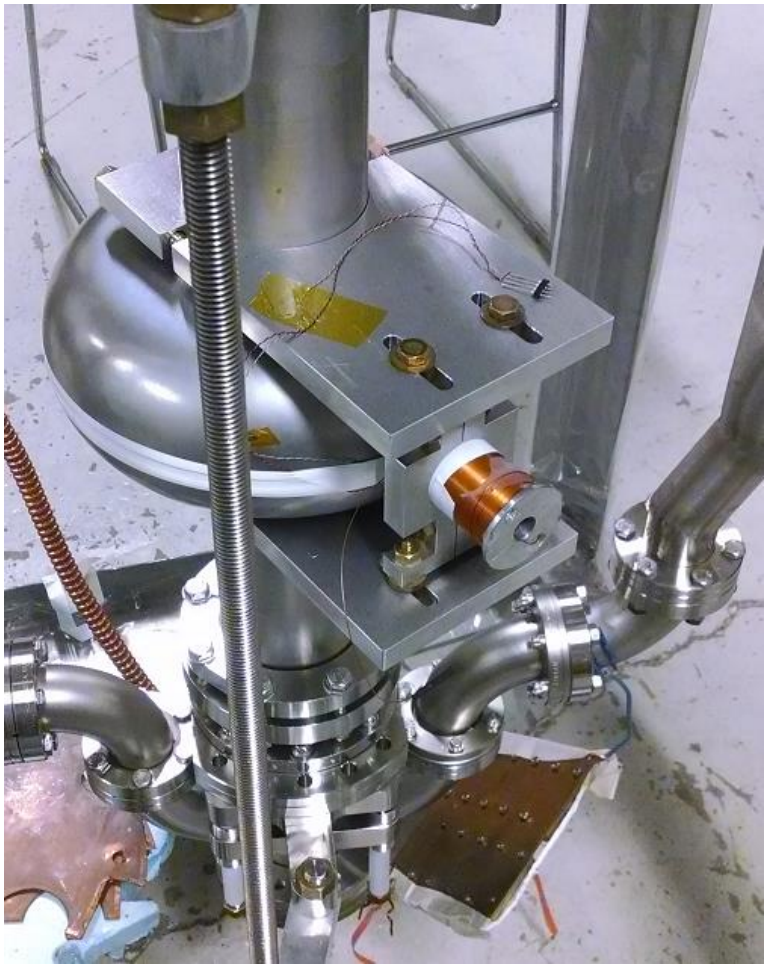
Nb_3Sn Cavity ERL1-4

- History of ERL1-4
  - *Nb_3Sn coating, just HPR*
    - Test shows relatively flat Q vs E up to quench at ~13 MV/m, Q~1e10
  - *5x HF rinse, HPR*
    - November test shows Q-slope
  - *120 K Torture*
    - Test shows no degradation
  - *Remove coating with BCP*
    - Baseline test: good performance up to 20 MV/m
  - *Recoat with same parameters*
    - Test shows performance is repeatable

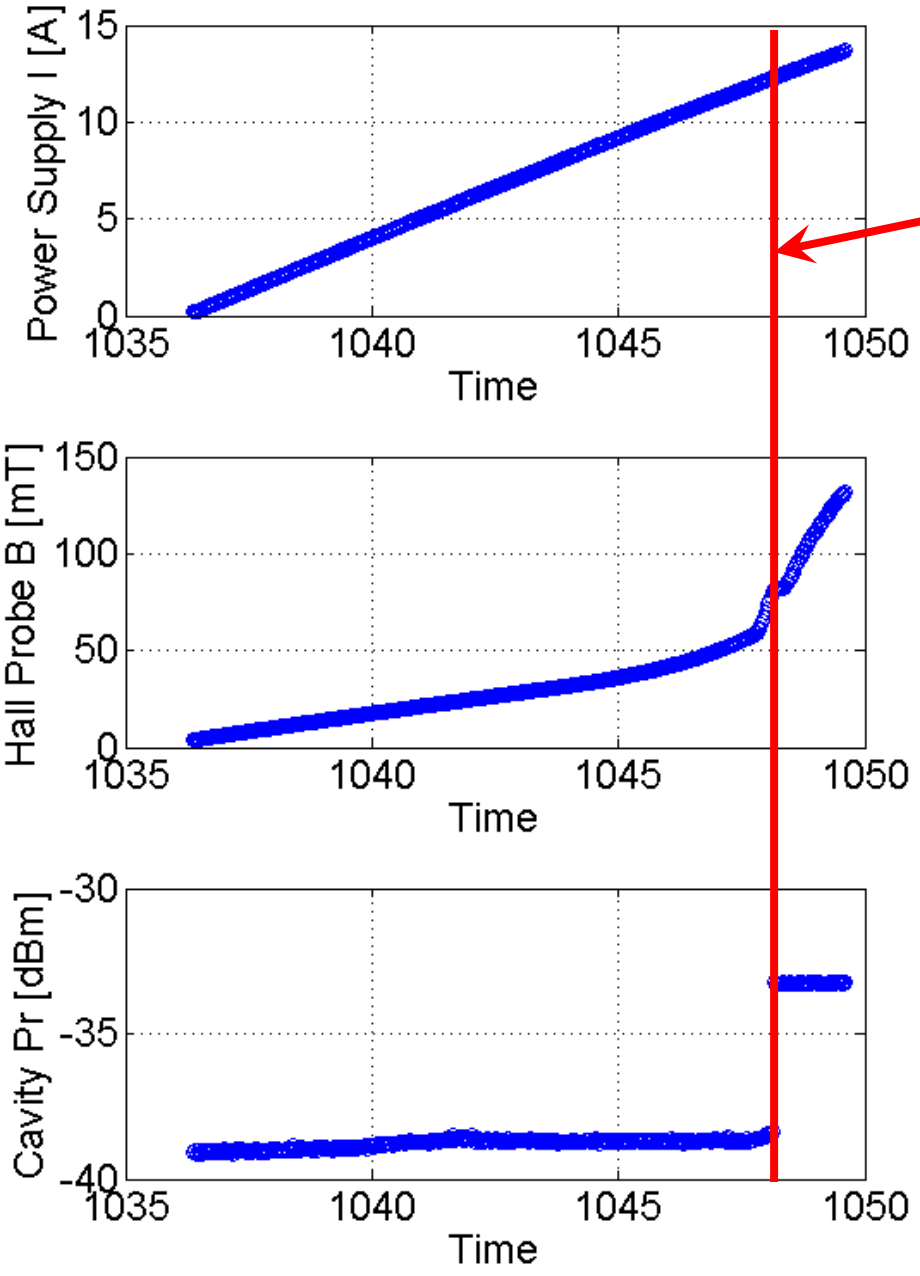

First Coating, 2.0 K
First Coating, 4.2 K
Second Coating, 2.0 K
Second Coating, 4.2 K
10^{11}
10^{10}
10^{9}
Q_0
0
5
10
15
E_{acc} [MV/m]

Measuring DC Flux Penetration Field

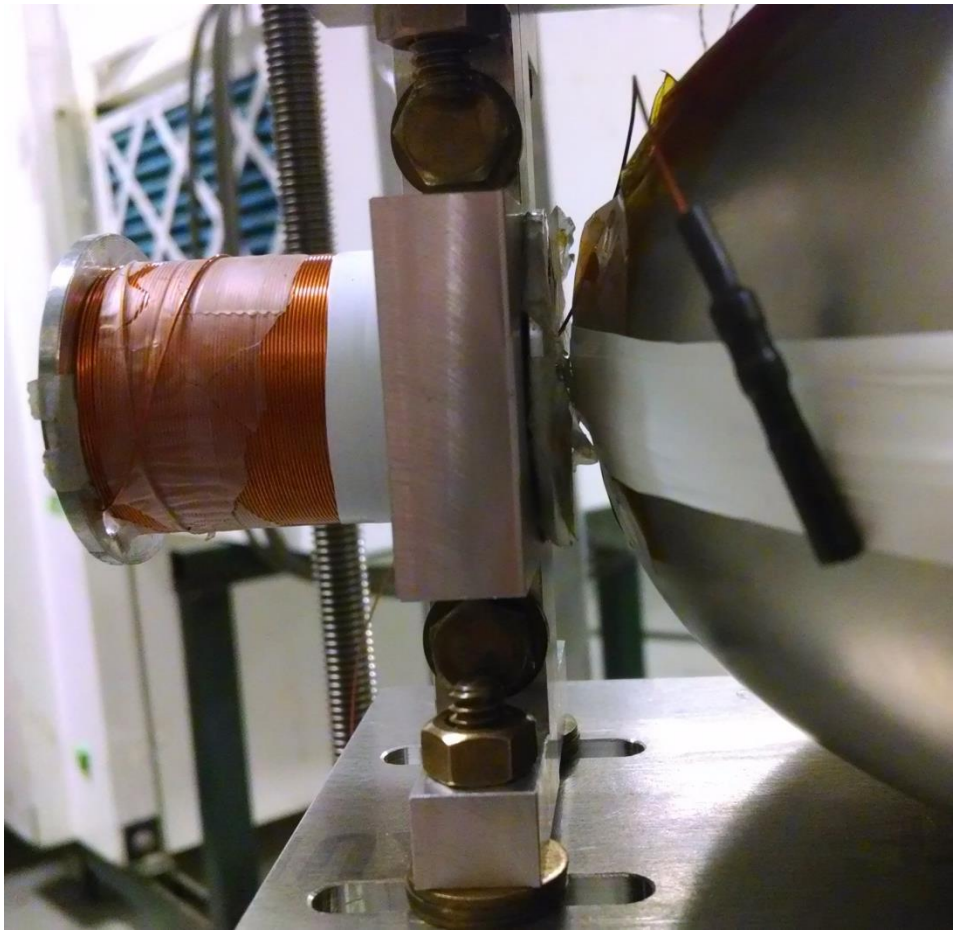
- Nick made a 1760-winding NbTi solenoid
- Get cavity to a few MV/m, then apply DC field, watch Pt (or Pr)
- When RF field drops, flux from DC field has penetrated to RF surface
- Hall probe measures magnetic field



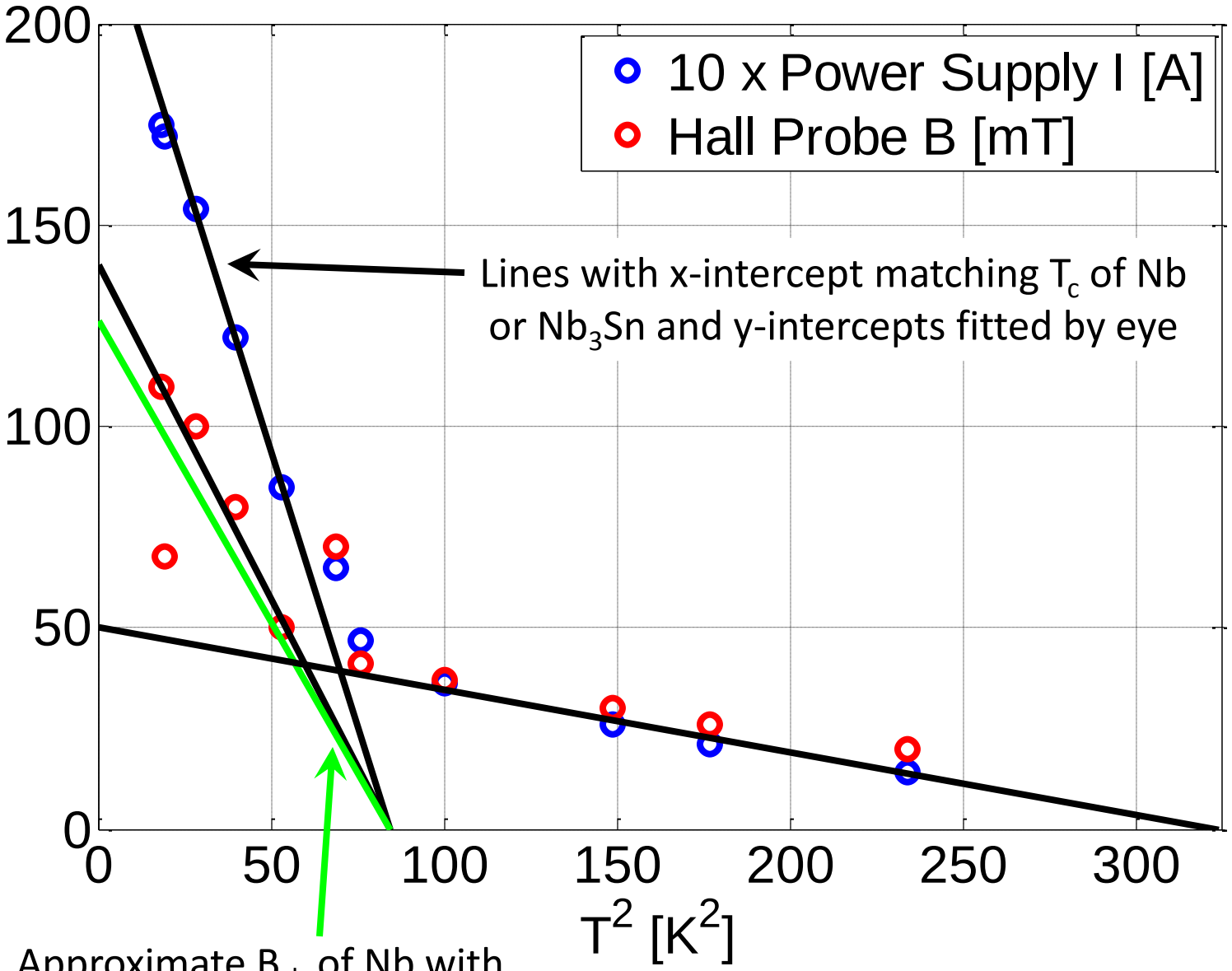
T = 6.3 K



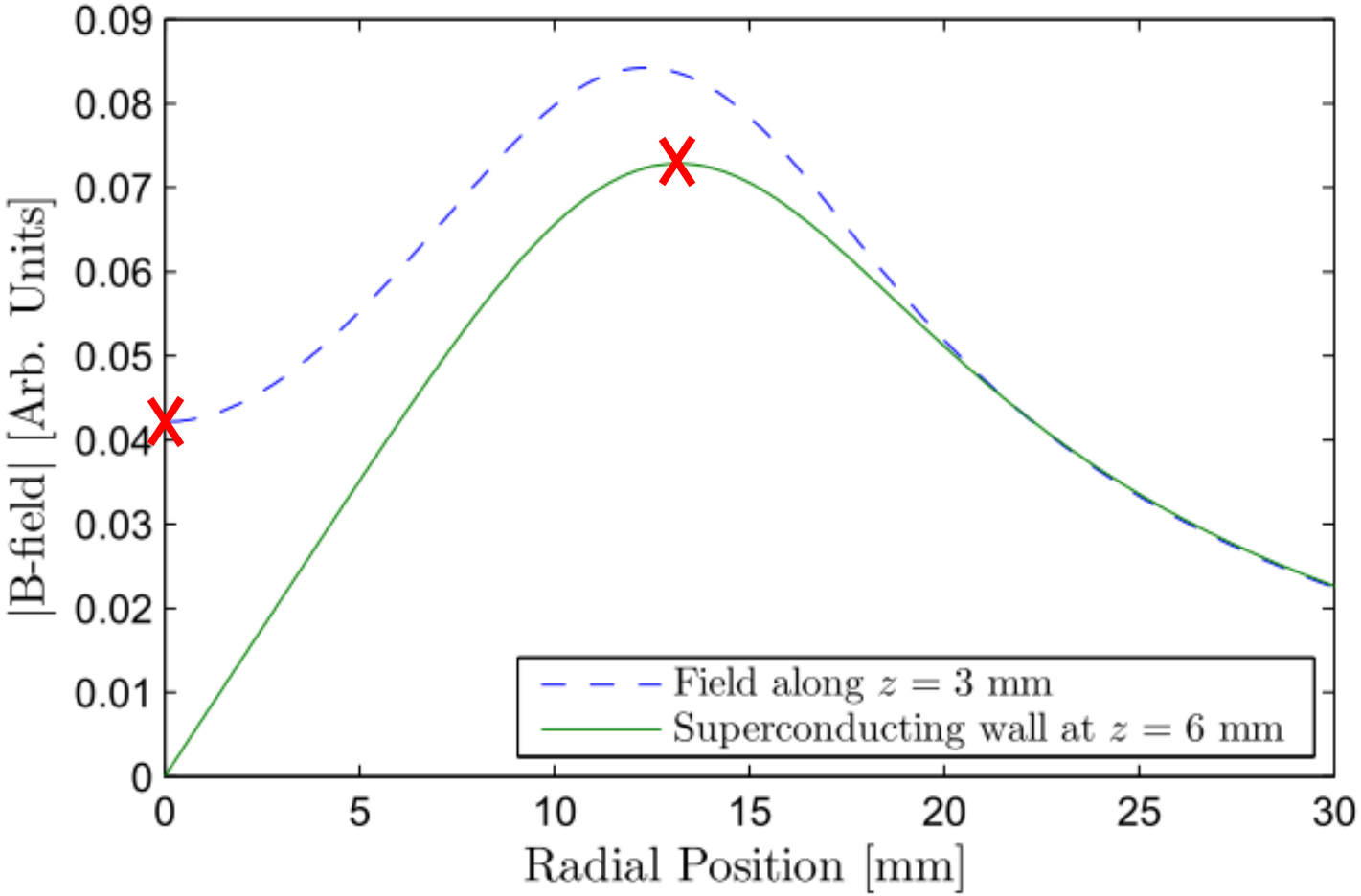
Flux penetration



Flux penetration as a function of T^2



From Nick's thesis:



Ratio of X's gives magnetic field correction for hall probe