Magnetics for the DarkLight@Ariel

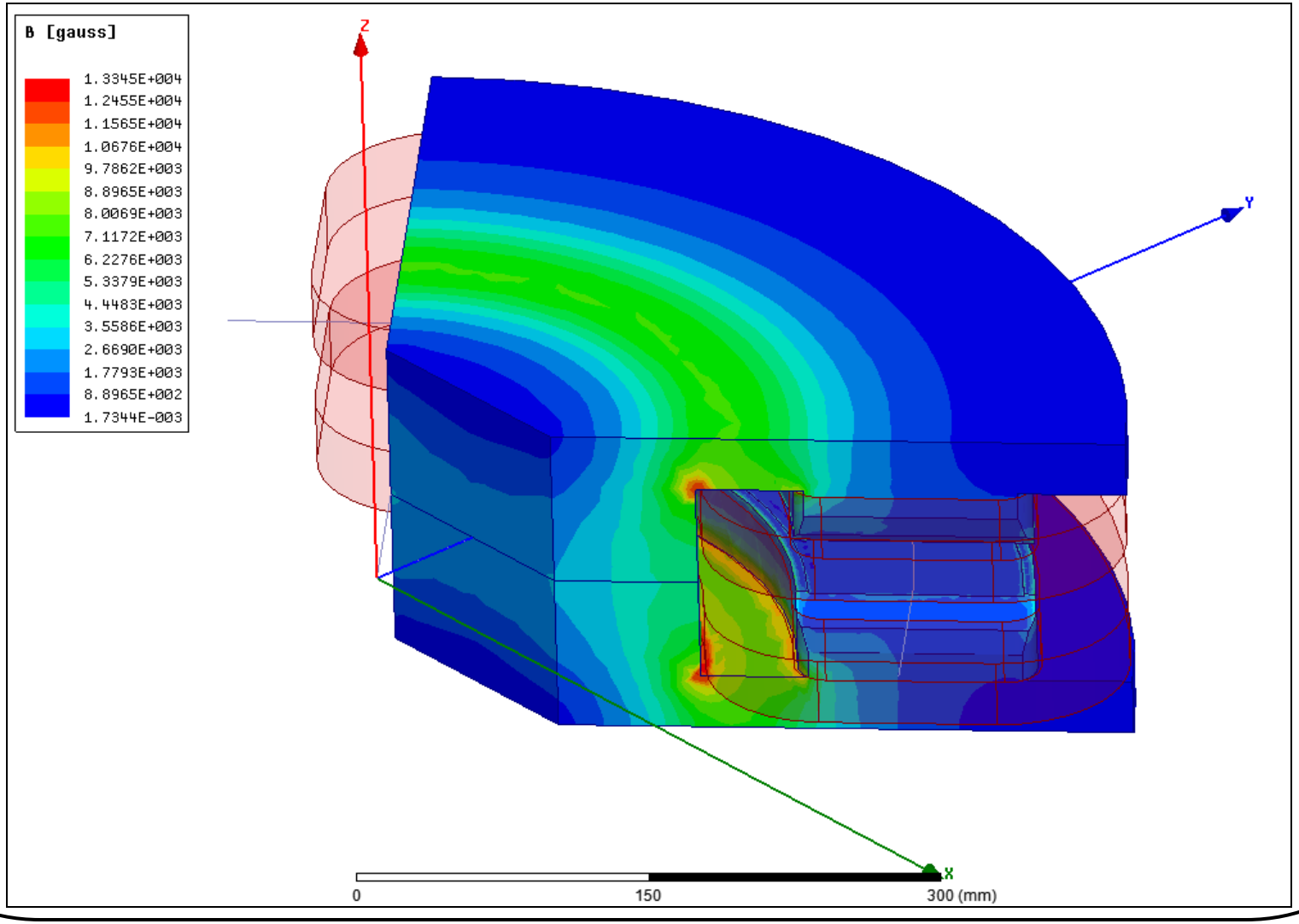
February 2021

Ernie Ihloff, P.E.
Jim Kelsey
Jason Bessuille
Danielle Petterson

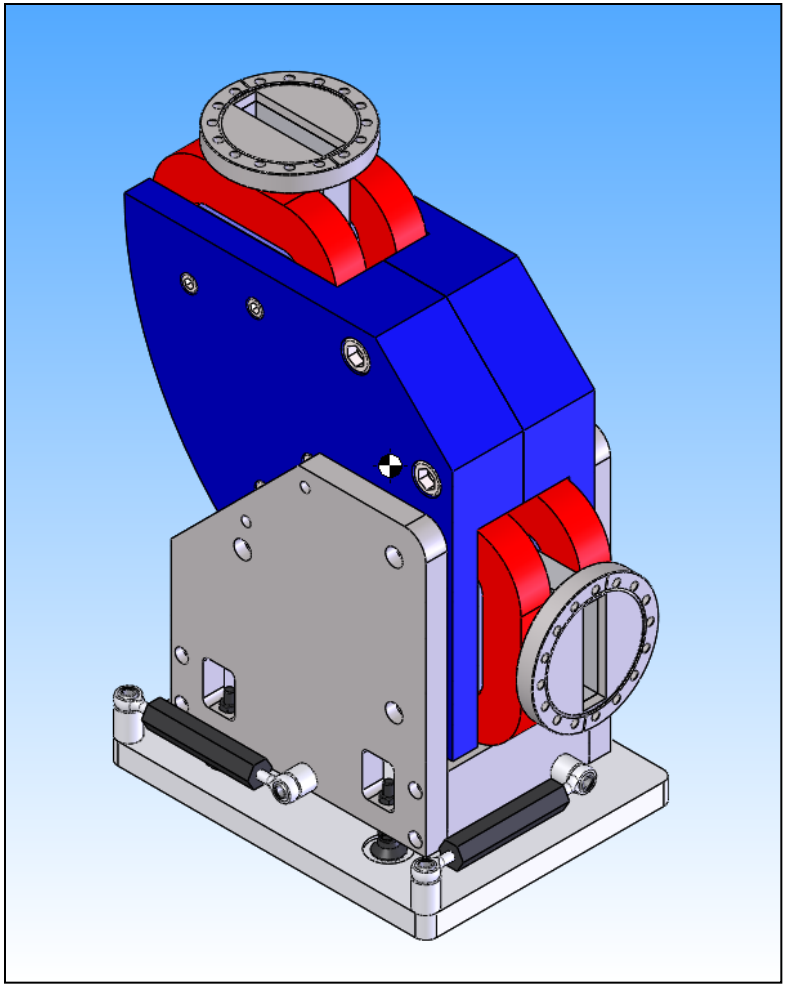
Introduction

- The MIT Bates engineer team has a long track record of collaboration with physics experiments in the design, construction, testing and installation of normal conducting electromagnets.
- Very similar magnets were designed and made for Charles Epstein's thesis at the MIT HVRL.
- Many magnets were designed and built for the MIT Bates accelerator and storage ring as well as for Proton Therapy.
- We feel confident that we can design and excellent quality spectrometer for DarkLight@ARIEL

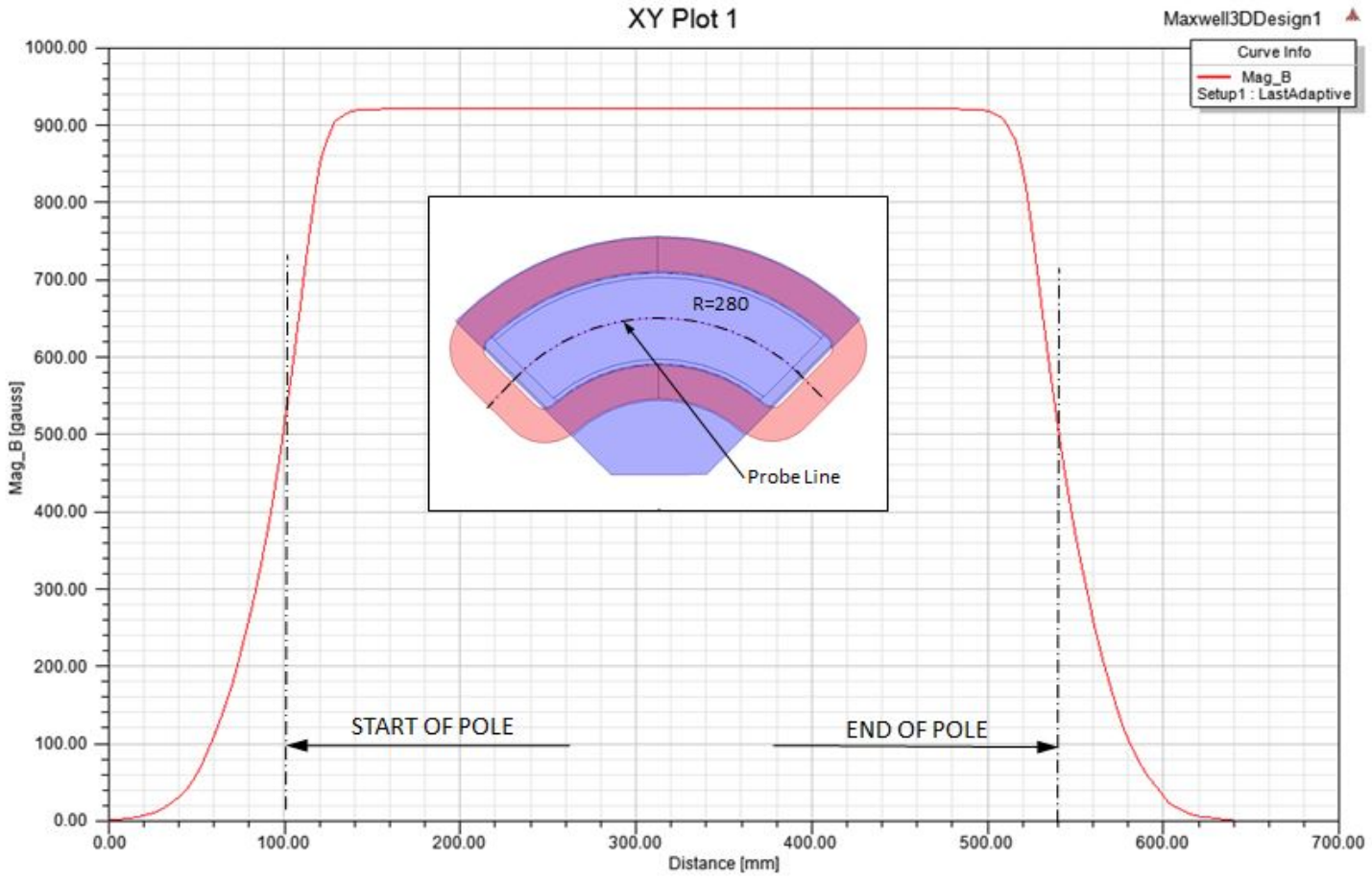
Yoke and Pole Piece |B| Field Plot



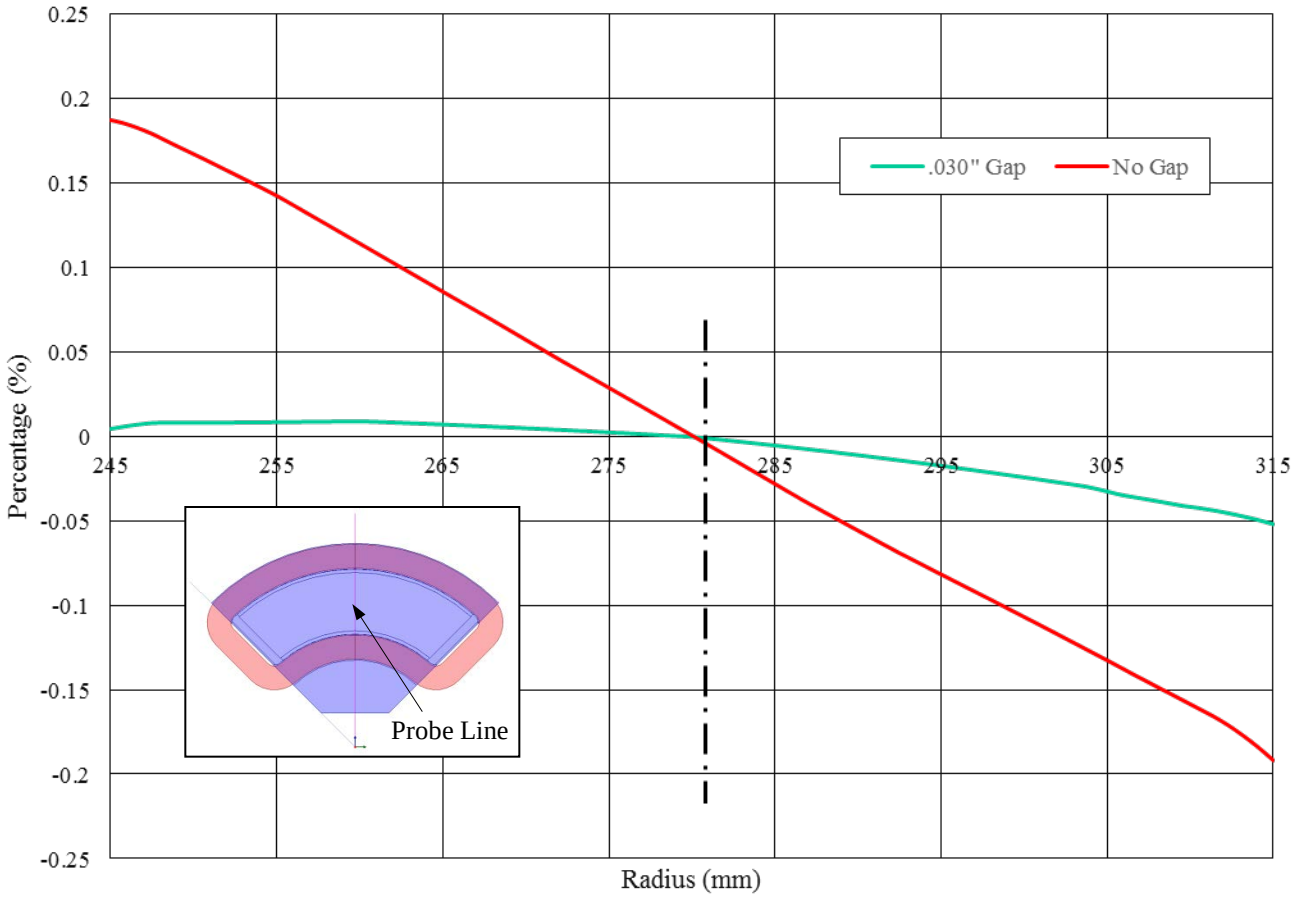
Introduction to 1B Magnetics



Plot of |B| Along Pole Centerline on Midplane



Comparison ΔB/B vs Pole Radius: Center of Pole on Midplane .030" Pole Air Gap vs No Gap, Range Limited to: 245 < R < 315



MIT HVRL system

MIT Bates designed for Jlab

MIT Bates designed magnet system
Proton beam