

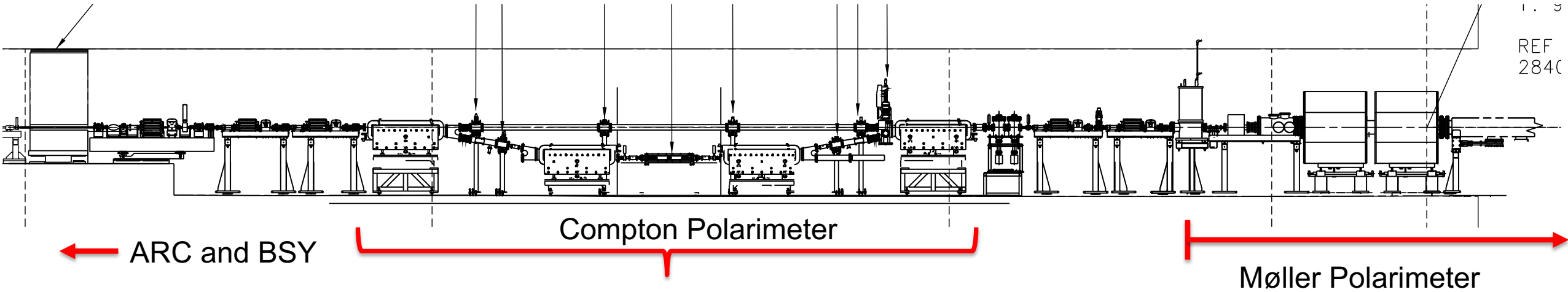
Beamline for Polarized Target Experiments in Hall C

b1/Azz Collaboration Meeting

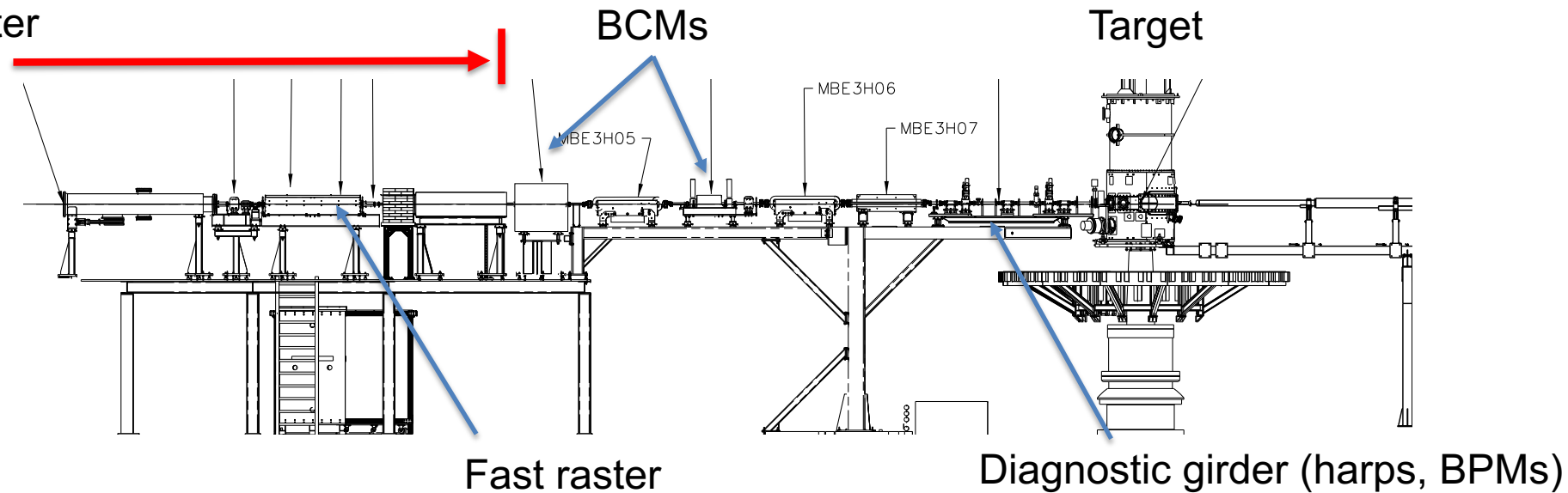
**Dave Gaskell
Jefferson Lab**

June 3, 2026

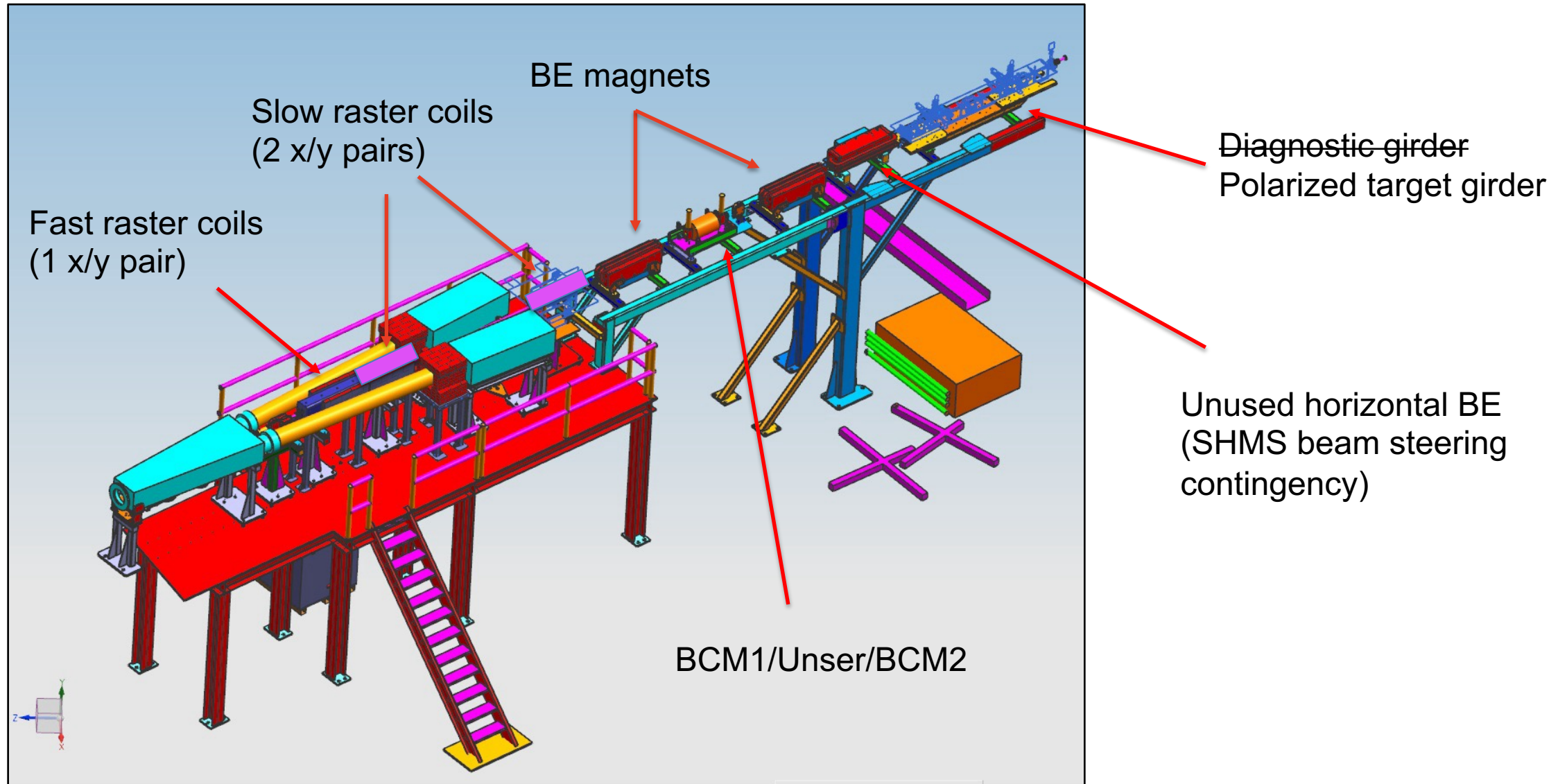
Hall C Beamline – Layout for Unpolarized Targets



Møller Polarimeter

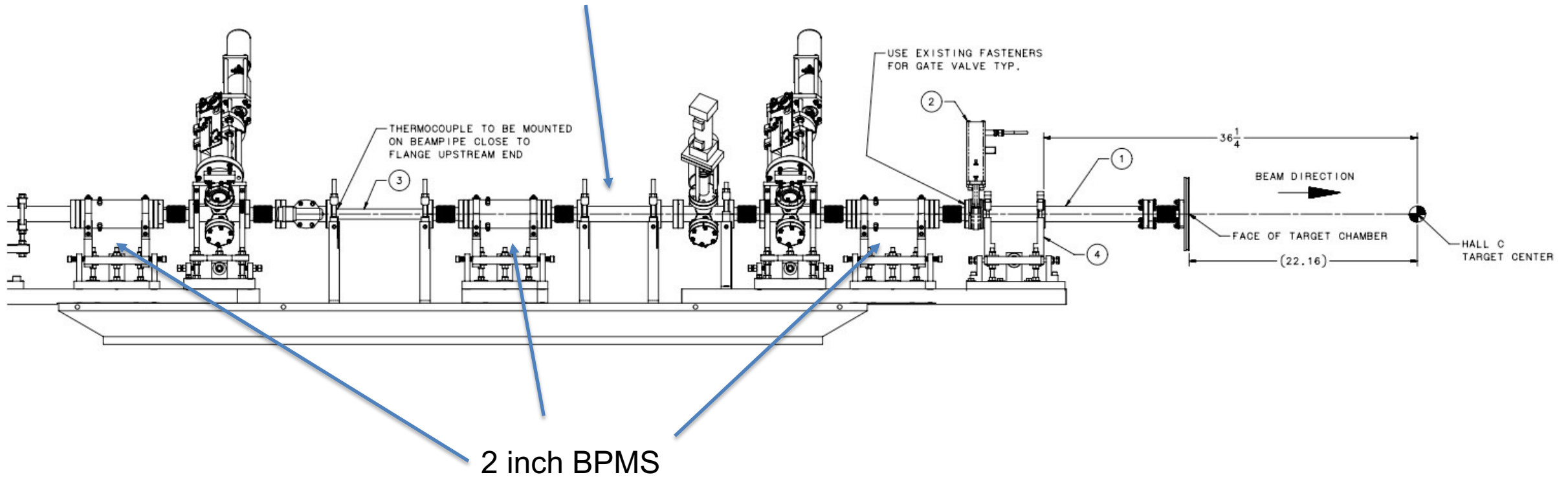


Beamline for (not transversely) Polarized Targets

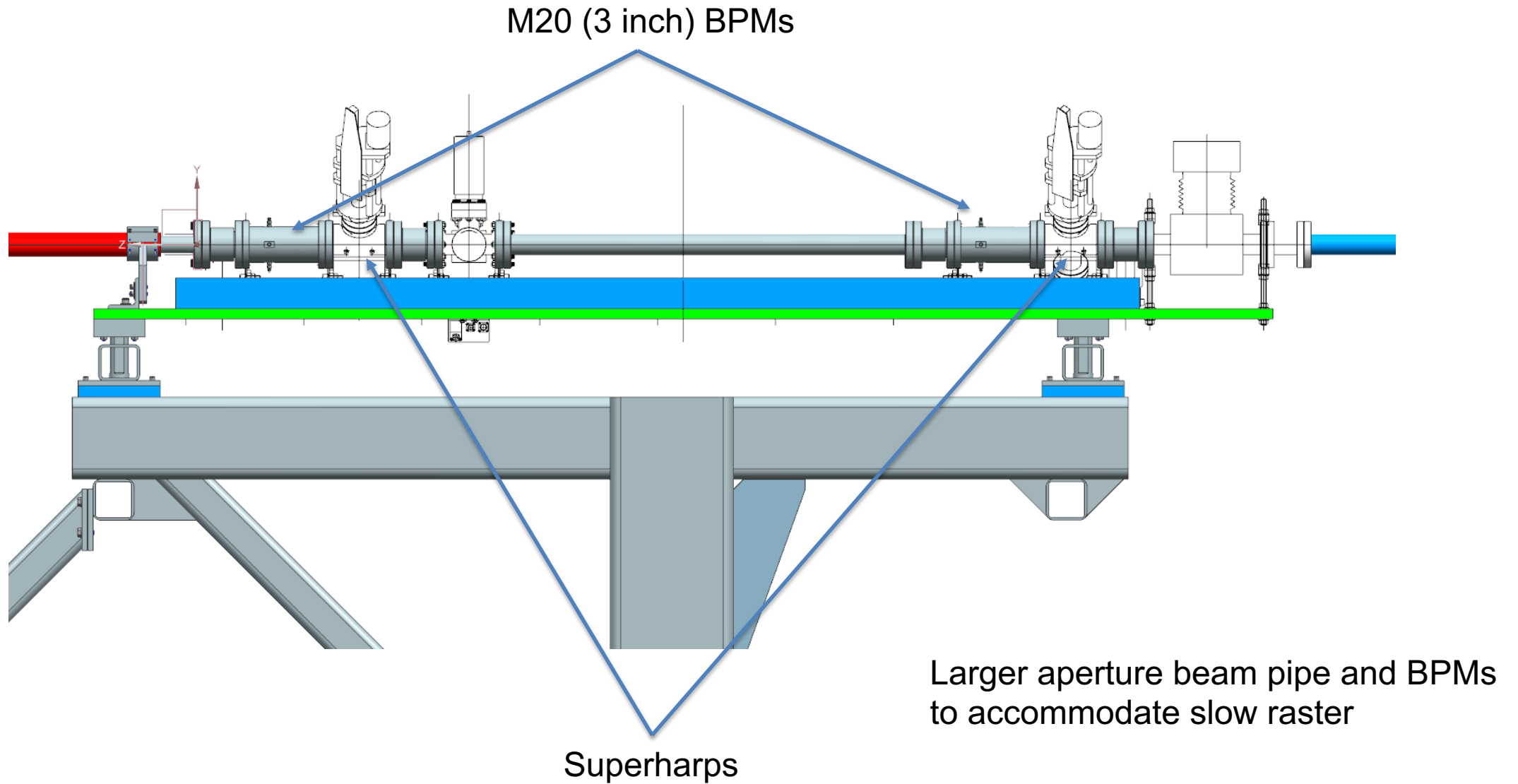


(Standard) Superharp Girdler

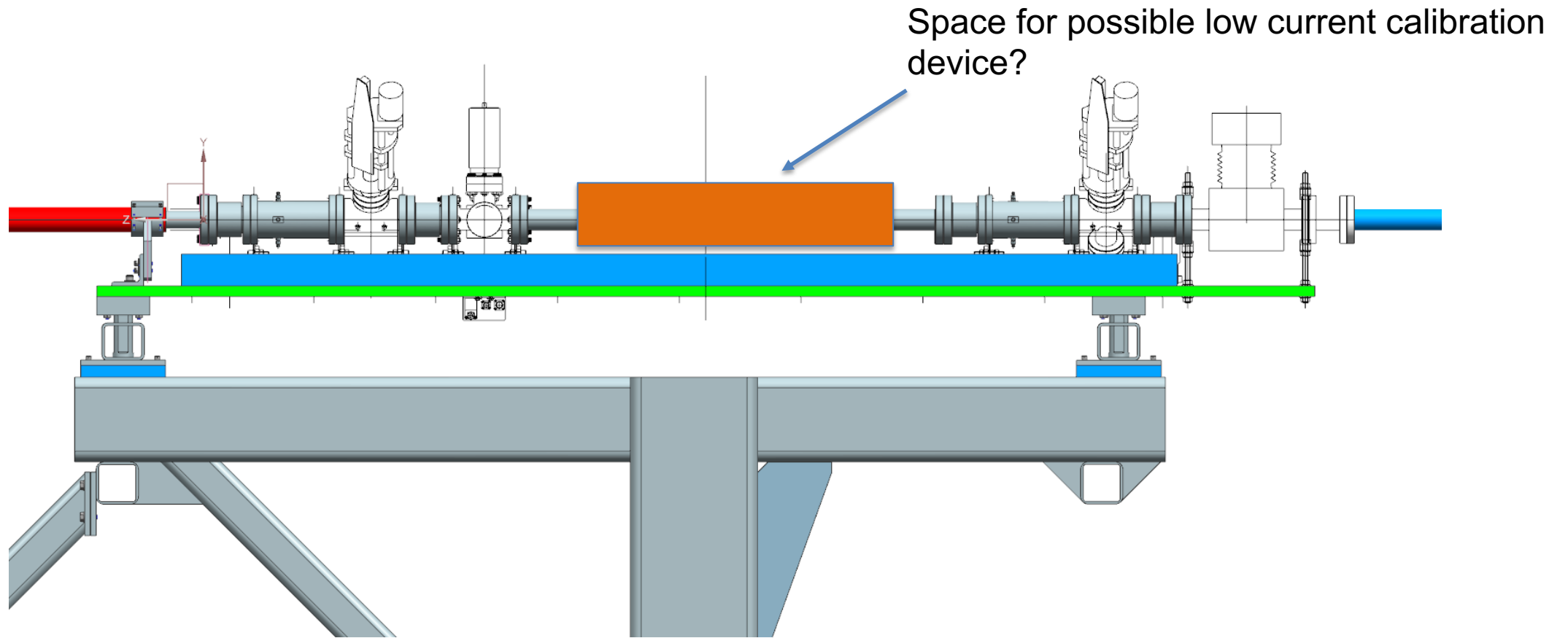
1.5 inch beam pipe



Polarized Target Girder



Polarized Target Girders



Polarized Target Girder

Polarized target girder will be used to provide additional diagnostics for Hypernuclear experiments

Polarized target girder has been removed from Physics Storage and staged in ESB

- Significant refurbishment will be required
- One BPM is missing – I&C has spare 3-inch BPM on hand
- Spare harps can be taken from Q-Weak girder stored in ESB
- New spool piece also needed
- SEM has been removed



Slow Raster System

Before retirement, Chen Yan prepared all the raster coils that would be needed for 12 GeV era

→ 2 sets of x/y fast raster coil pairs

→ 2 sets of of x/y slow raster coil pairs

Found one set of slow raster coils on shelf in Physics Storage building

So far, unable to locate 2nd set of slow raster coils

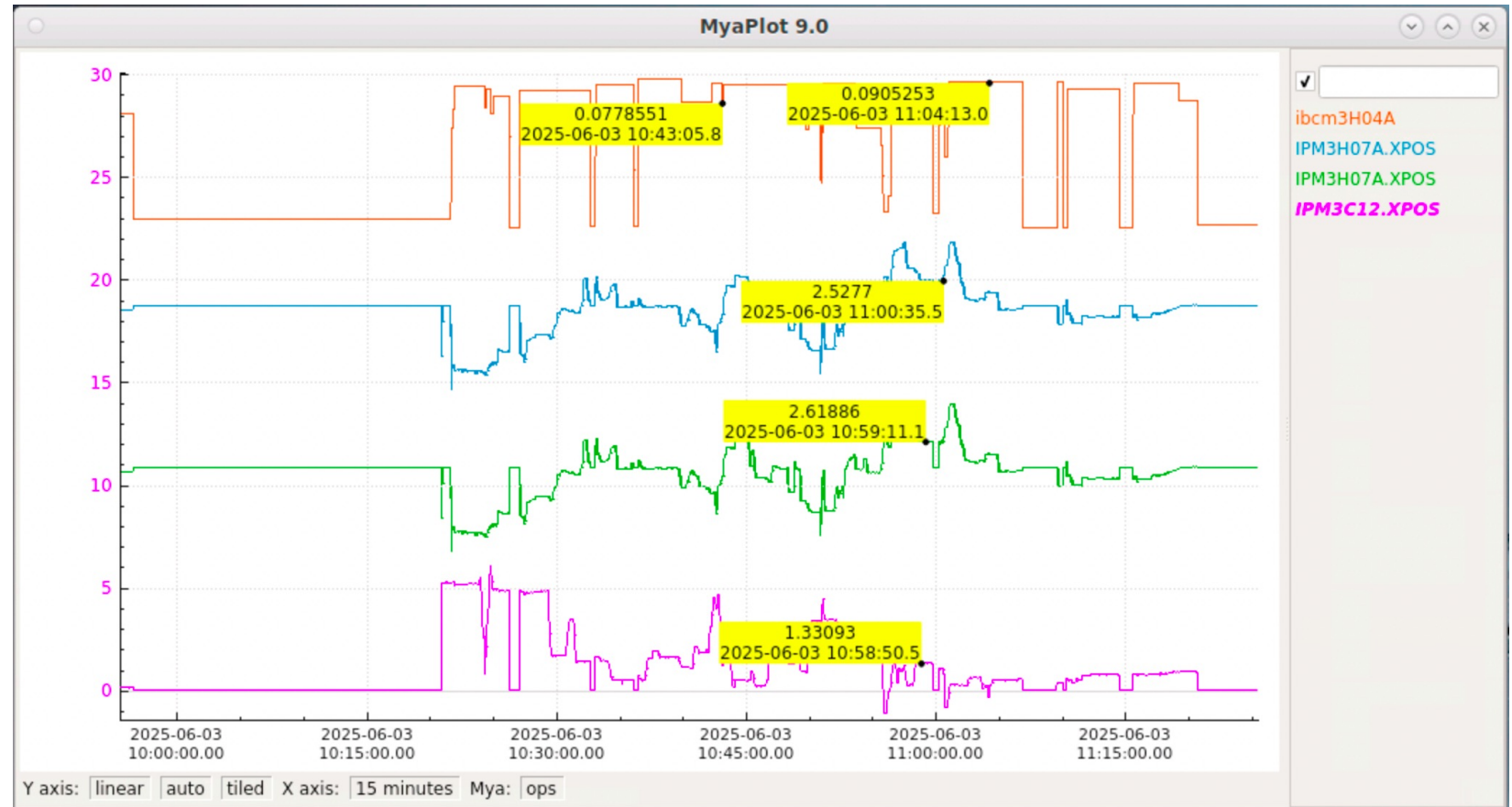
One pair might have been lent to Hall B for HD-ICE target tests

→ Search ongoing



Beamline Performance at Low Currents

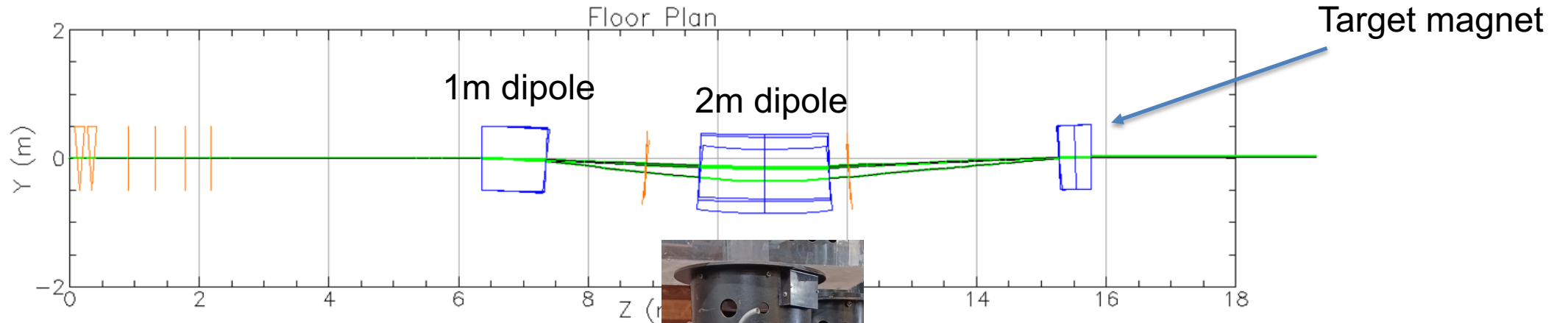
- LAD experiment ran at lower currents during last run period
- Typical production running was at 300 nA
- Some tests were done at even lower currents (<100 nA)
- Like 6 GeV era, beamline instrumentation (BPMs, BCMs) functioned ok
- There was some issue getting the slow position locks working, but this could have been resolved if more time had been taken



Transverse Target Experiments

Ryan Bodenstein

JLab Tech note: 25-023



- Transversely polarized target will require vertical chicane to successfully transport beam to dump
- Central dipole will need to be at different elevation for each energy
- Existing 1 m BE dipole and 2m FZ dipole not strong enough

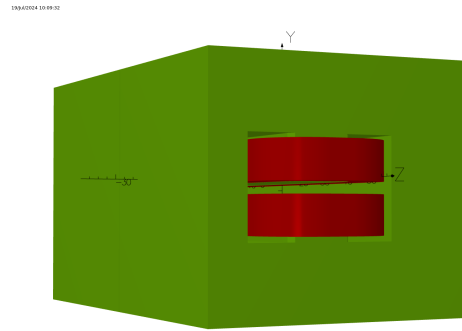


- In 6 GeV era, had telescoping stand for polarized target chicane
- located in Physics Storage

Polarized Target Chicane Magnets

- Polarized target chicane magnet requirements
 - 1 m dipole: 1.54 T
 - 2 m dipole capable of 1.45 T

Existing 1m BE dipole does not provide enough field → new dipole will be needed



Jay Benesch has modelled and designed suitable dipole



Jay Benesch
JLab Tech note: 24-027

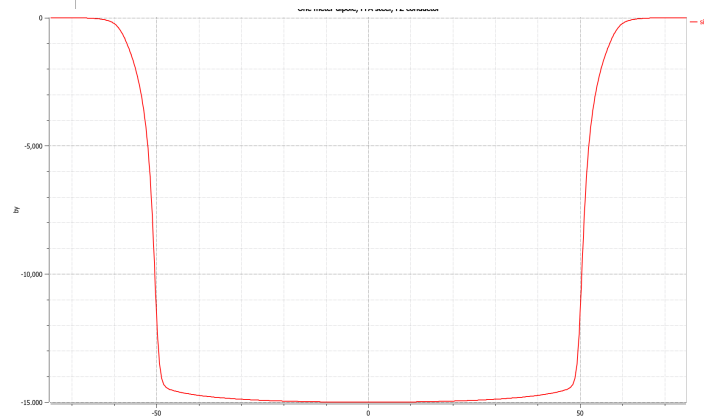
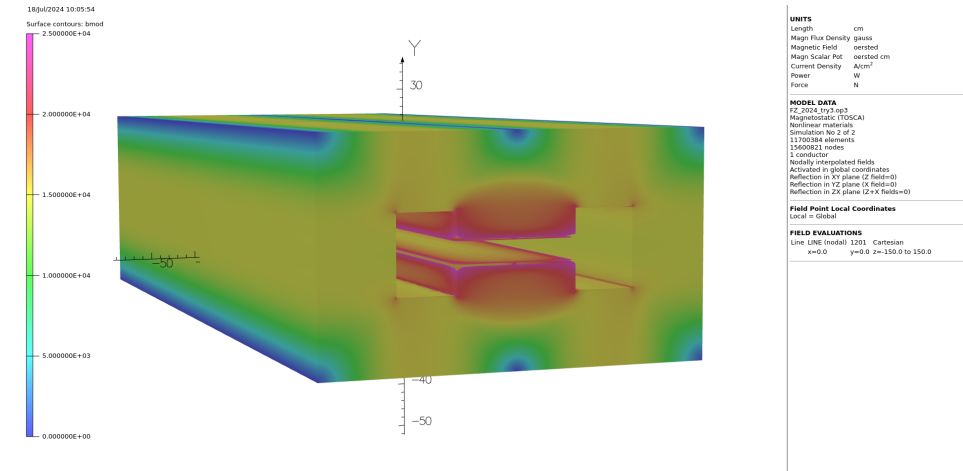


Figure 3 By(z) of model providing -1.54E6 G-cm (I assume the chicane bends down rather than up.)

Existing 2m FZ dipole can be used with modifications and new coils



- Pole width reduced from 29.2 cm to 25 cm to make room for new coils
- 1000 A @ 75 V power supply needed

Scope of Work for Upstream Beamline

- b1/Azz
 - Detailed design for slow raster, polarized target girder placement
 - Refurbish polarized target girder
 - Installation (accelerator installation, vacuum groups, instrumentation, survey and alignment)
- g2p
 - Detailed design and fabrication of new and refurbished chicane magnets (\$\$)
 - Detailed design of beamline → remove “bridge”, re-install telescoping stand + slow raster, target girder as noted above
 - Installation – this will be significantly more complex and time consuming.

Beam and Beamline Personnel

- Hall C APEL will be transitioning from Jay Benesch to Ryan Bodenstein → will play crucial role in beamline updates, especially for g2p
- New Operations Liaison is Ashley Yoon (formerly Les Richardson) → provides important input on procedures, checks for beamline accuracy in CED and drawings, notes special requirements for experiments for Operations
- Hall BCM Point of Contact is now Ciprian Gal
 - We are fortunate that Dave Mack has returned to JLab as a User, but his focus will be on his research and developing Positron Program
- Upstream beamline and polarimetry point of contact: Dave G.
 - Bill Henry is also a Hall C Moller expert so can assist with questions, setup, running, etc.

EXTRA

Polarized Target Girder

