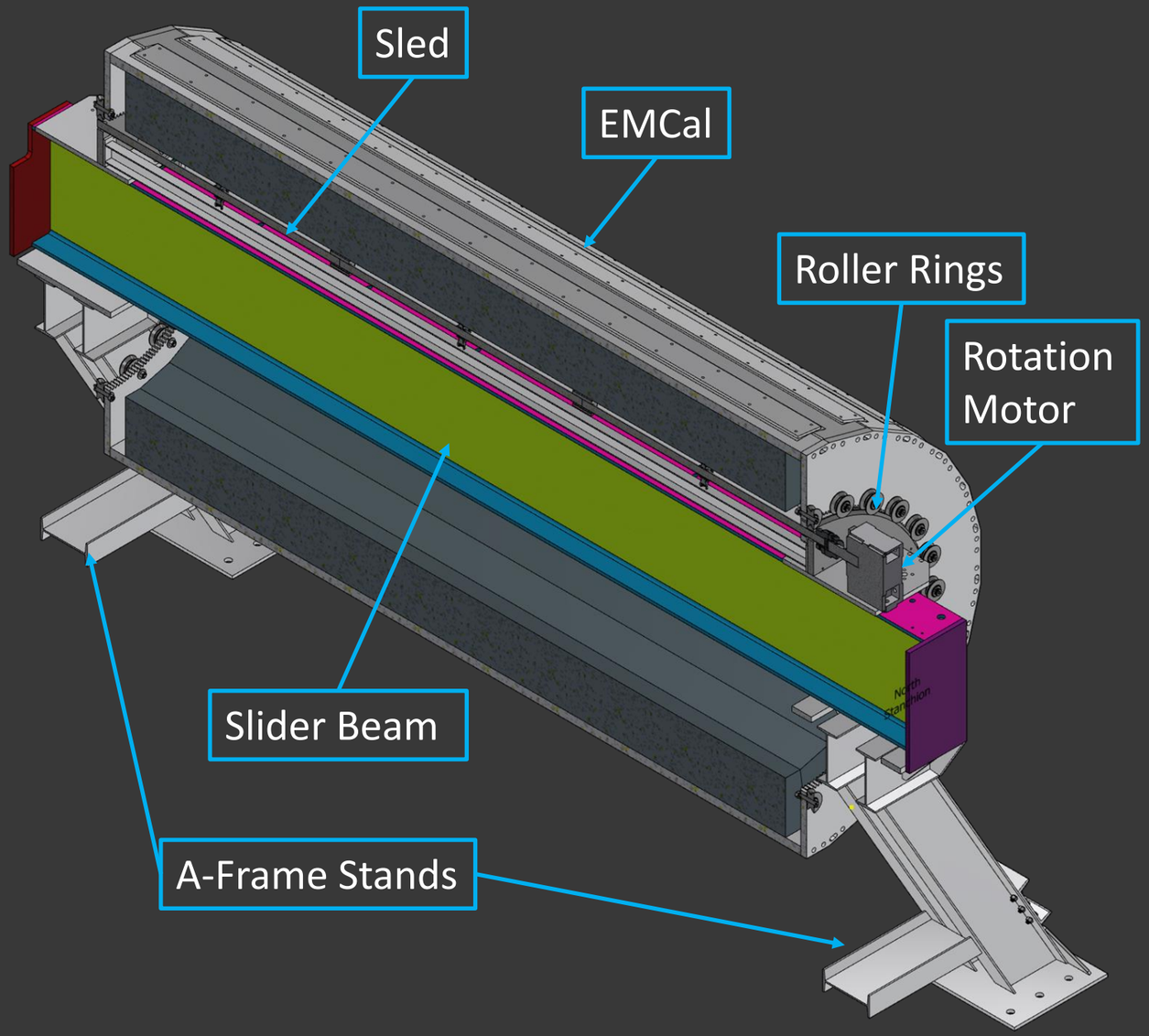
Barrel EMCal Integration, Assembly and Installation

Dan Cacace

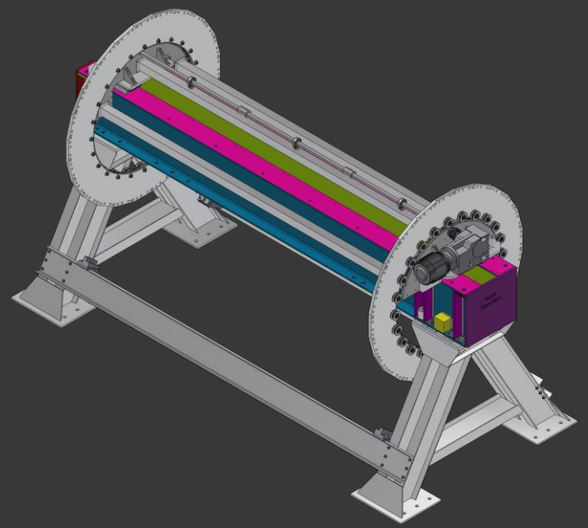
Assembly Fixture

- A-frames used if under 40Tons (AH crane limit).
- Otherwise assemble during step 4 of installation.
- Assembly steps the same either way.

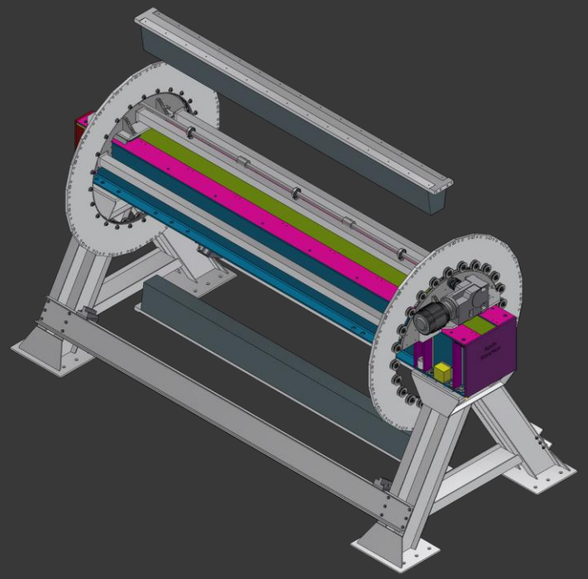


Assembly

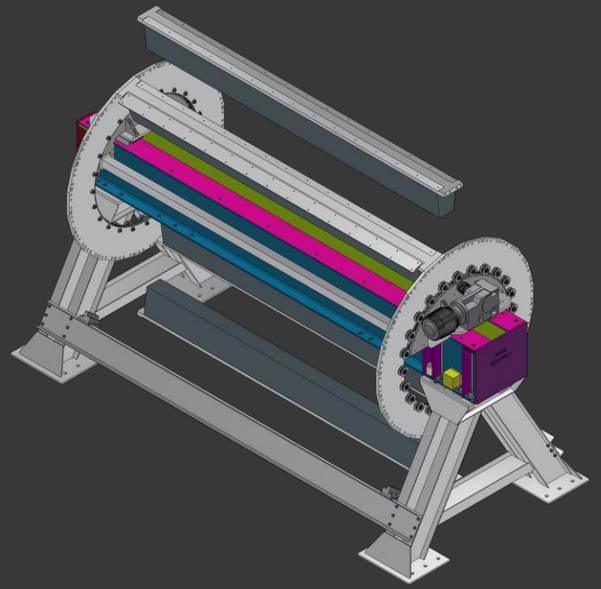
1. End Rings in Place, No Sectors



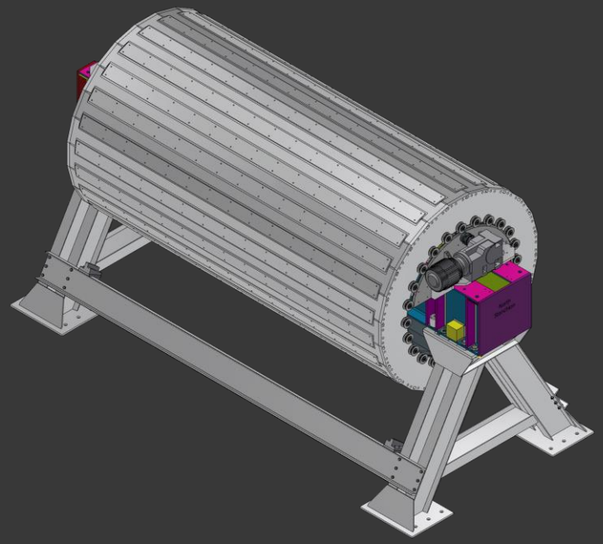
2. Install Top and Bottom Sectors



3. Attach Sector, Rotate and Repeat

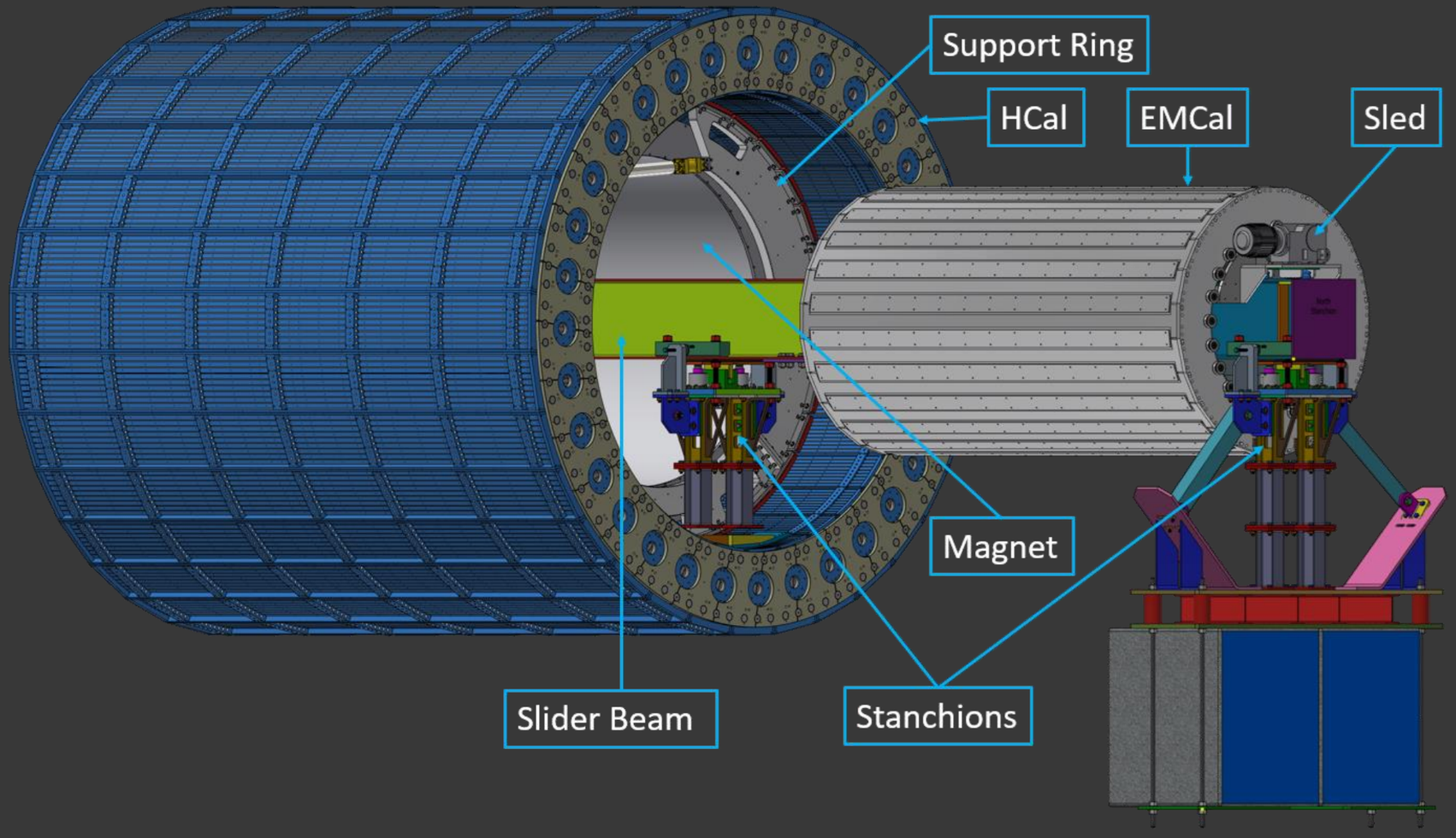


4. All Sectors Installed



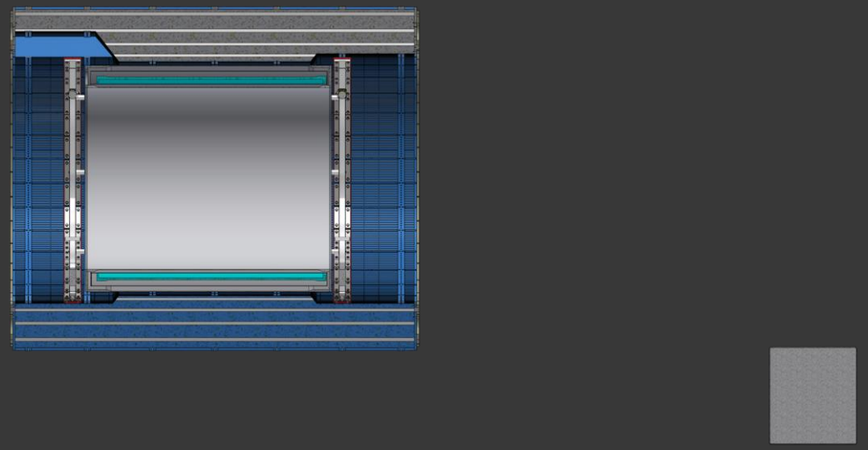
Installation Tooling

- Use existing installation tooling from sPHENIX that was used to install Inner HCAL as shown in photo (modification needed).

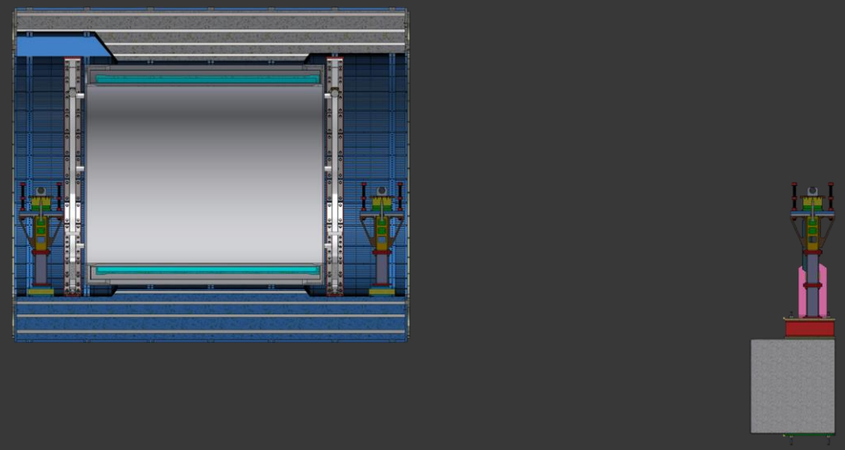


Installation

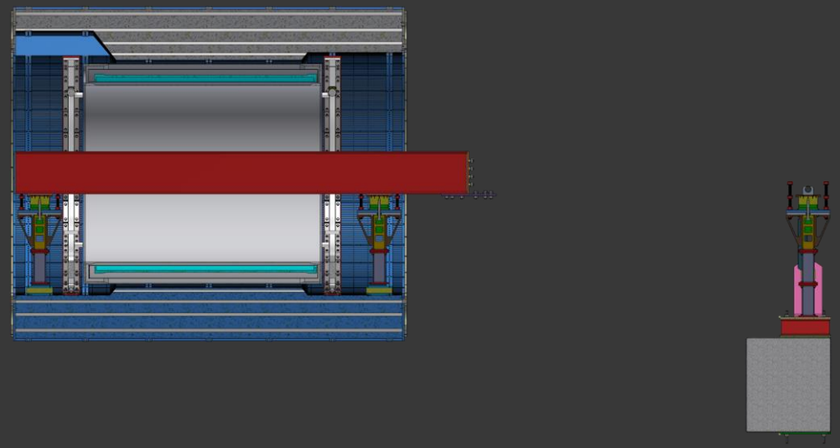
1. Prepare Area



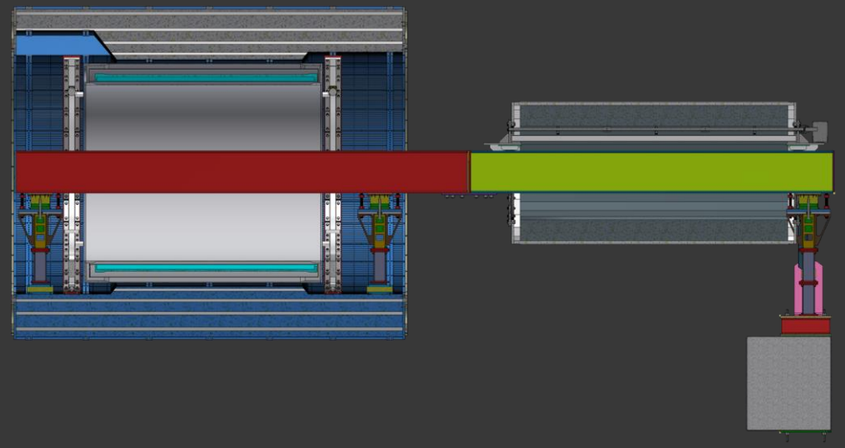
2. Install Stanchions



3. Install Long Slider Beam

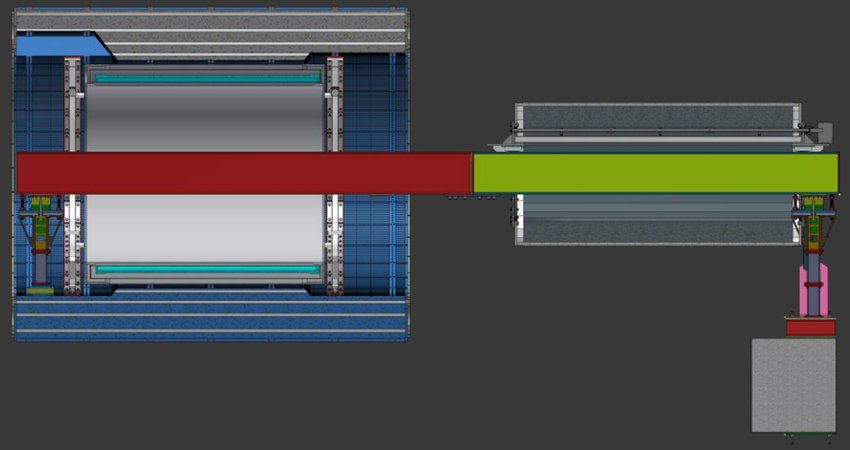


4. Attach Short Slider Beam with EMCal/Sled

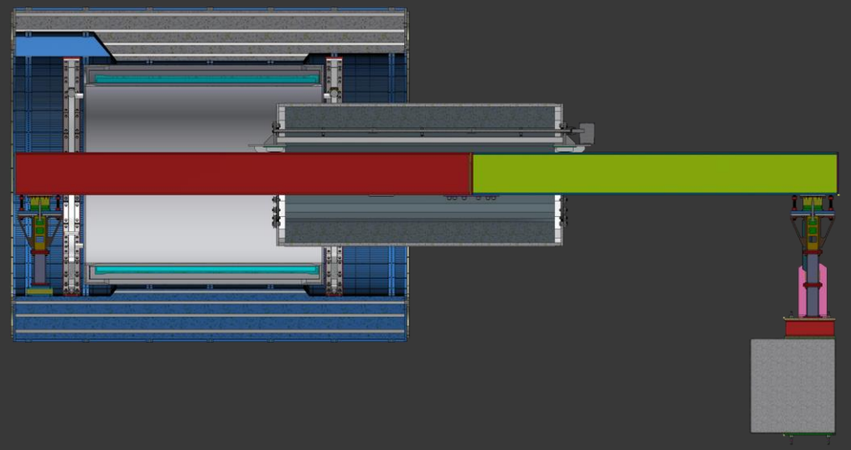


Installation

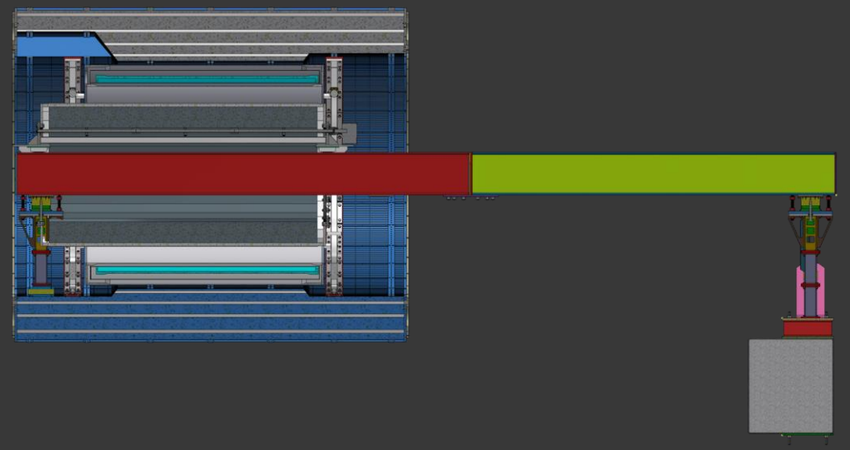
5. Remove Center Stanchion



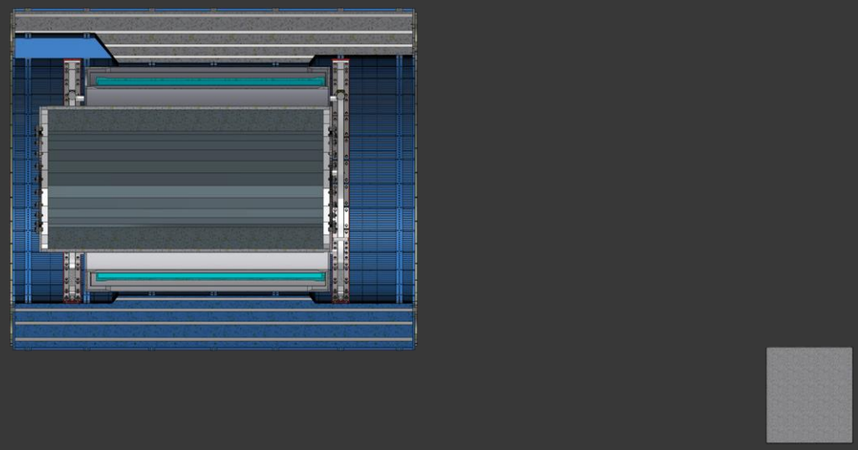
6. Install EMCal



7. Attach EMCal to Support Rings

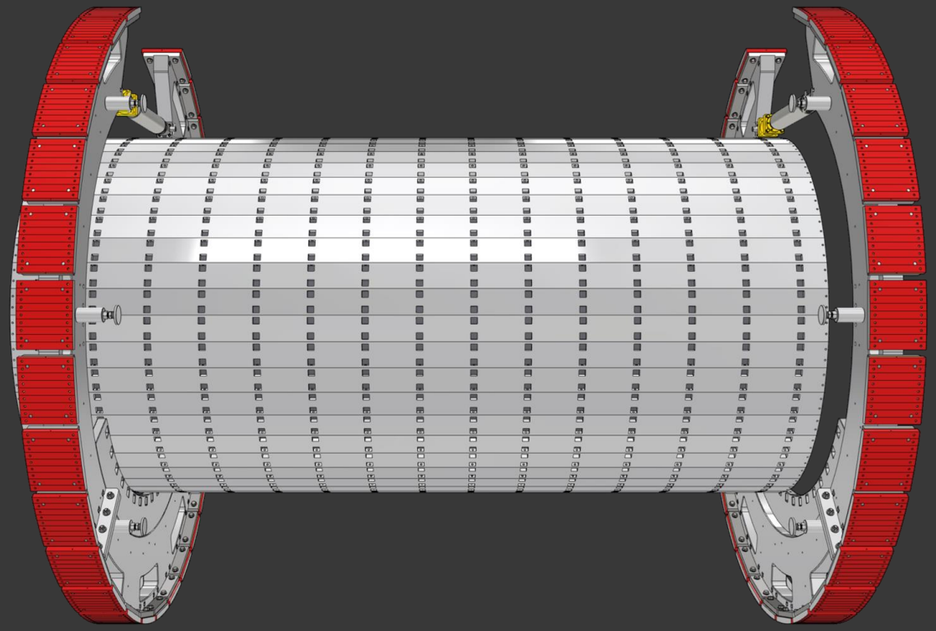


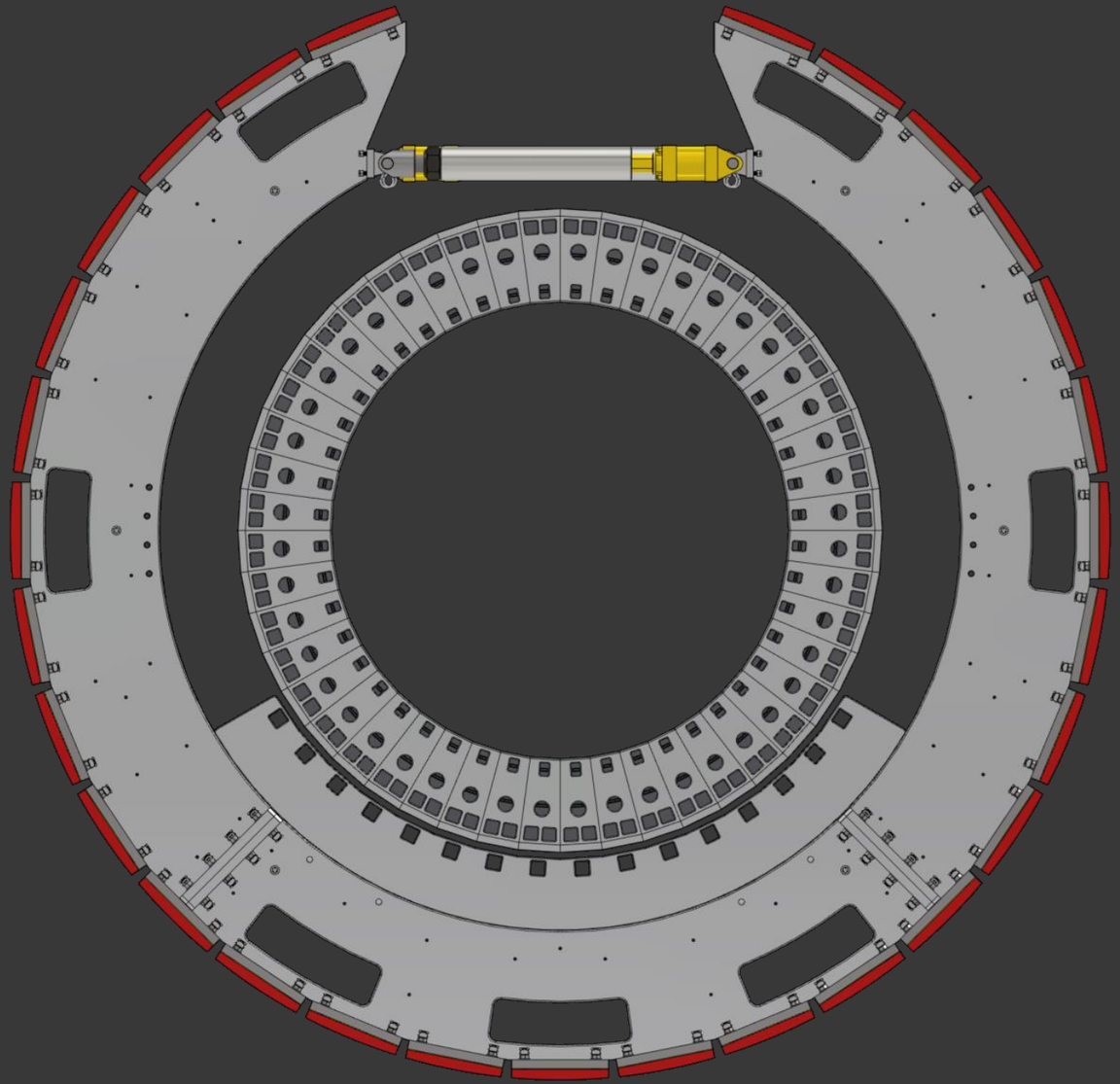
8. Reverse install steps to remove beams



Support Structure

- Support rings are reused from sPHENIX
- Intermediate part needed to bridge/adapt to barrel EMCal
- Additional restrains likely needed for seismic loads.





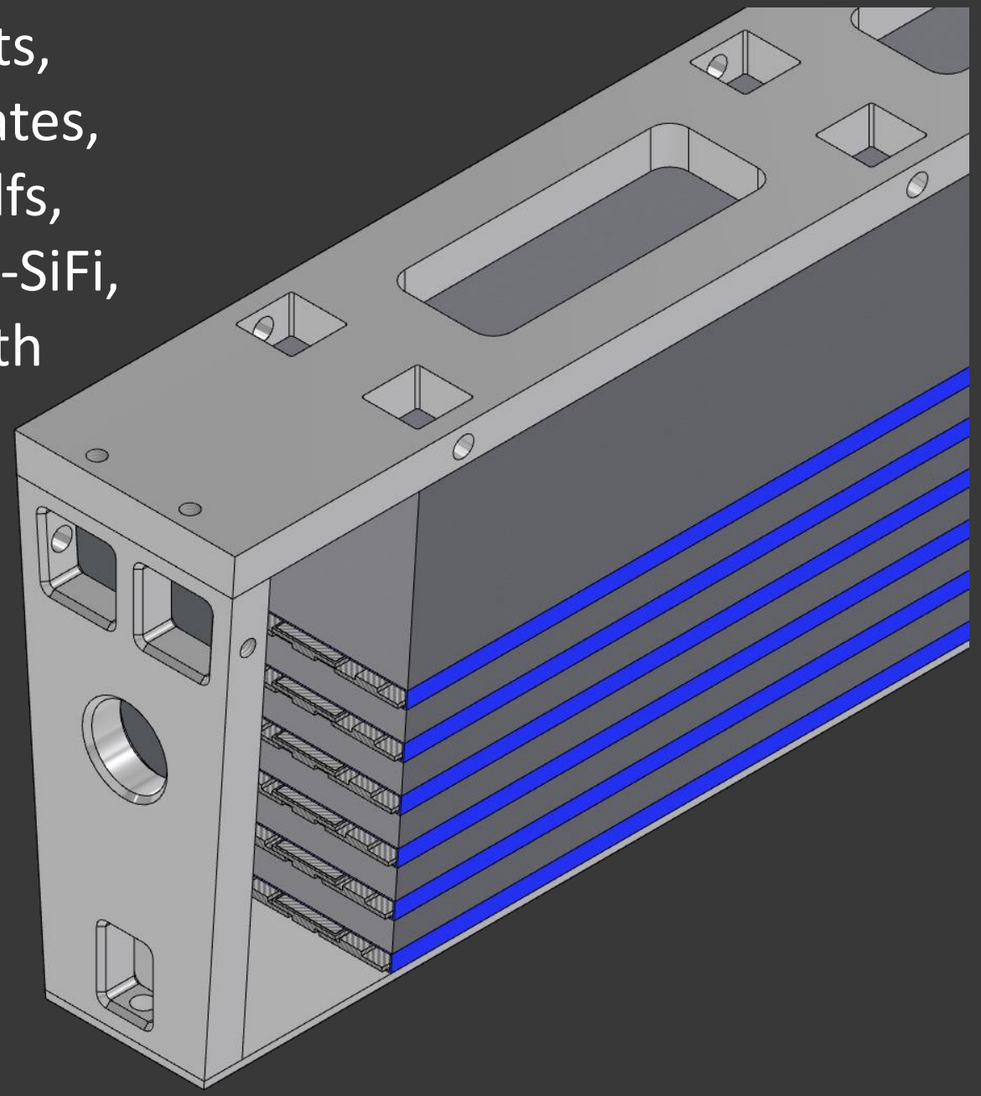
Weight Reduction?

- Crane limit: 40Tons
- Install Tooling: 3Tons
- Rigging Hardware: ~1Ton
- Contingency: 1Ton?

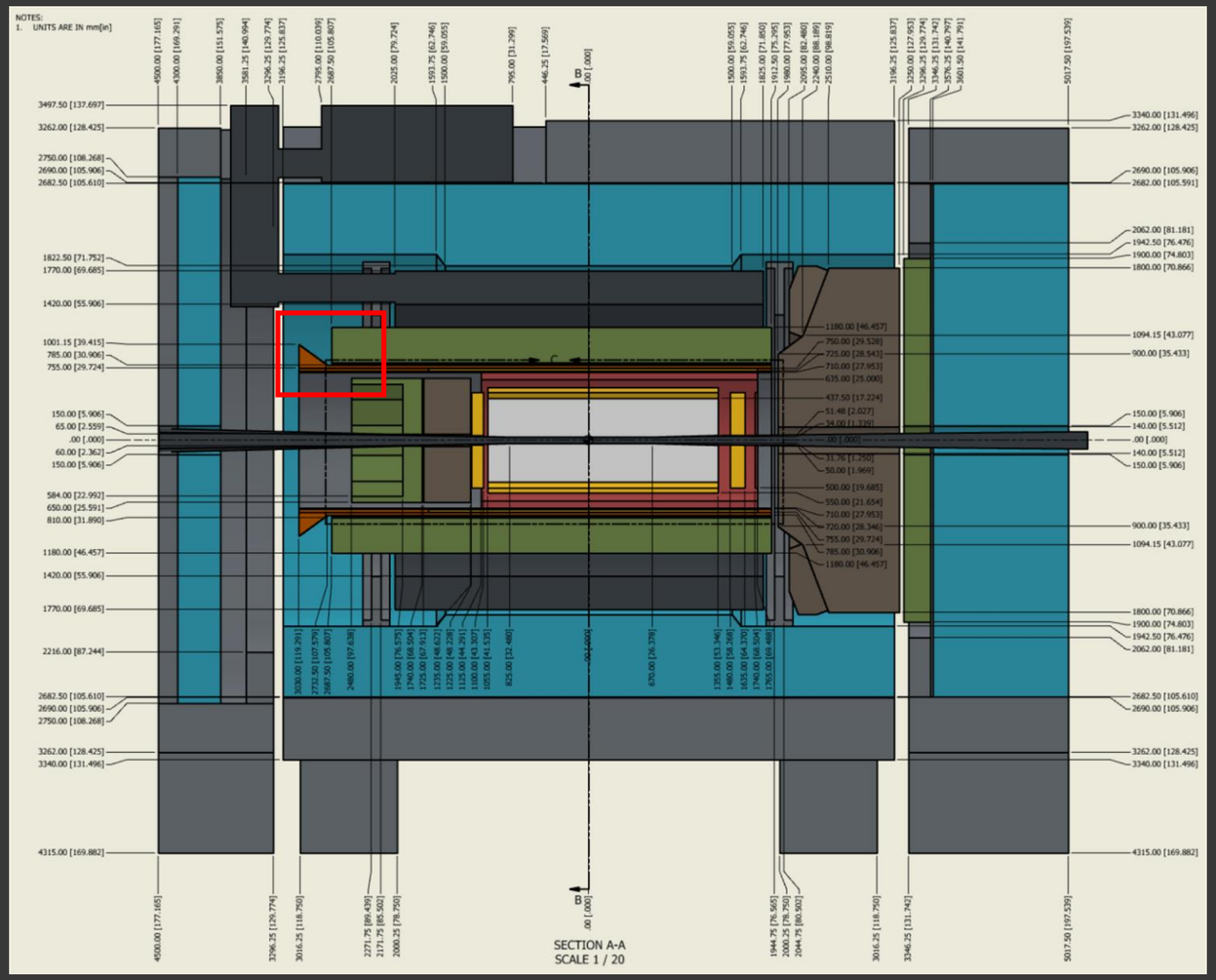
- Desired Detector Weight: 35-36Tons

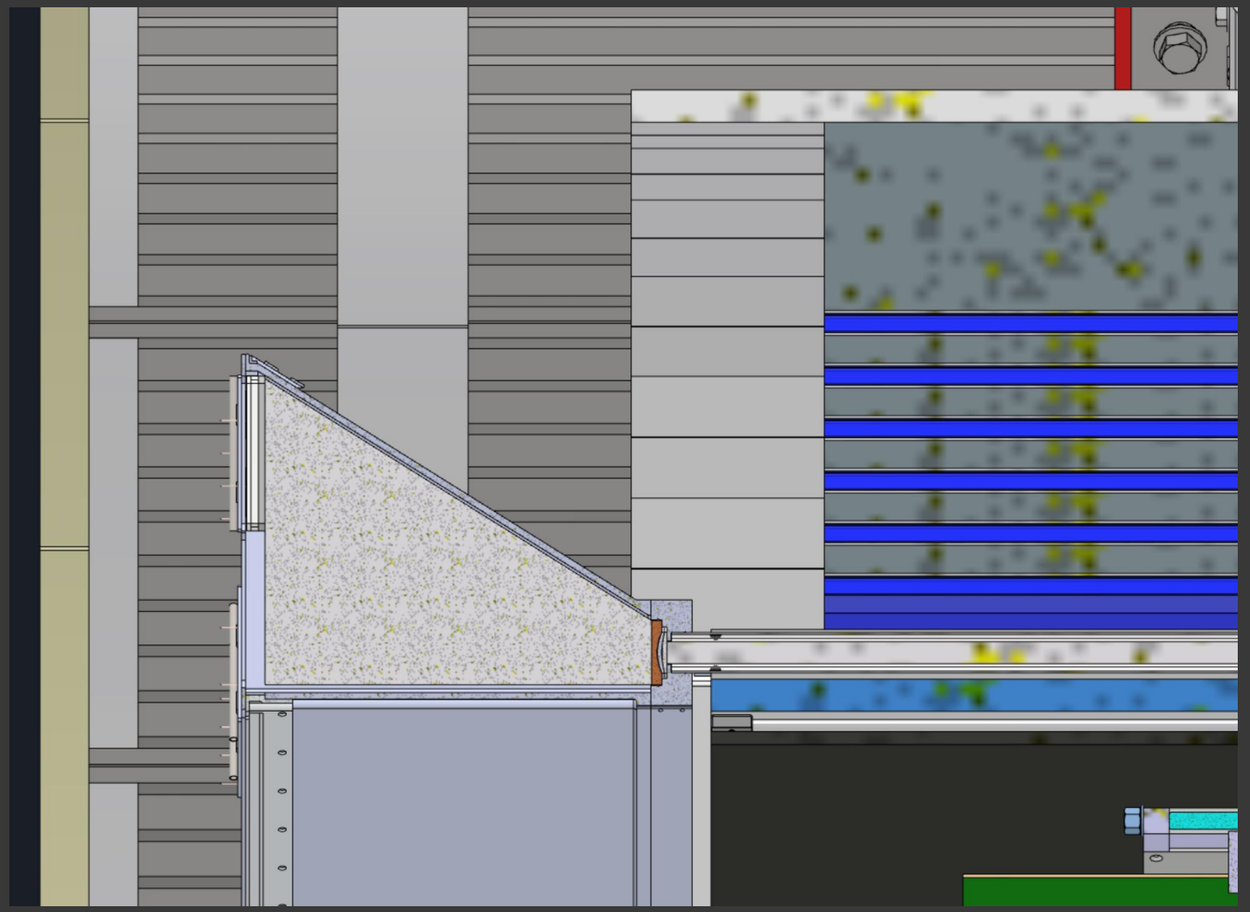
- Current Detector Weight: 45-46Tons

36Tons:
Al cutouts,
No Al Plates,
1cm shelfs,
12cm Pb-SiFi,
Old length



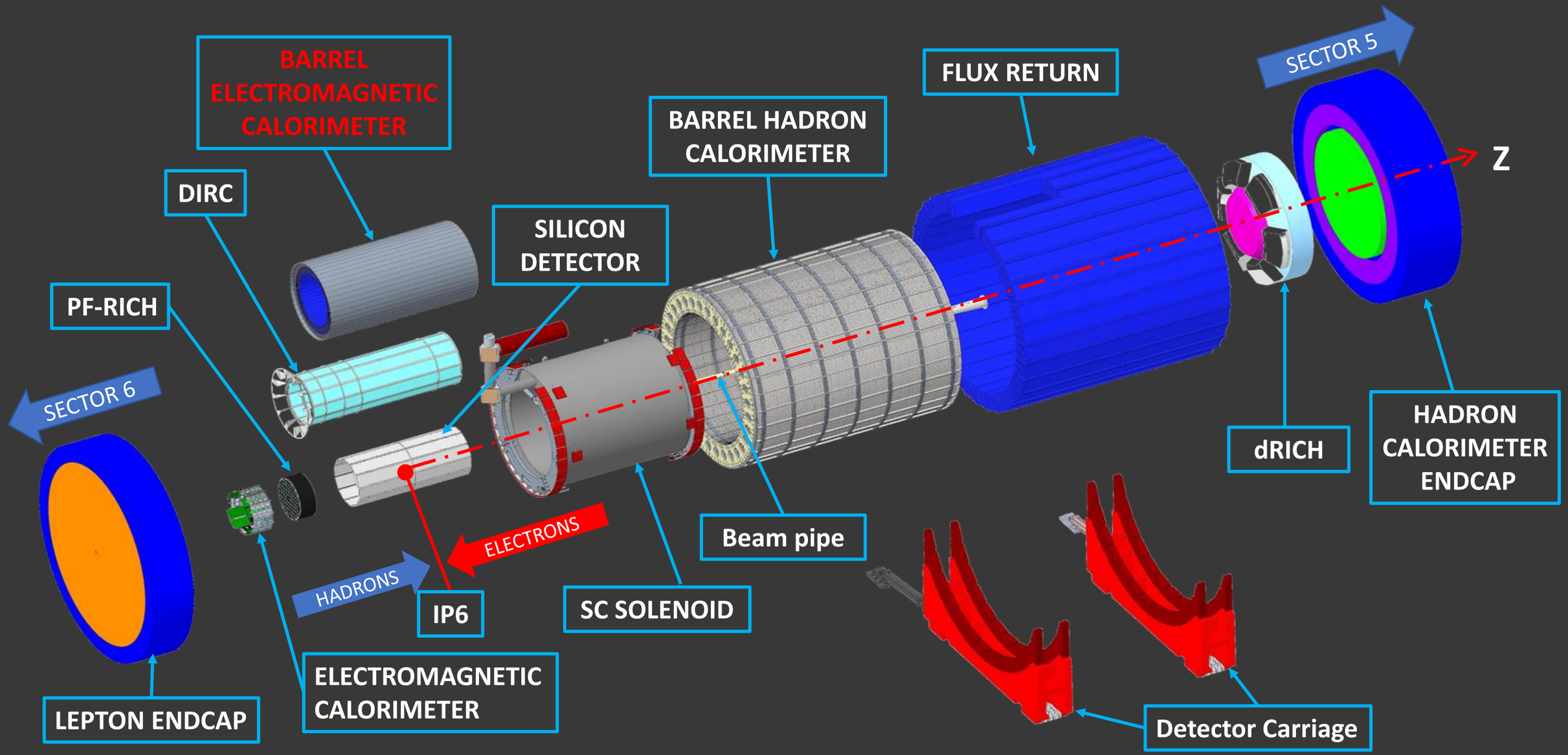
Interference



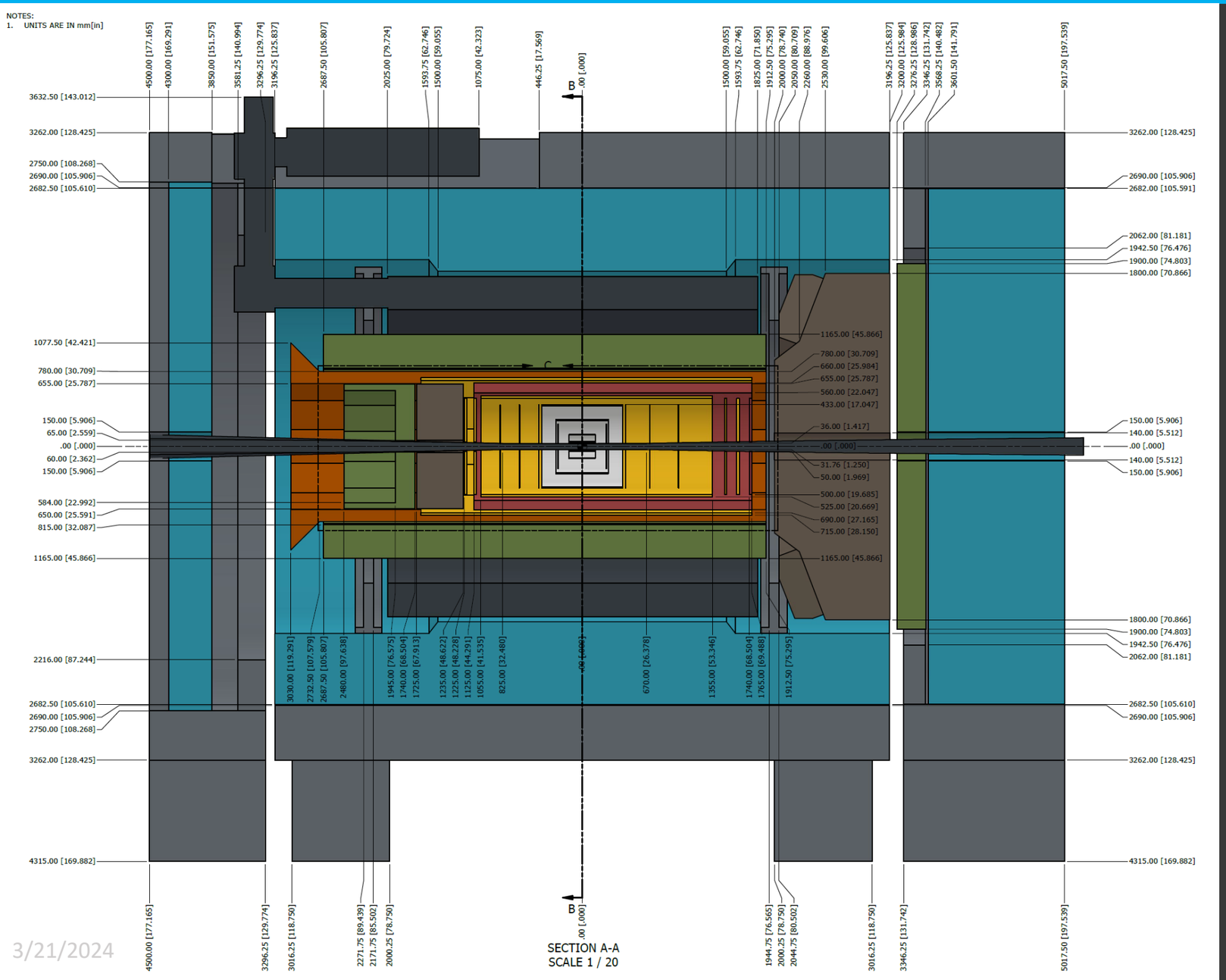


Backup

ePIC Exploded View

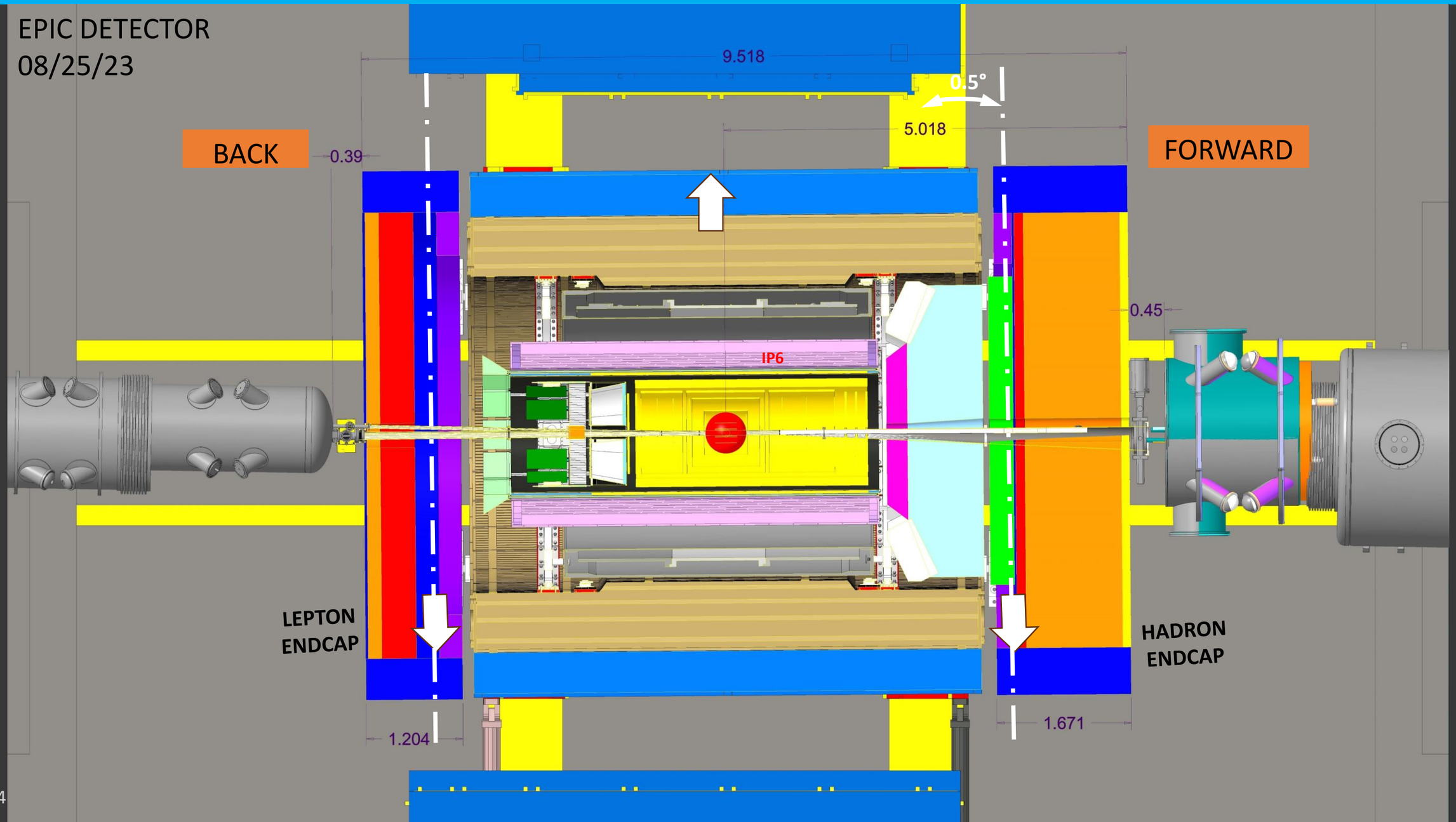


ePIC Envelope Drawing

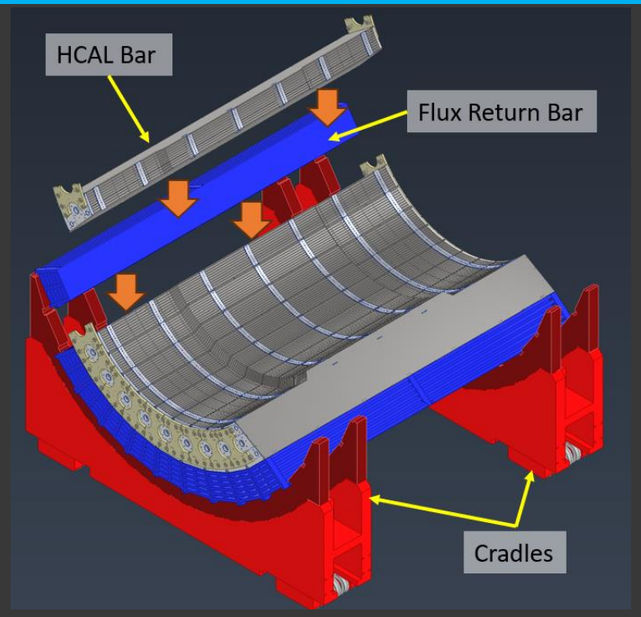


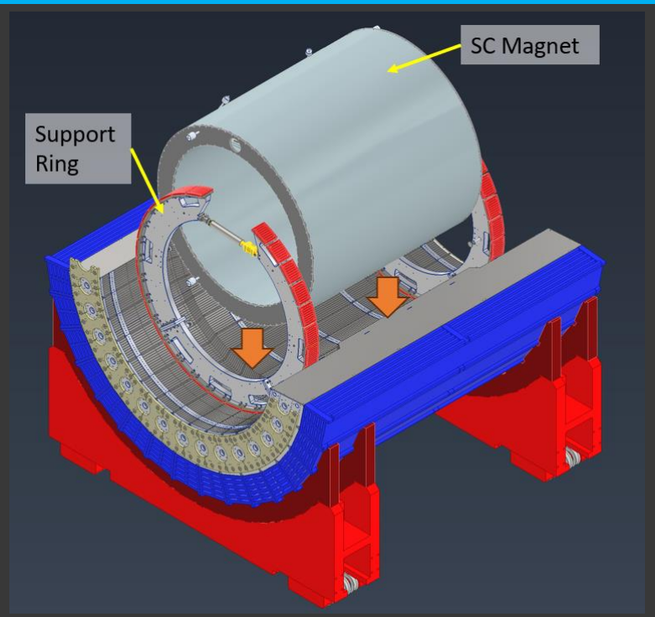
- All subsystems stay within a given envelope and changes must be agreed to

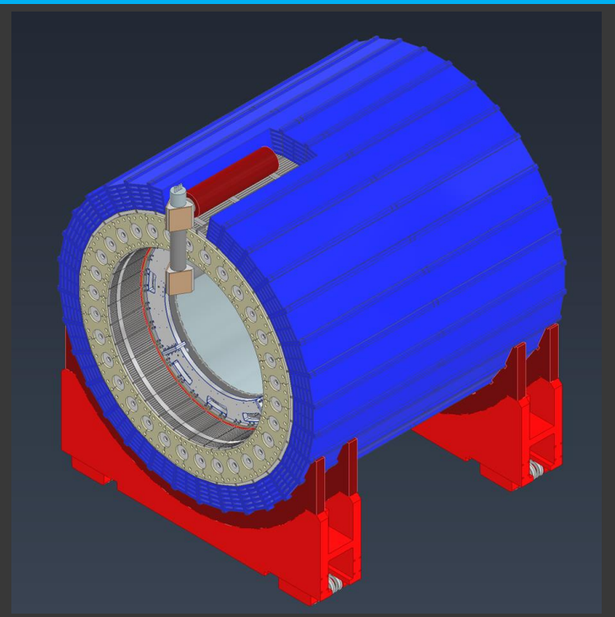
Top-Down Cross-Section

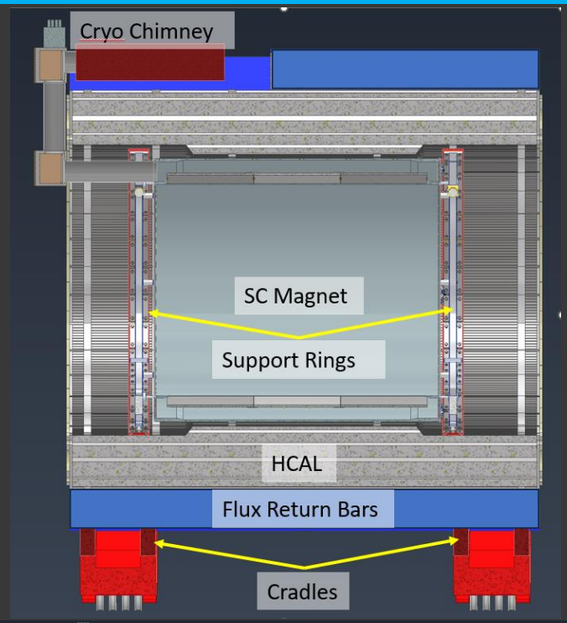


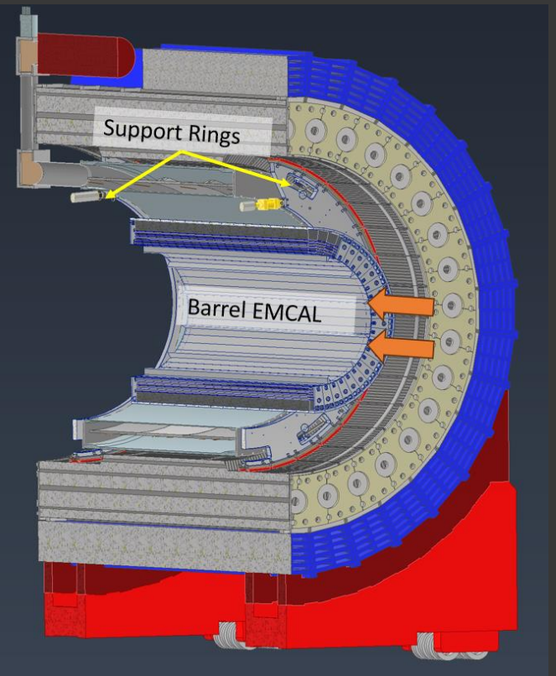
Installation Sequence

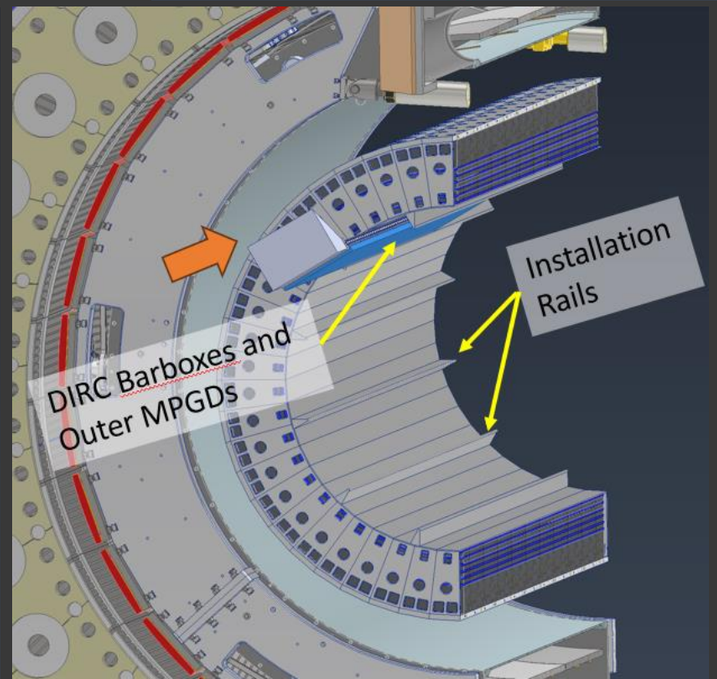


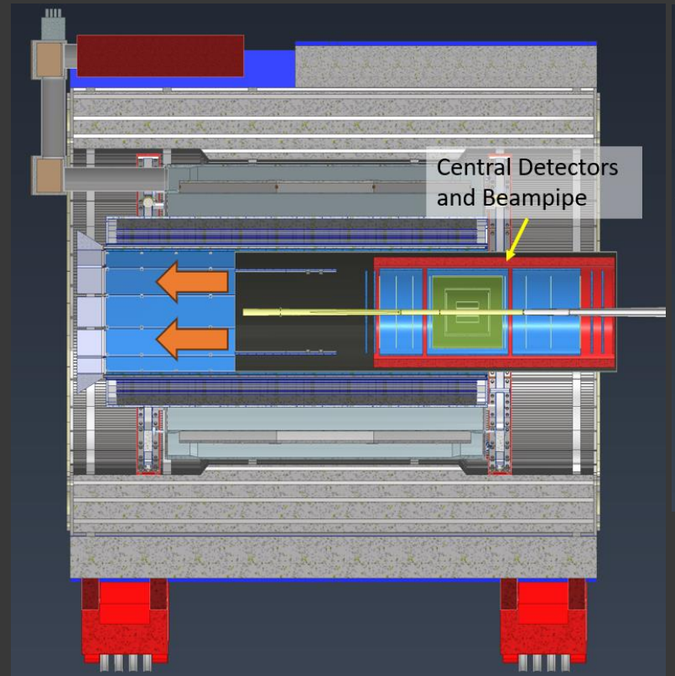


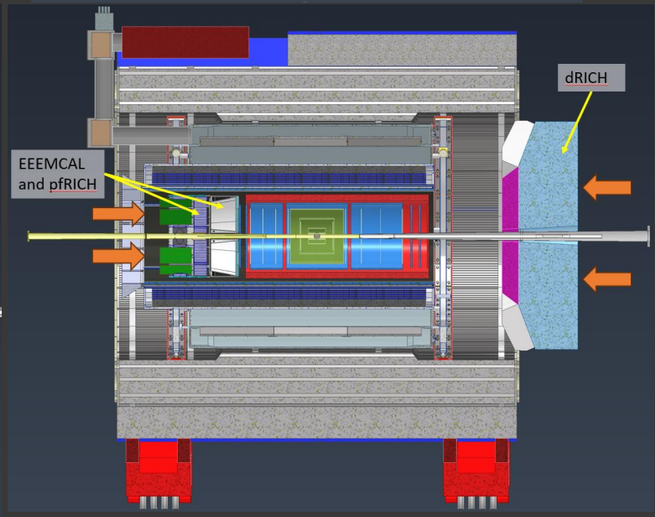




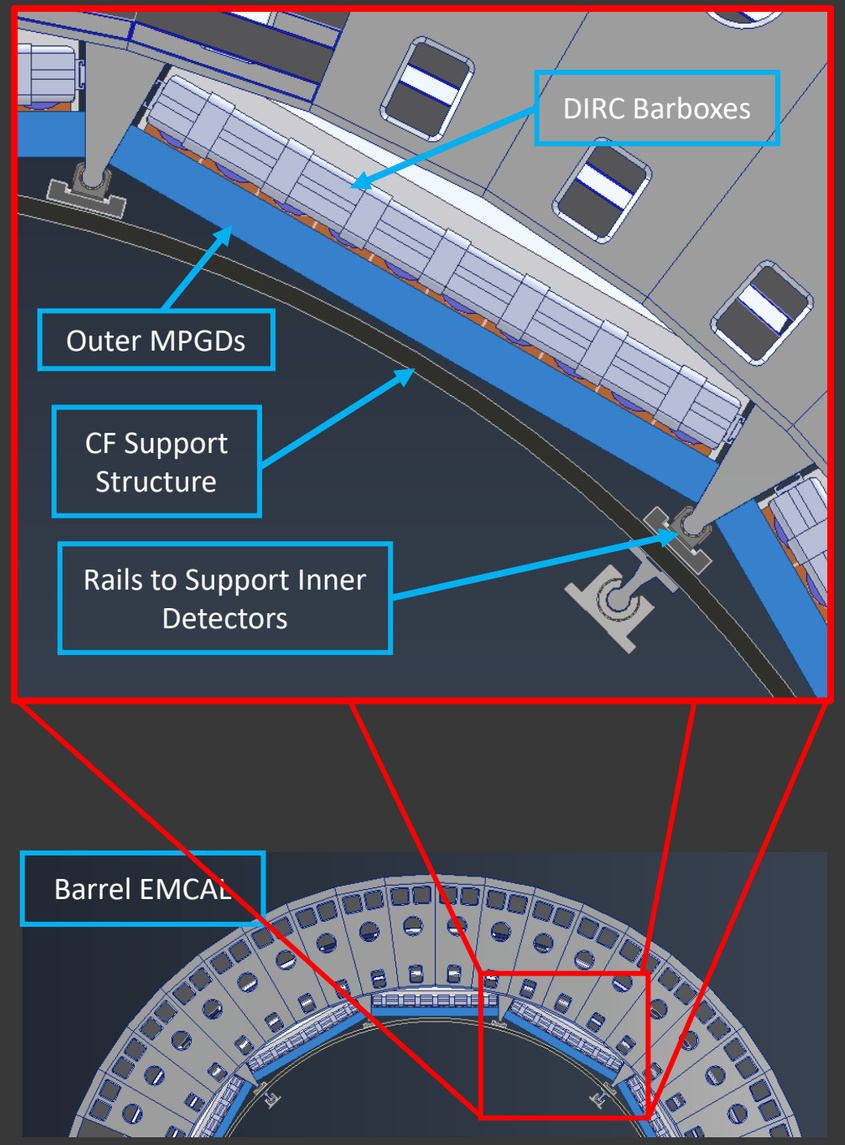




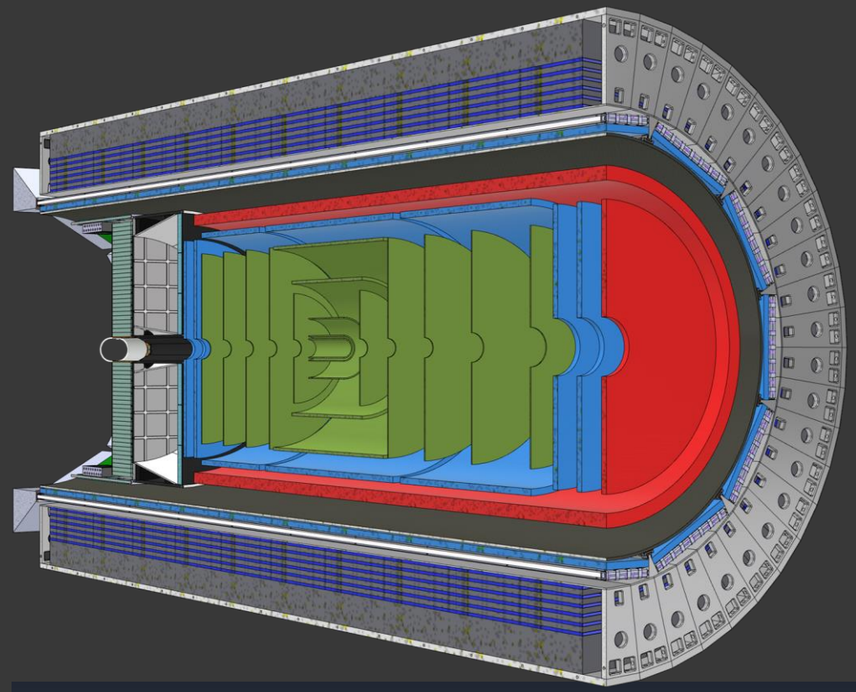


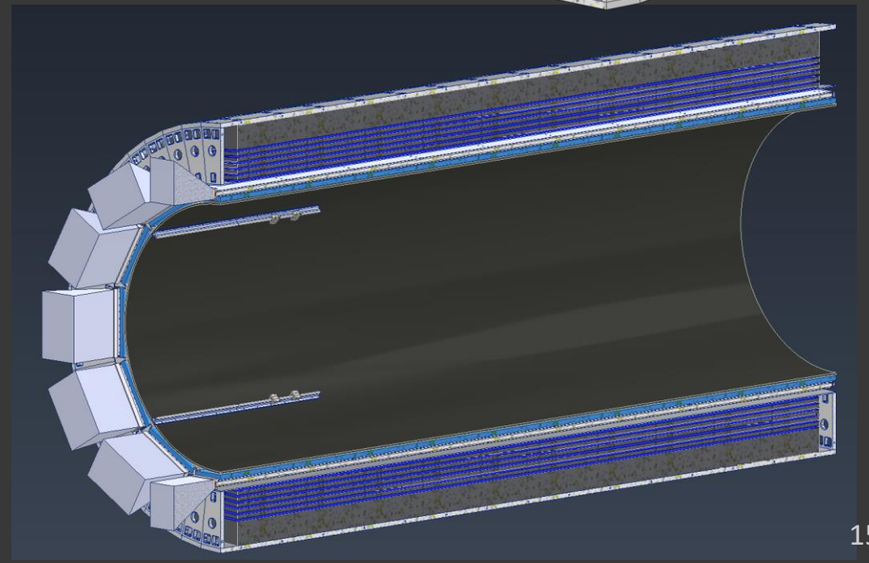


Supporting Structures



- Current plan is to use barrel EMCAL for support of Inner Detectors.
- Outer MPGDs and DIRC barboxes will be nested in the area between rails.
- A carbon fiber support structure supported using barrel EMCAL will support all the inner detectors.
- Separate Rails will be used for EEEMCAL and pfRICH Installation.
- Gaps between the EEEMCAL and the carbon fiber cylinder will allow for inner services to be brought out.





Services

- Current estimate of services.
- South: divided into 6 groups around dRICH electronics boxes
- North: Need to avoid DIRC prisms.