ePIC SVT in CAD

Ben Denos

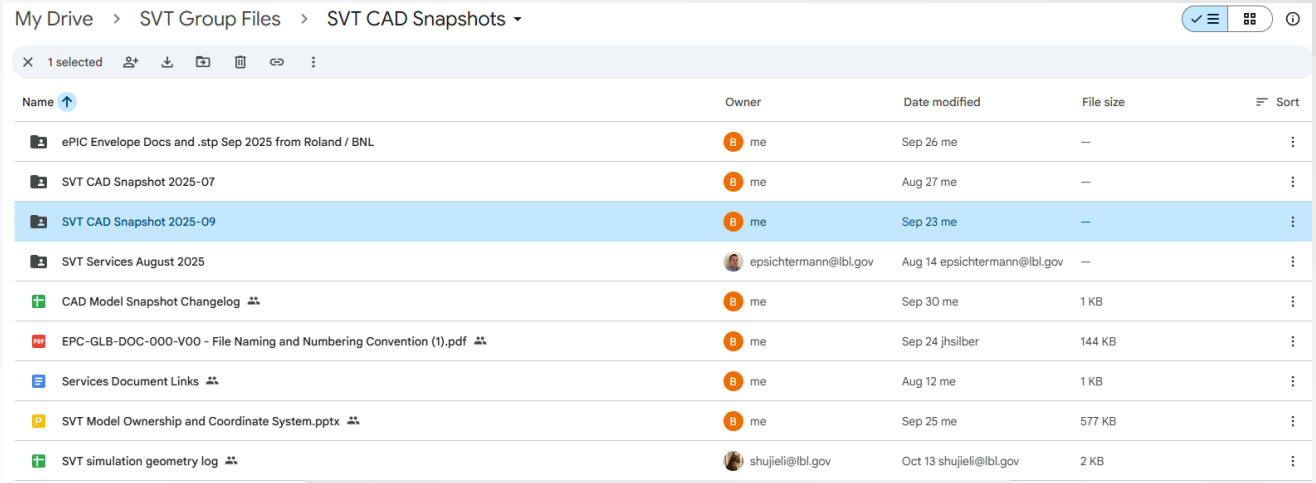
Purdue University

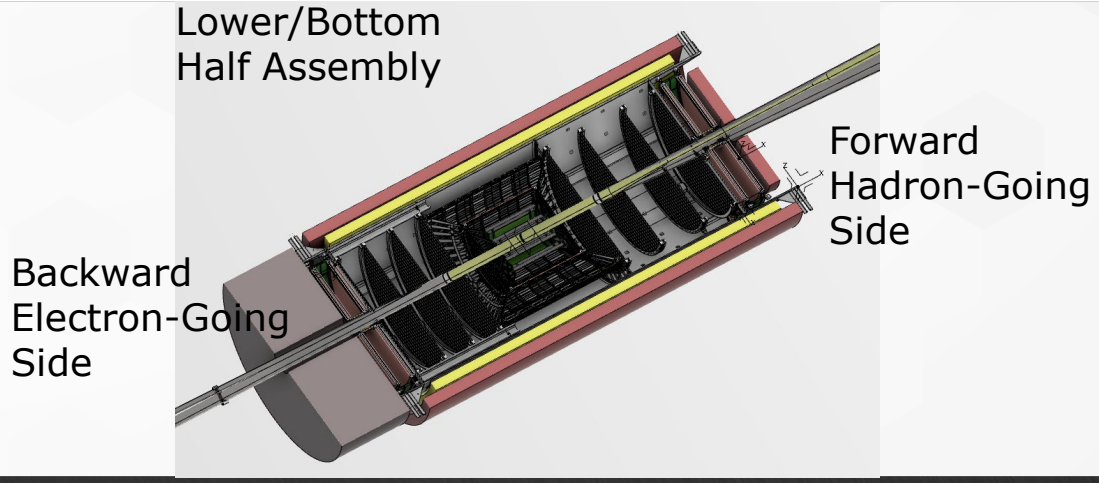
14 October 2025

Latest Model Snapshots

- Beampipe – May 2025
  - DET-VA-CHM-0100 1m beryllium 250527.stp
- Inner barrel (L0-2) – July 2025
  - ePic_HalfAssembly-SVT-IB.v2.stp
- Outer barrel (L3-4) – September 2025
  - OB_ASSY_SNAPSHOT_17_SEPT_25.STEP
- SVT Disks (H/E-D0-4) – September 2025
  - SVT- LBNL- DISKS,CONES,SERVICES - EC-1012-5969.A11 -2025-09-29.stp
- MPGD Disks – July 2025
  - 2025-July-ECT.stp
- TOF/CYMBAL/pfRICH Envelopes – October 2025
  - Recreated from “EPIC Envelope - 09-22-2025.pdf”

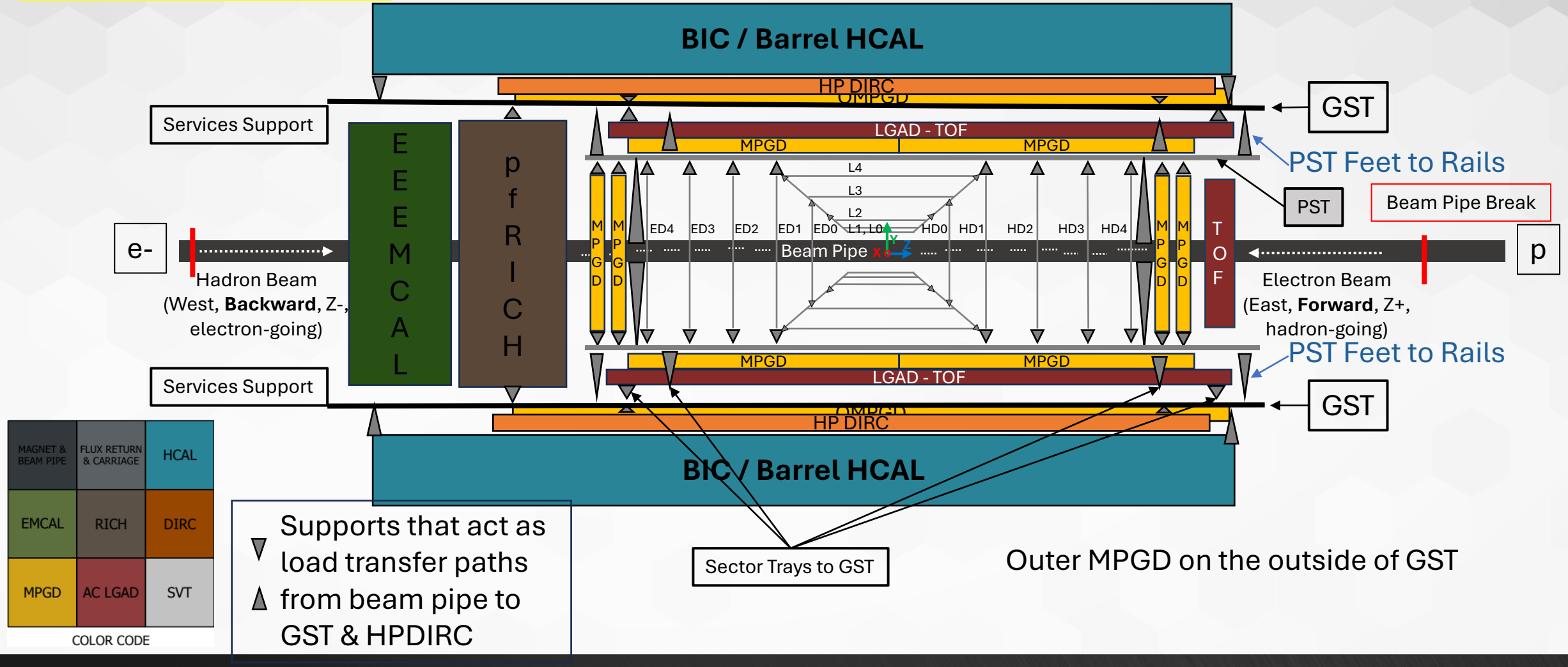
- Bi-monthly snapshots saved as .stp files in Google Drive





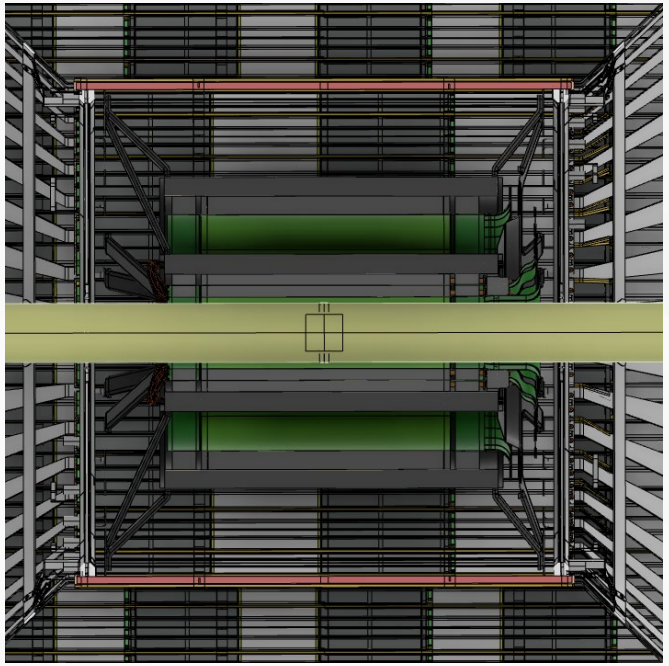
ePIC Detector Support Hierarchy Y-Z View - Oct 2025 option 2 (for internal discussion)

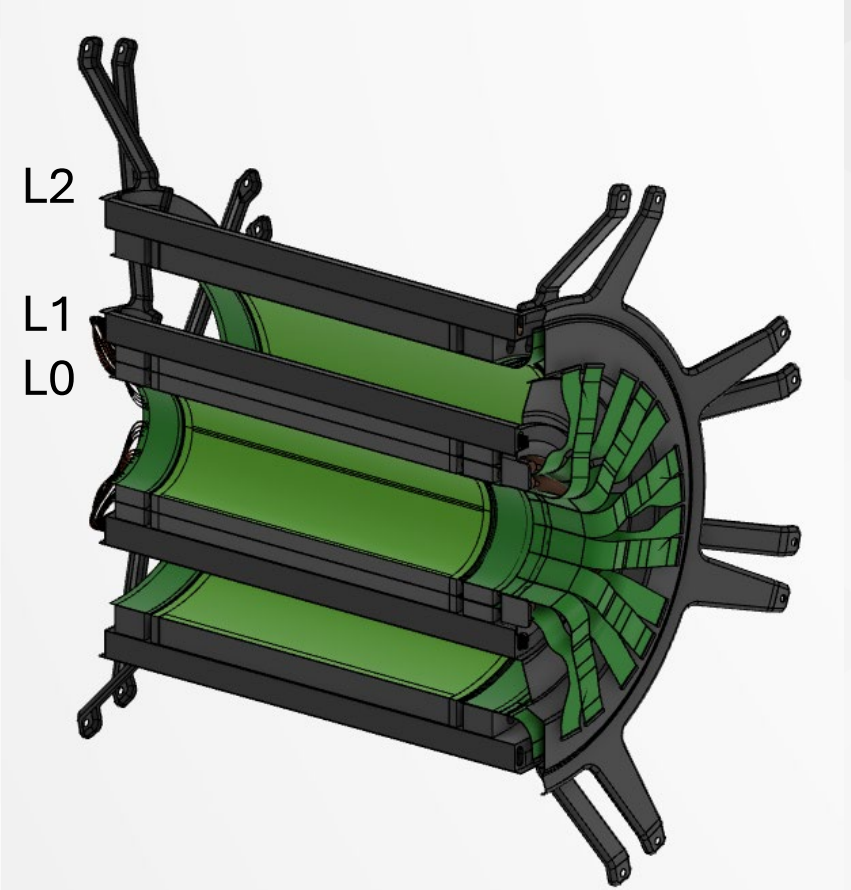
Nth DRAFT – NOT TO SCALE



SVT Inner Barrel

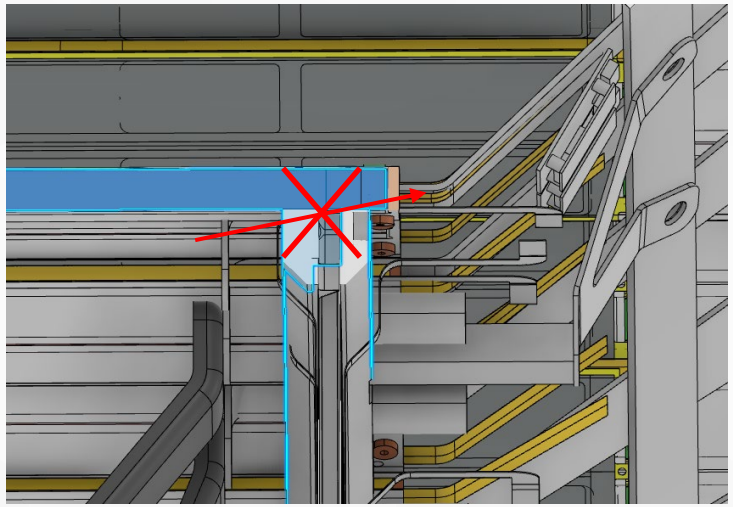
- Model from July
- Request model with boards (at least simple representations)
- No obvious interferences

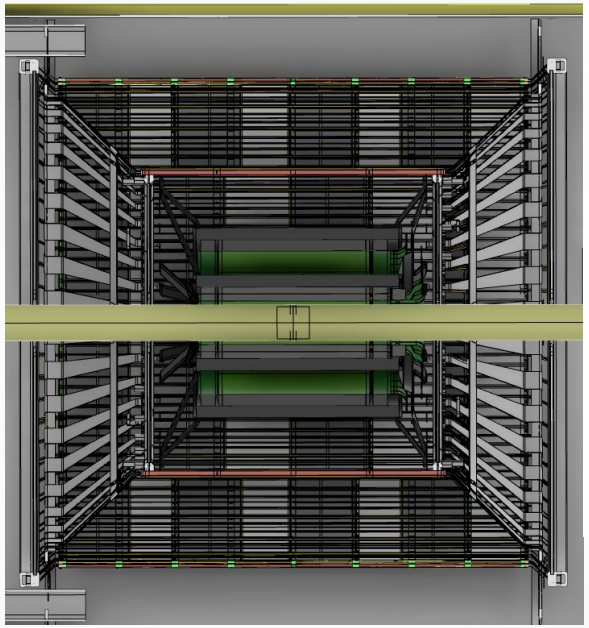


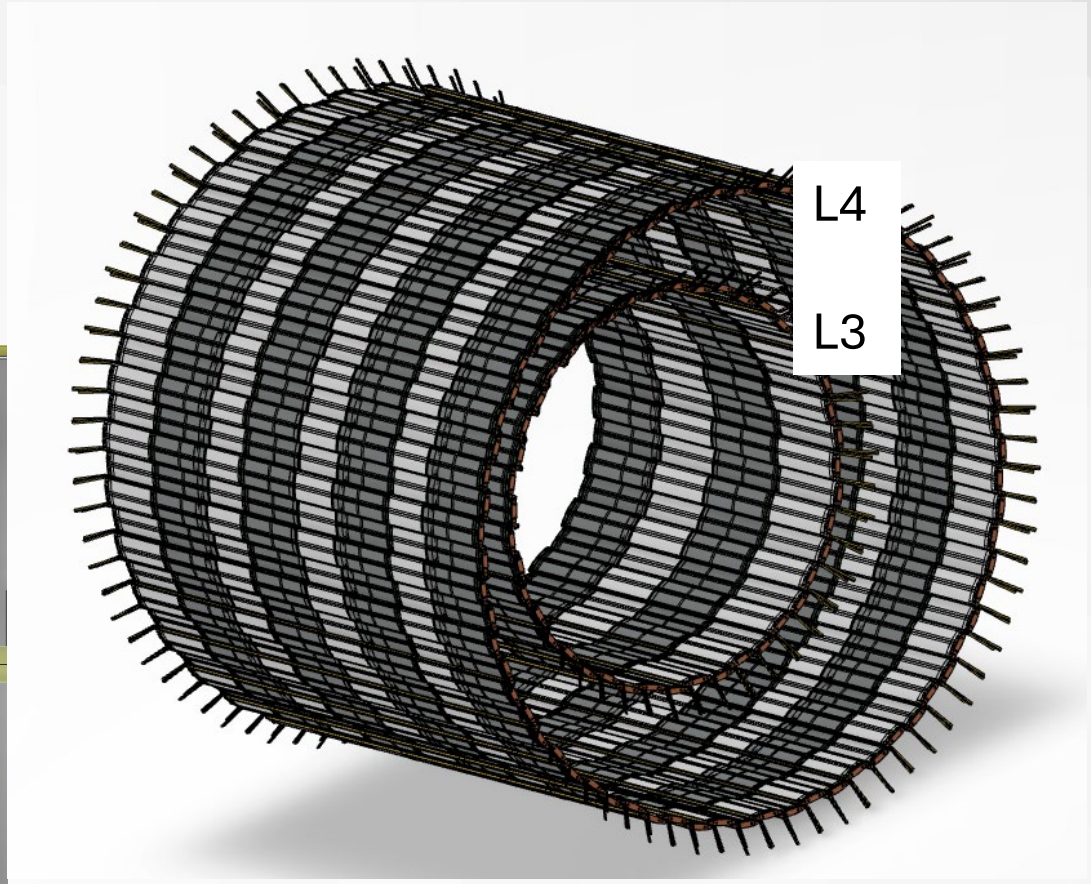


SVT Outer Barrel

- Model from September
- Ongoing update conversations between Joe Silber and Adam Huddart
  - To update layer 3 interference with HD0 and ED0 disks
  - No room for services

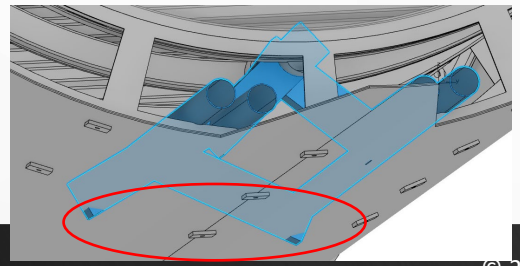




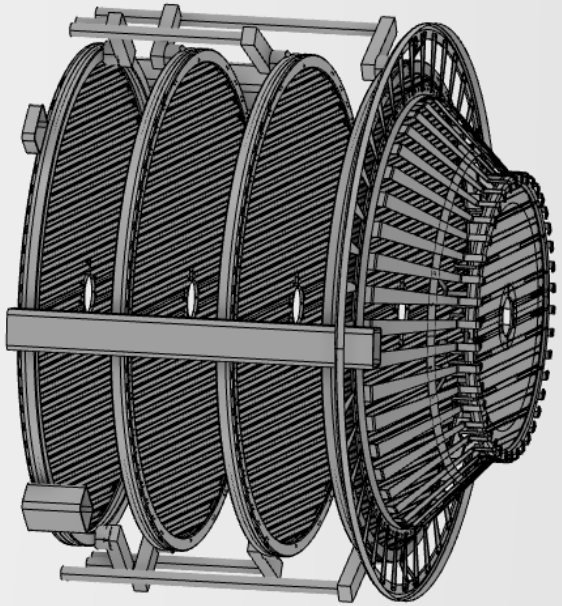


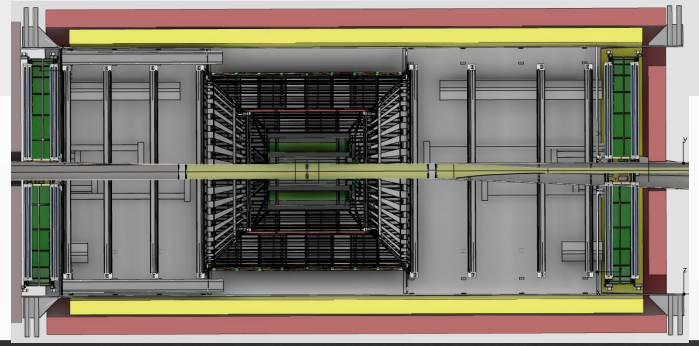
SVT Disks (and Barrel Connections)

- Model from September
- Air inlets/exhaust added
  - Requested shift of exhausts away from 3 and 9 o'clock for PST joint and beampipe support clearance
  - Small penetration of PST with new inner radius 535mm
- Resolving interference of HD0/ED0 with with OB L3

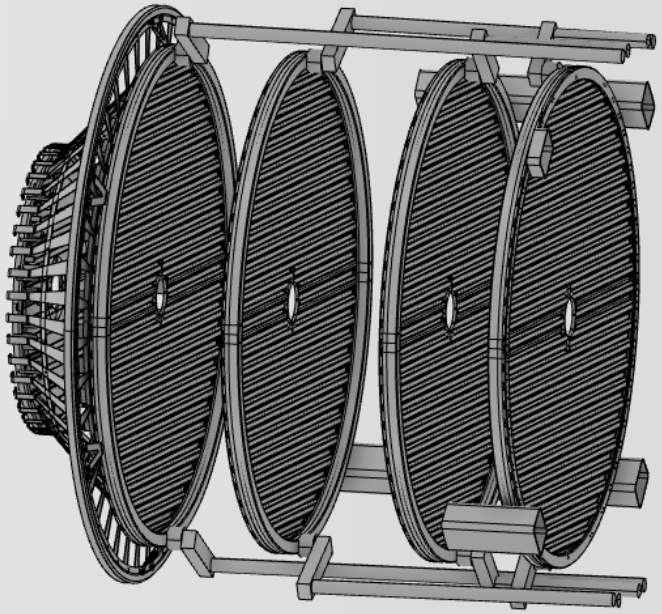


Backward
(Z-, electron-going)





Forward
(Z+, hadron-going)

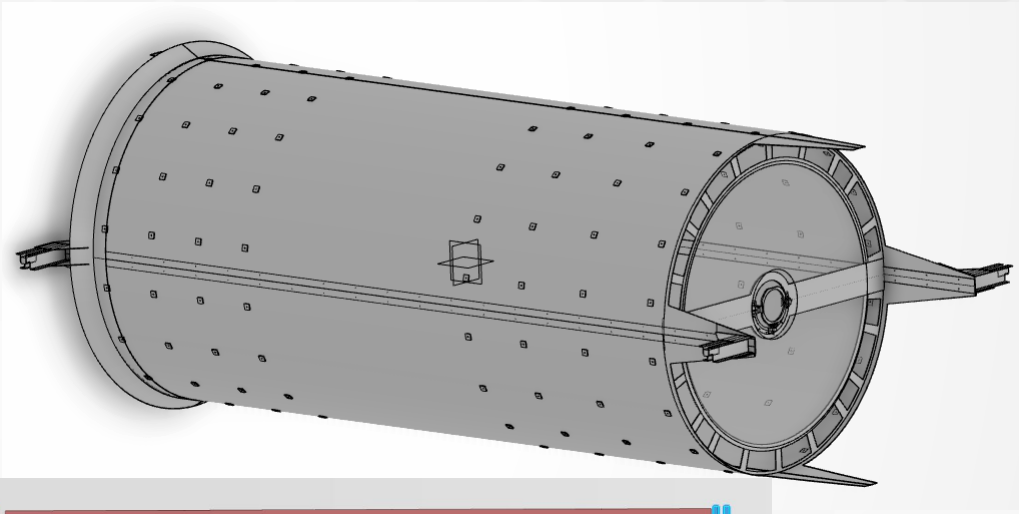


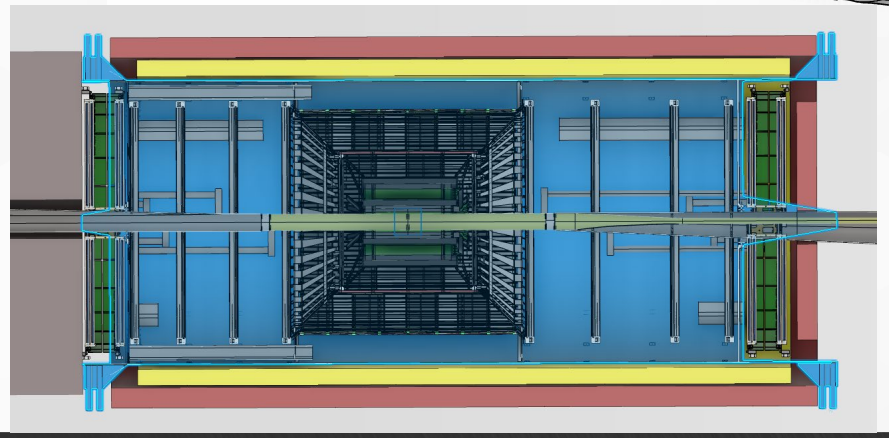
PST

- Model from September (or newer)
  - Drawing packet and .stp file available https://drive.google.com/drive/folders/1BqMfAAYiFx2YpS8LJYa97ev0lmOOVBqB?usp=sharing
- Minor disk/air interferences
  - Requested shift of exhausts away from 3 and 9 o'clock
  - Small penetration of PST with new inner radius 535mm
- No outward interference with cymbal/TOF
- Simulation work in progress to refine designs, but envelopes look good
  - Half cylinder and full assembly cases

Backward
(Z-, electron-going)

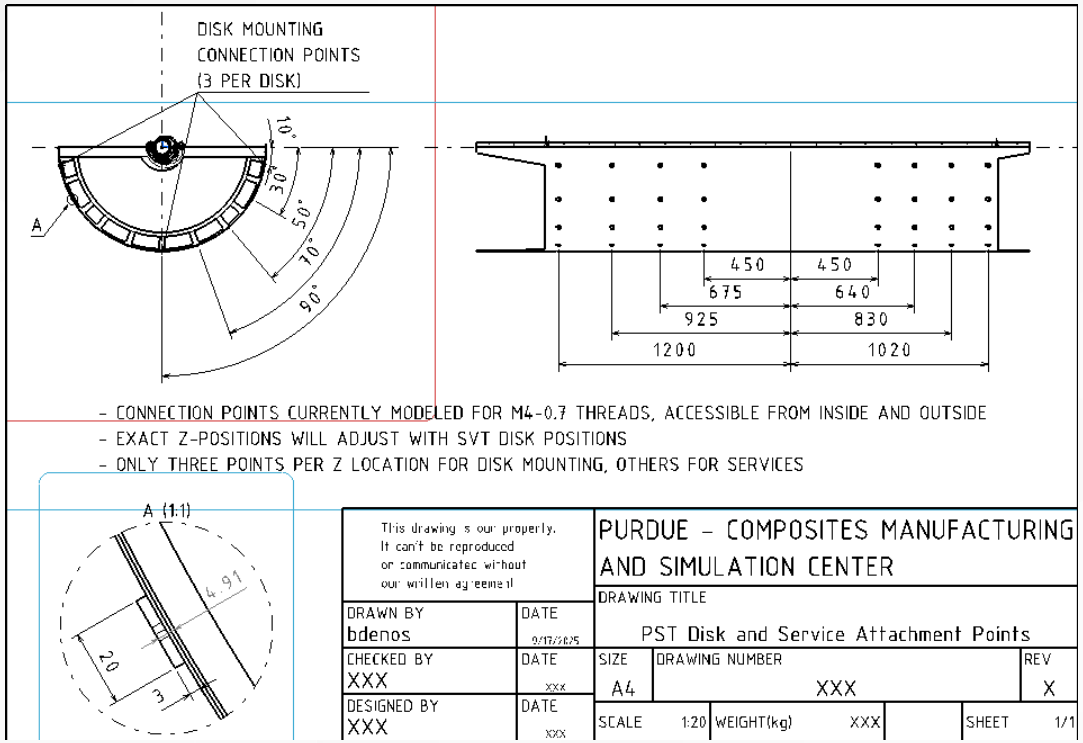
Forward
(Z+, hadron-going)



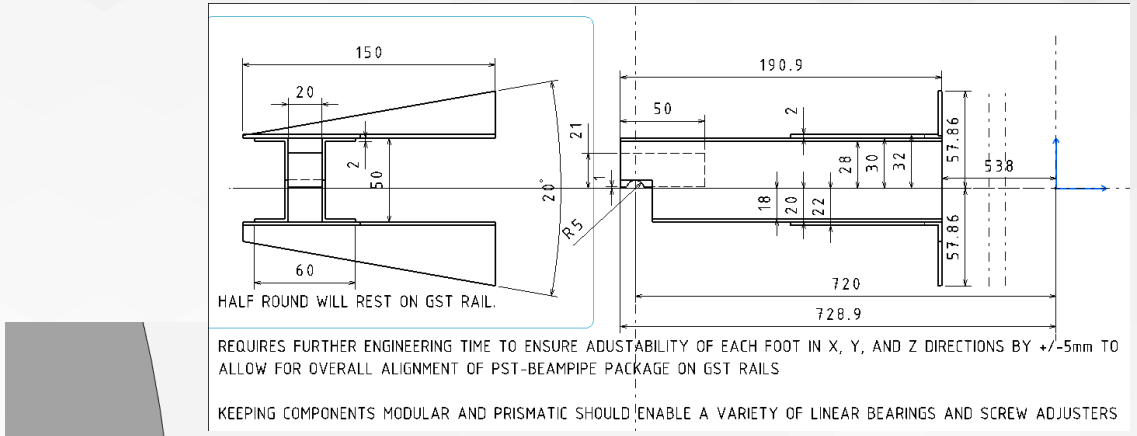


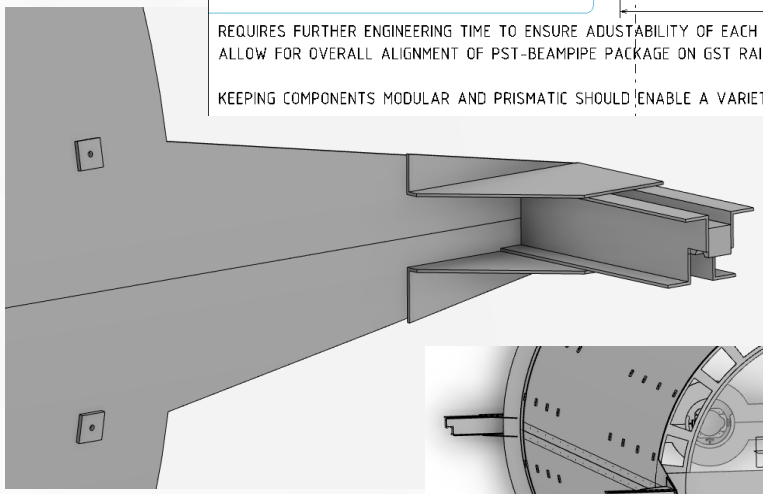
PST Latest Updates

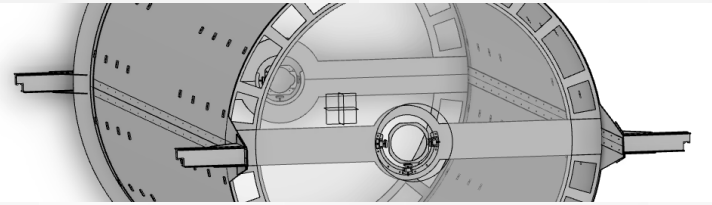
- Disk and services connection points
  - 3 points per half-disk intended, others for services or temporary fixturing
  - Easily re-position or change quantity when disk locations final



- More rigid PST feet to GST support rail
  - Once structurally sufficient, add adjustment mechanism for X-Y plane motion, iterate

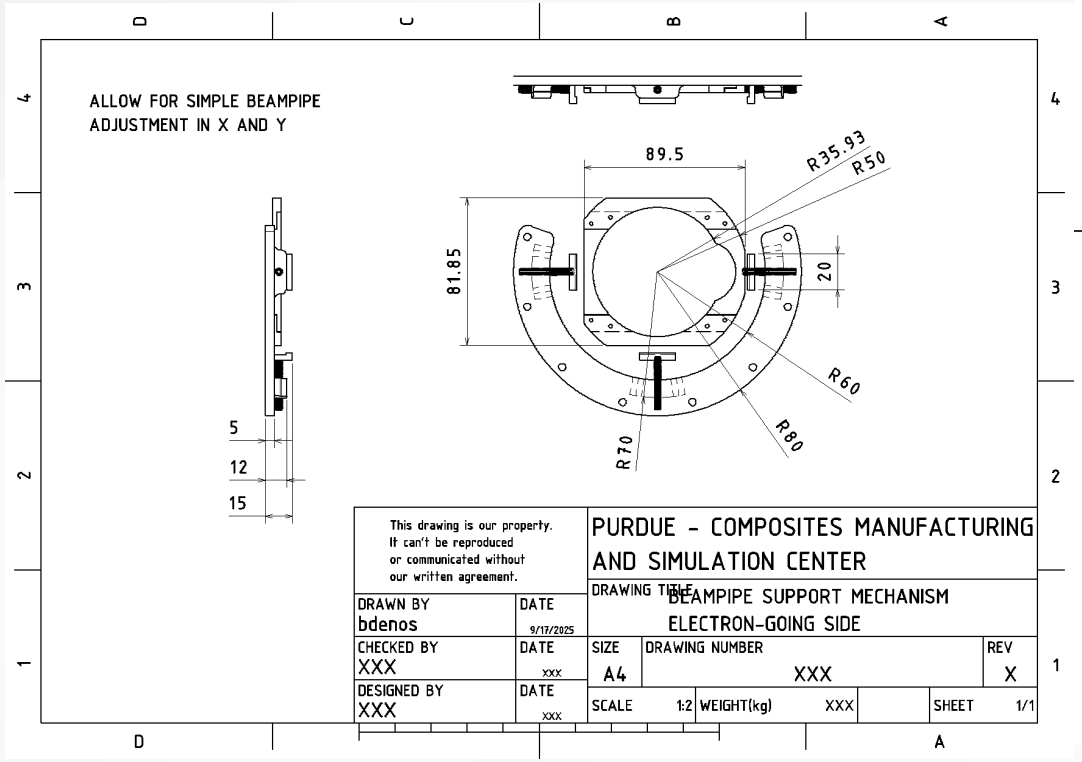


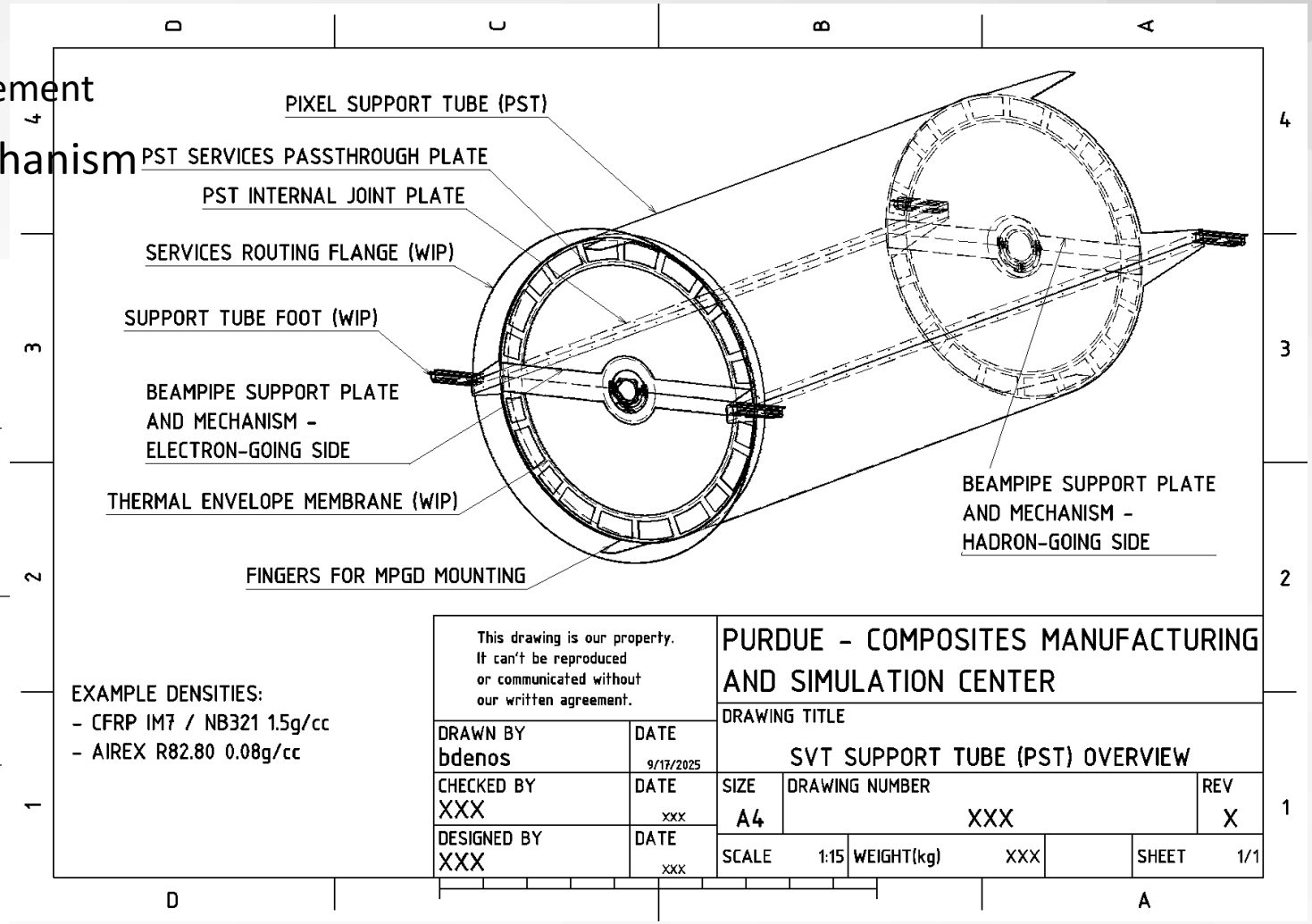




PST Other Features

- Services passthrough plate
  - Placeholder, but illustrates space requirement
- Beampipe support and alignment mechanism
  - Discussion on Oct 27th





Other Known Updates Needed

- PST support feet
  - adjustability
- PST half cylinder assembly cradle
  - mimic final support as closely as possible
- Beampipe adjusters
  - Handle torque, more constraint?
- Barrel attachment points
  - Tie directly to disk 1 support? Or direct to PST?
- Disk attachment points
  - Define desired degrees of freedom and mechanism
- MPGD attachment points
  - 2 fastener hole locations per point
- Define degrees of freedom for all attachments

- Capture expected loads in a table
- Simulate half and full cylinder loads
  - Refine and iterate as needed

- Capture all of this in a presentation and in PDR document
- Many refinements still needed, but targeting “60% design maturity” for PDR