

PST Attachment Points

SVT Workfest at Stonybrook University 10 July 2025

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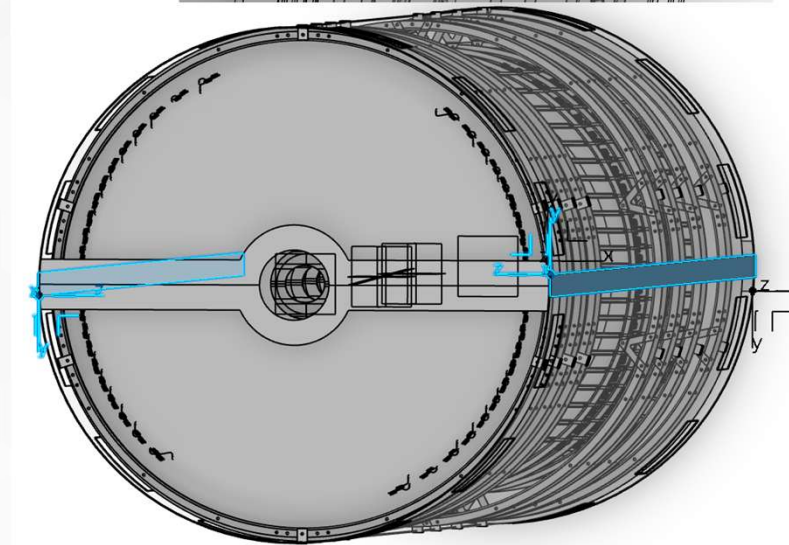
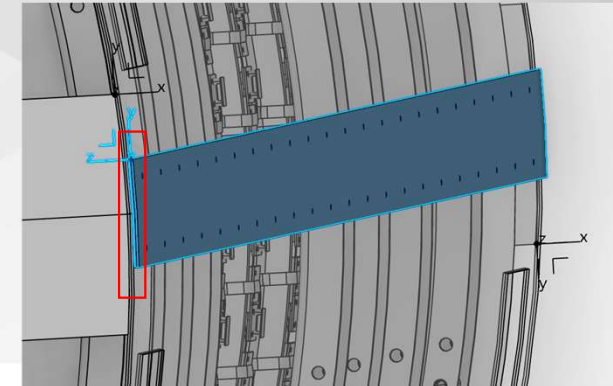
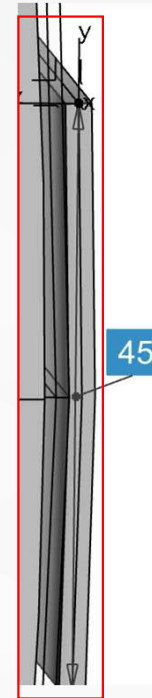
PST, Beampipe, SVT Barrel, Disks

Attachment Functionality – Position Adjust VS Hold

- ◆ Does a connection need to **drive positioning**?
 - ◆ Example: adjustment screws in each axis
 - ◆ OR does a connection need to only **allow for positioning**?
 - ◆ Use oversized holes, spherical washers, etc.
 - ◆ Always needs to “lock” after positioned
 - ◆ The answer changes complexity and mass of “permanent” connectors
- ◆ Recommendation
 - ◆ Don’t expect fine alignment using PST features
 - ◆ Composite shape is hard to control and machine during and after assembly
 - ◆ Align SVT detectors with a rigid, temporary fixture
 - ◆ Use connector brackets to lock detectors in position after alignment
 - ◆ Adjustment of entire PST-SVT-disk package with “feet” on support rails discussed later

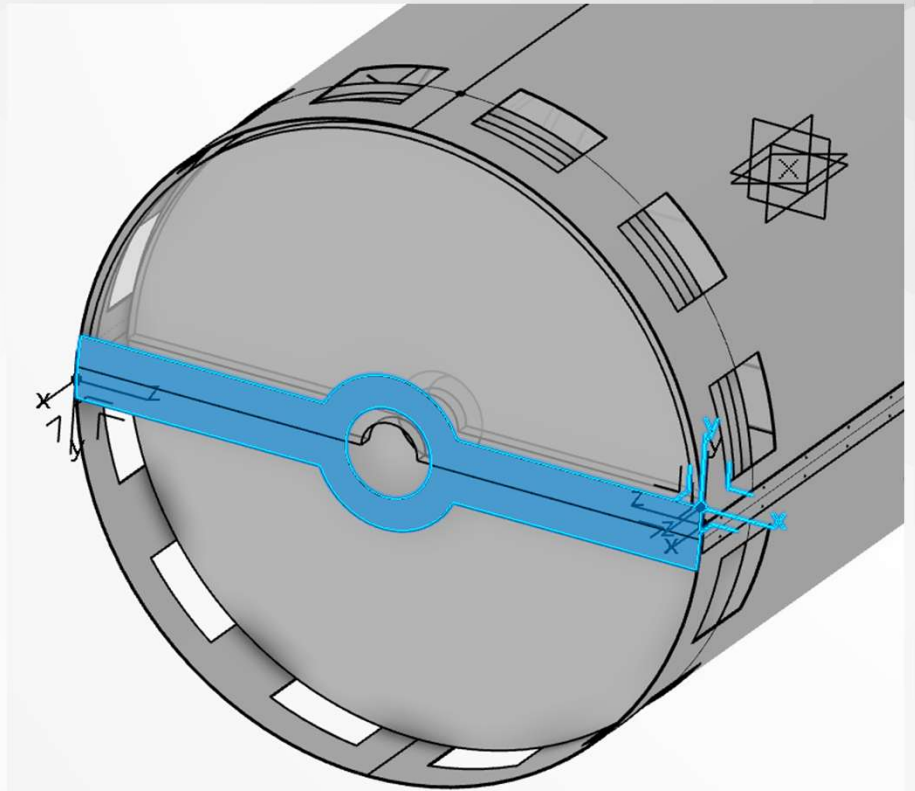
SVT Half Cylinder Joint

- Simple curved profile, full length joint plate
 - 2mm thick, ~45mm tall, 2875mm long
- Connect to half cylinders with regularly spaced fasteners
 - Requires threads (or screws) to be fixed inside half cylinder edges
 - Oversize threaded holes
 - Better if moved inside, threaded/inserts?
- Add ~4-6 alignment pin holes
- Removable! But could bond to one side (half cylinder) if desired



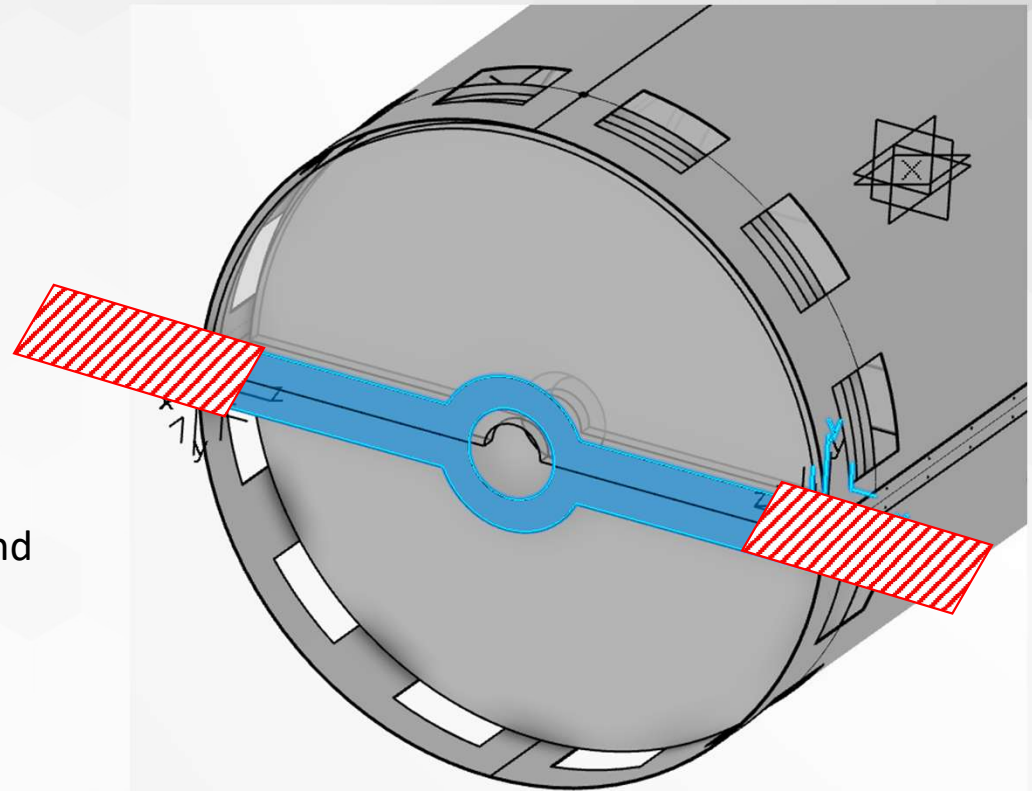
Beampipe Support Plate

- Structural connection between PST and beampipe at each end
- Allows beampipe adjustment relative to PST/SVT with yet undefined “collar”
 - Integrated permanent adjusting mechanism...
 - OR locking mechanism with temporary adjuster
- Fixed to PST at cylinder half joining plate (3 and 9 o'clock) via brackets
- Also helps maintain PST circularity to minimize deflection



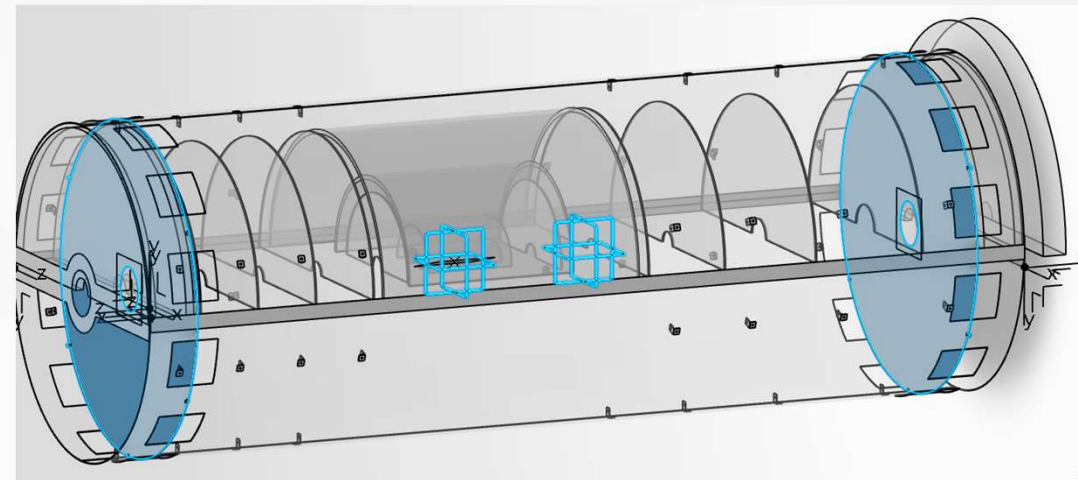
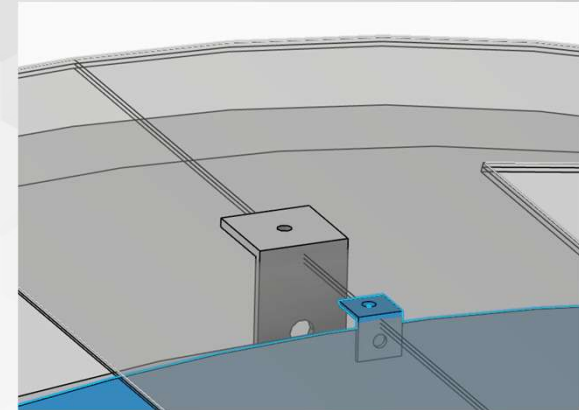
SVT Rail Support Bracket

- Connect beampipe support plate to PST support rails
- Needs more design time
- Functions / Constraints
 - Support SVT/PST/Beampipe and some services mass
 - Allow SVT/PST/Beampipe package alignment up to 1-2mm in X-Y plane
 - Don't interfere with F/B MPGD Disks and TOF/pfRICH
 - Removable during installation to avoid TOF/cymbal interference



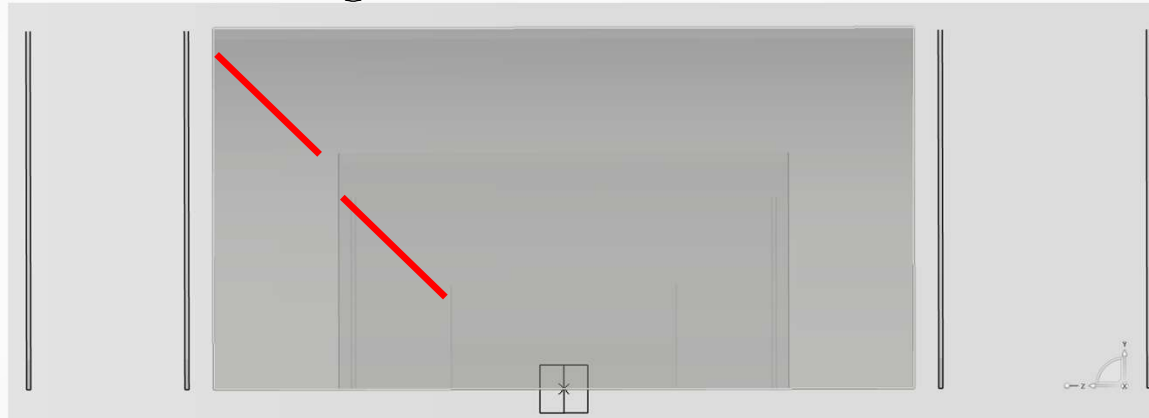
SVT Thermal Envelope Membrane

- Currently, “solid” disk (1mm?) thick CFRP
 - 2+ sections around beampipe
 - Could replace with kapton film “drum” on CFRP ring if preferred, but still need sealing ring around beampipe
- at Z= -1495mm and +1070mm
- Install before MPGD F/B disks
 - Also possible to install full disk into a half SVT assembly and complete after joining
- Small 10x10mm angle brackets
 - Holes for M3
 - Spherical washers (?) for imprecision
- Seal to beampipe!
 - flexible



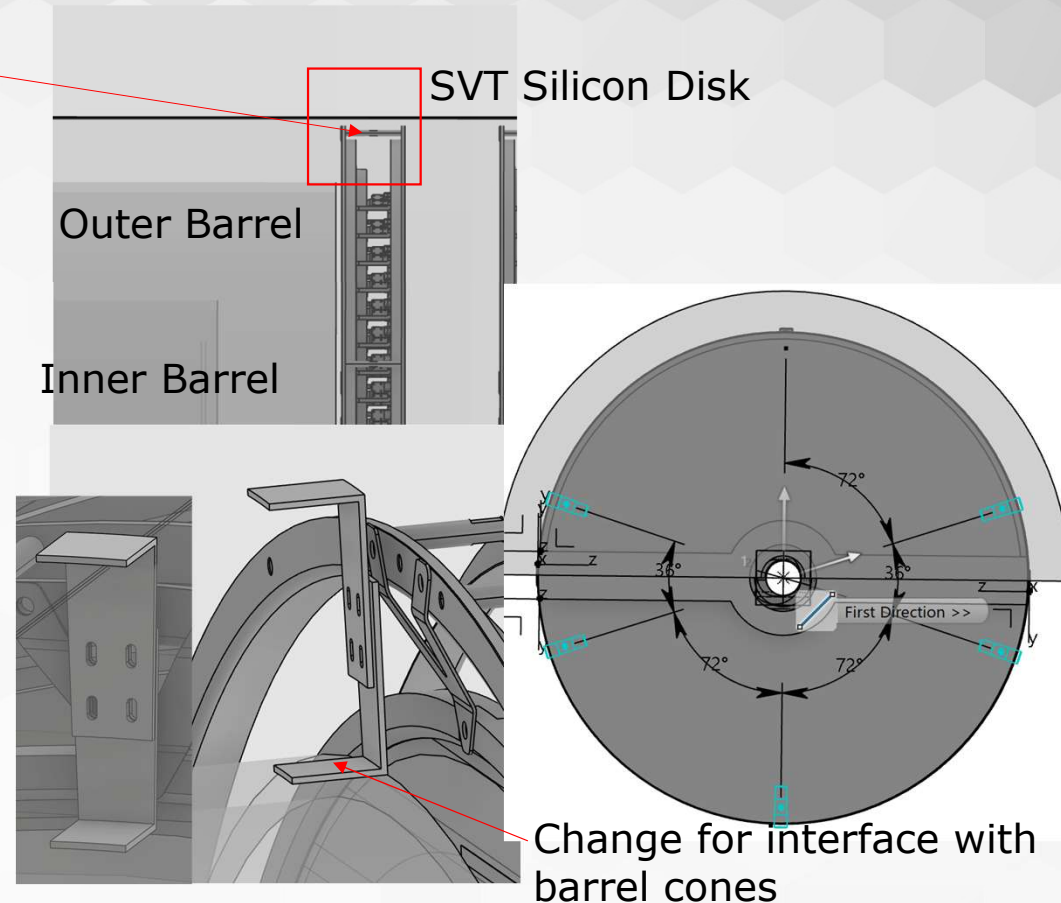
SVT Barrel Support Cones

- Connect inner and outer barrel
- Mounting point for connection to PST
- Mounting positions for services, boards(?)
- Open to geometry design and barrel attachment point requests from IB/OB teams
 - To best serve needed functions
- Purdue can then revise for composite manufacturability as needed
- Purdue can then lead attachment design to PST



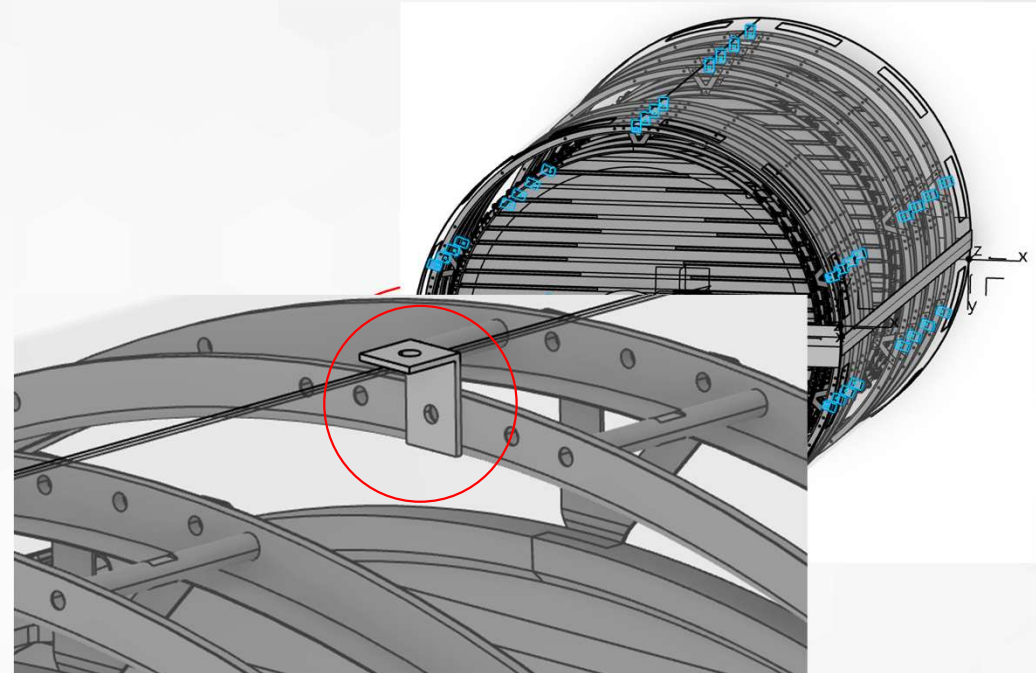
SVT Barrel Connector

- First SVT disk restricts position in Z
- 30x60mm angle brackets, in pairs
- Same angular spacing as disk brackets
 - Or offset to leave adjustability/access after disks in?
- 4 oversized elongated slots for M2 screws
- 1 M3 into PST, 1 into barrel
- Not an elegant positioning mechanism, just a holding mechanism, for now



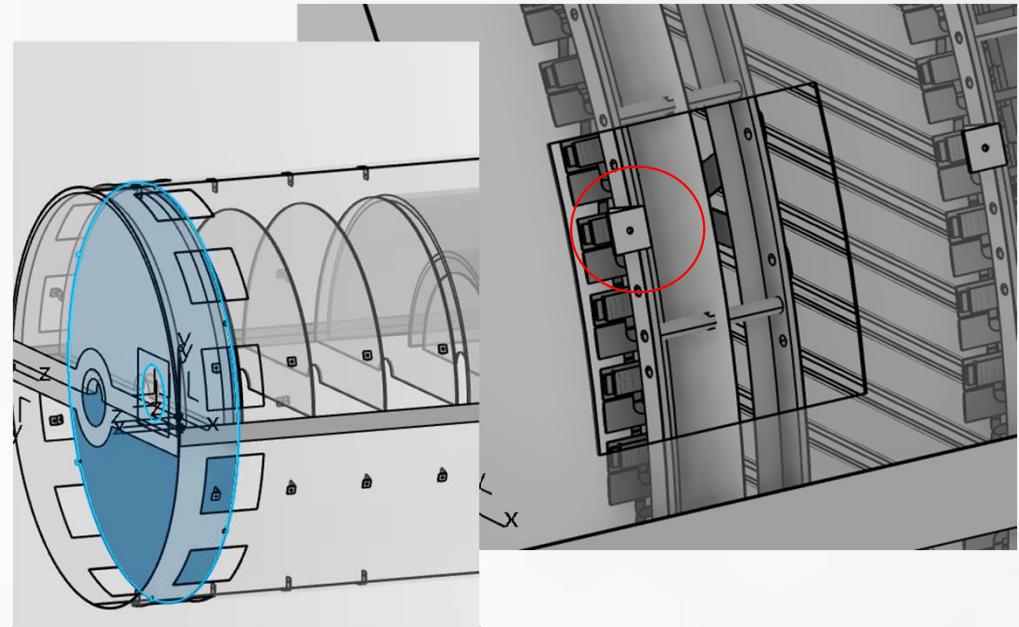
SVT Disk to PST Bracket

- Modeled here to allow for positioning, with oversized holes and
 - Spherical washer between tube and bracket
 - Spherical washer between bracket and disk support ring
- 30x20mm angle
- M3 hole into PST
- 5.5mm hole (?) into disk support
- Connection needs to be accessible from inside PST as barrel, then each disk is installed



Mounting point and/or services exit adjustments

- Need to discuss/confirm SVT services exit
 - Currently 12, avoiding 12, 3, 6, 9 o'clock
 - Any different requirement for services packaging?
- Then adjust outermost SVT disk attachment points as needed
 - Move from $\sim 72^\circ$ off Y-axis to 60° ??
- Bracket floating in mid-air currently



Future Work

- ◆ Identify available hardware for connections
 - ◆ Threaded inserts, spherical washers,
- ◆ Get most up to date barrel and disk models
 - ◆ Update connection brackets
- ◆ Brackets to connect beampipe support plate to PST joint plate
- ◆ Design adjustable rail support bracket
- ◆ Barrel cone development
- ◆ Adjust PST service pass throughs based on latest service estimates

Notes from discussion today:

- ◆ ...