

SVT Disks

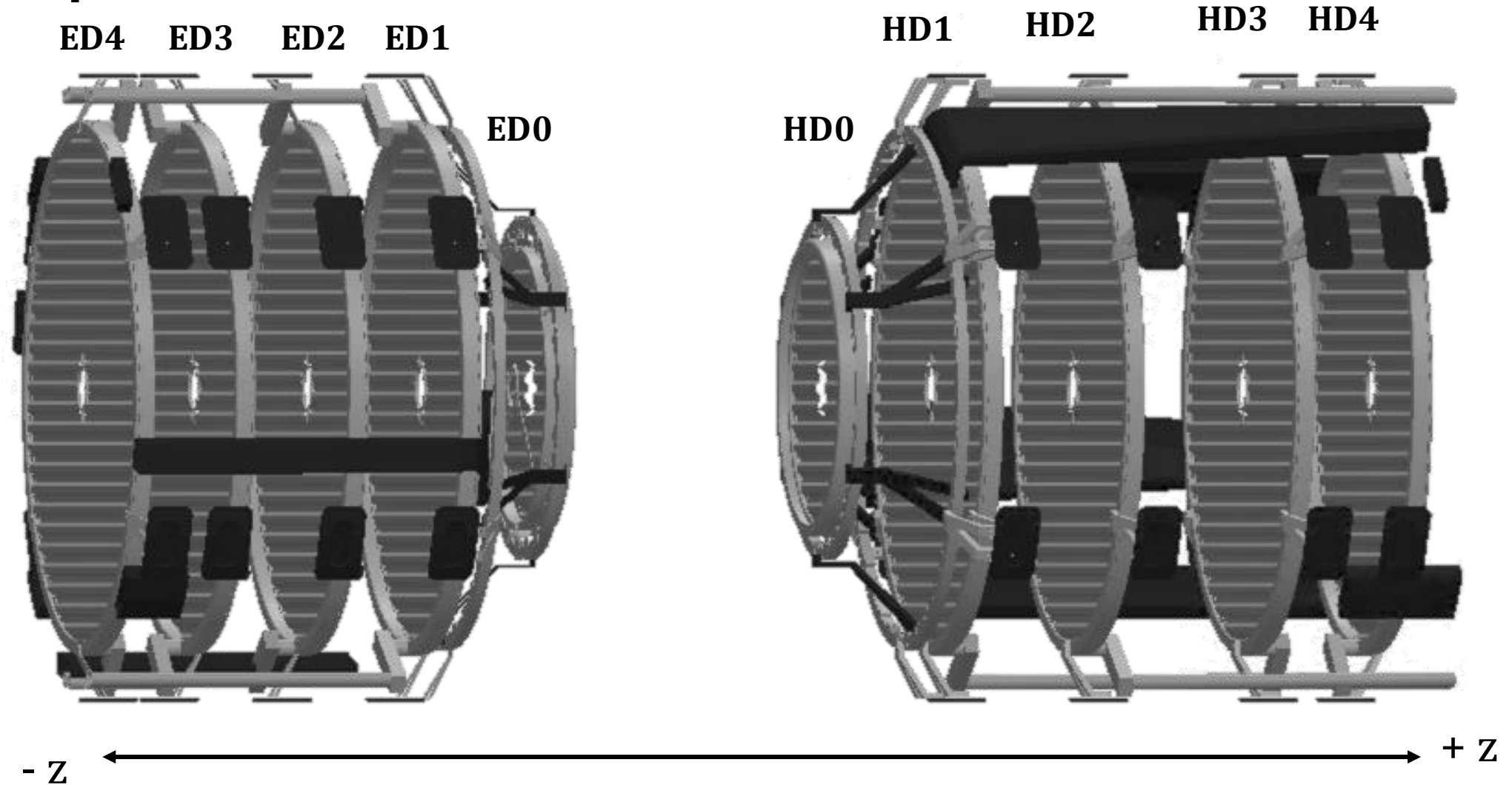
Nikki Apadula for LBNL group

Previous relevant talks:

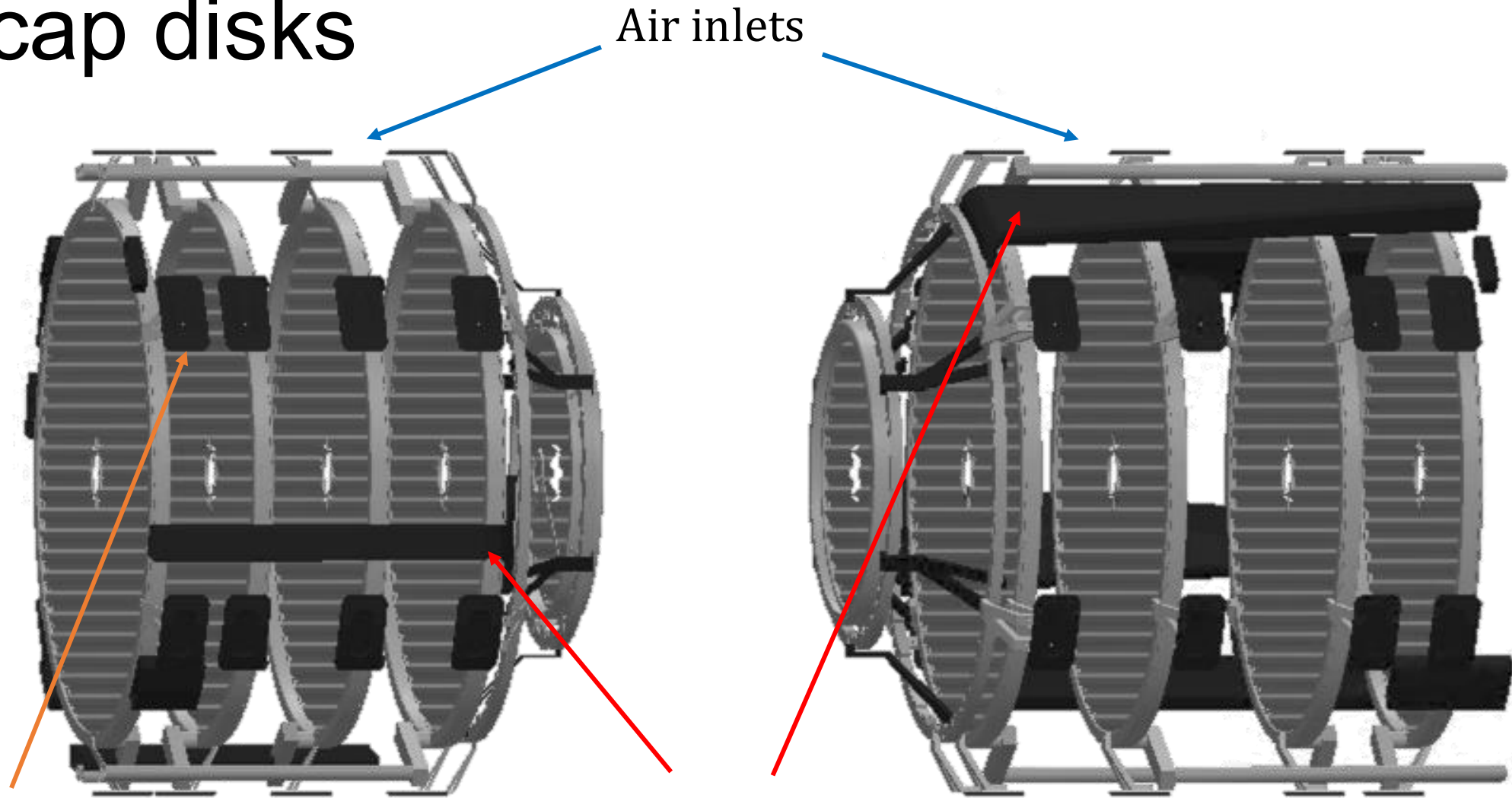
[Oxford Dec Workfest](#)

[SVT DSC Meeting - May '26](#)

Endcap disks



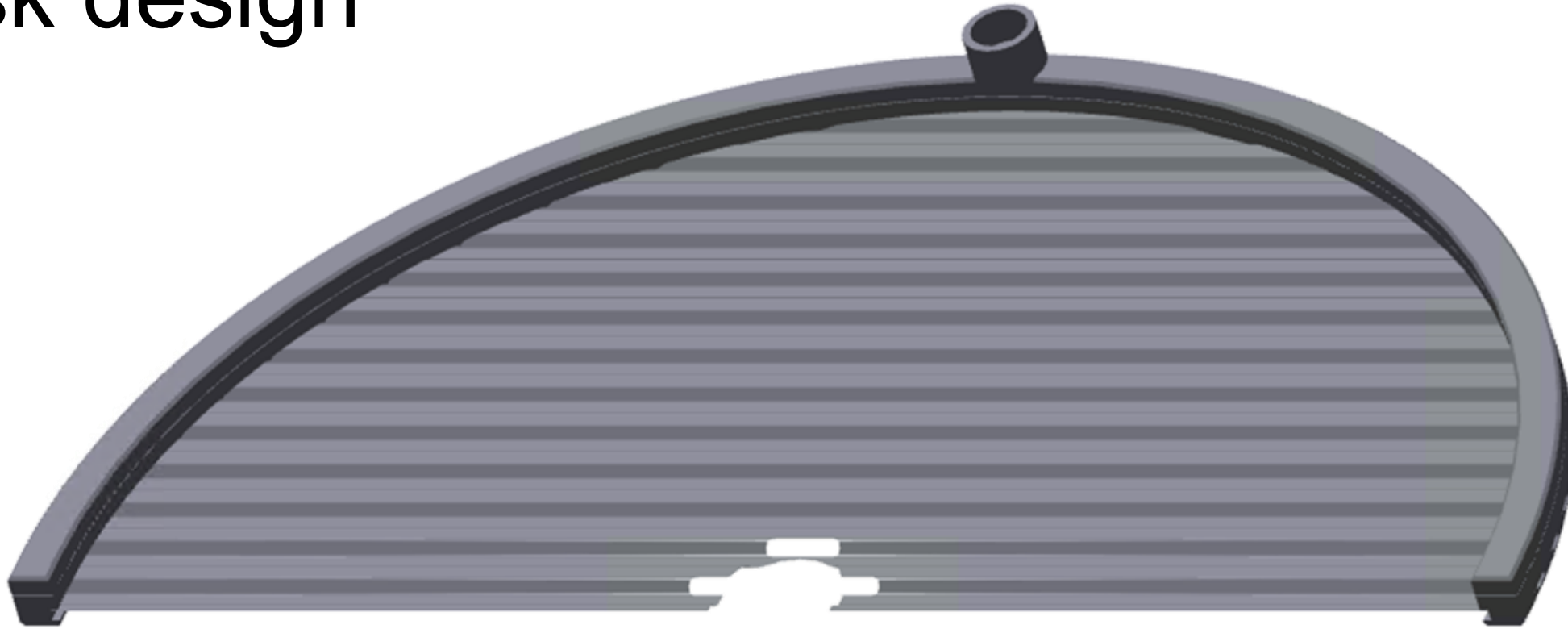
Endcap disks



Air exhaust ducts

Connections to PST

Disk design



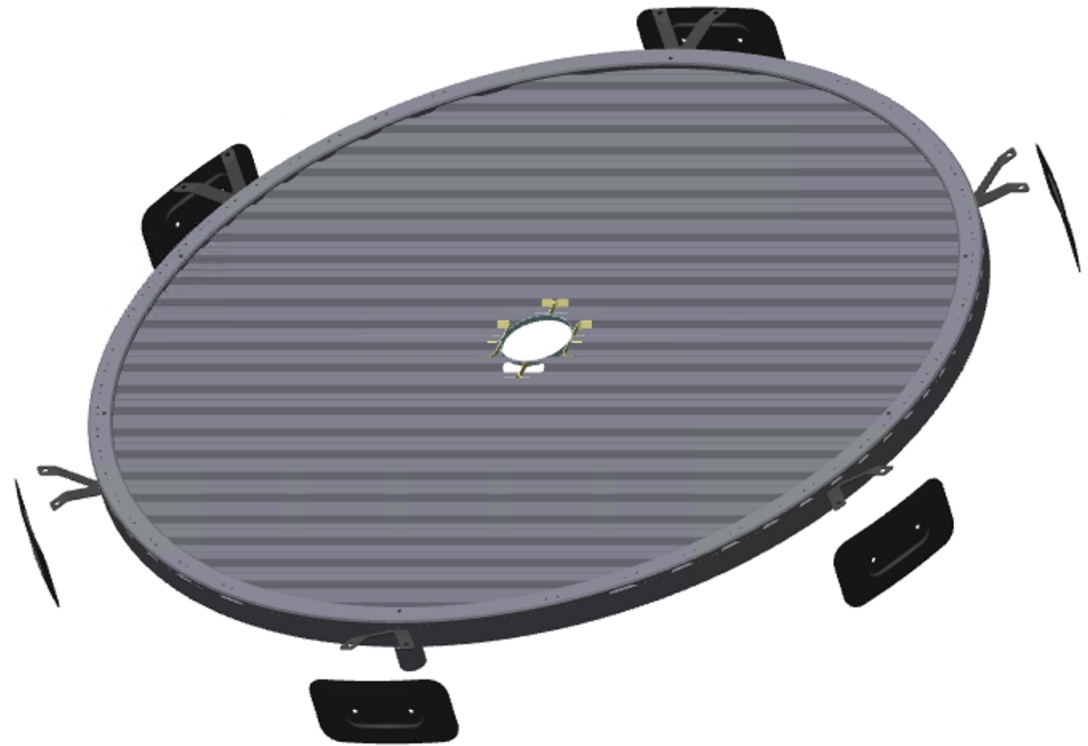
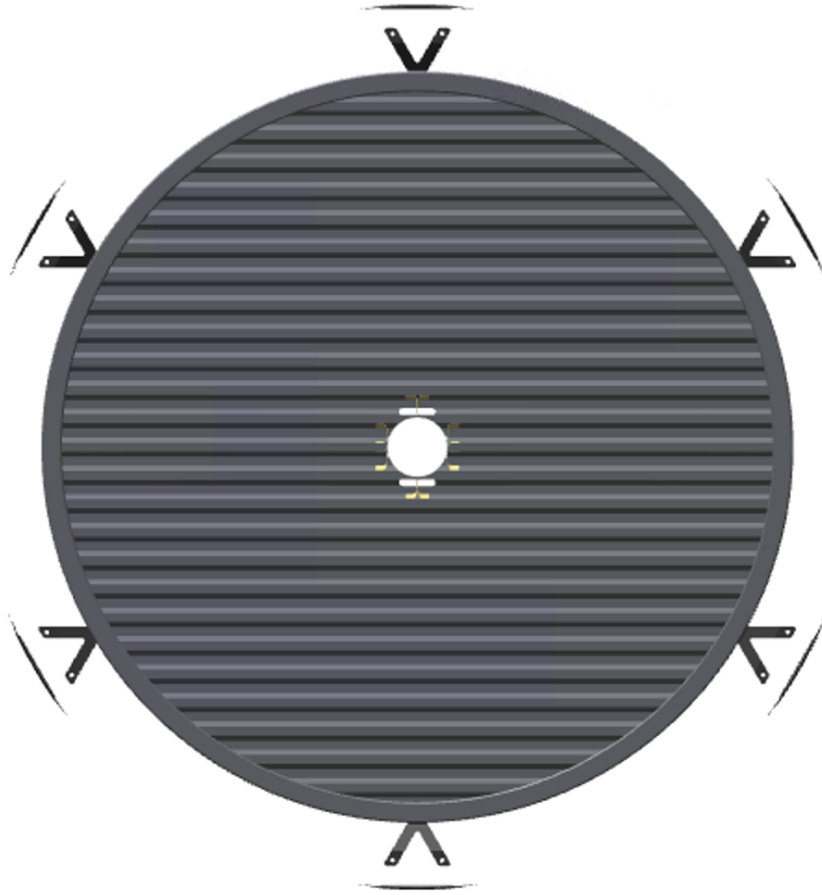
Disk rim

- mechanical support
- serves as an air manifold

Rim design has been updated → more in Elaine's talk

Disk design

Bipod connections from disks to PST



Disk Modules

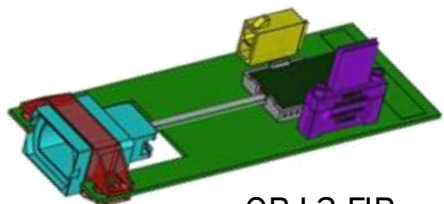
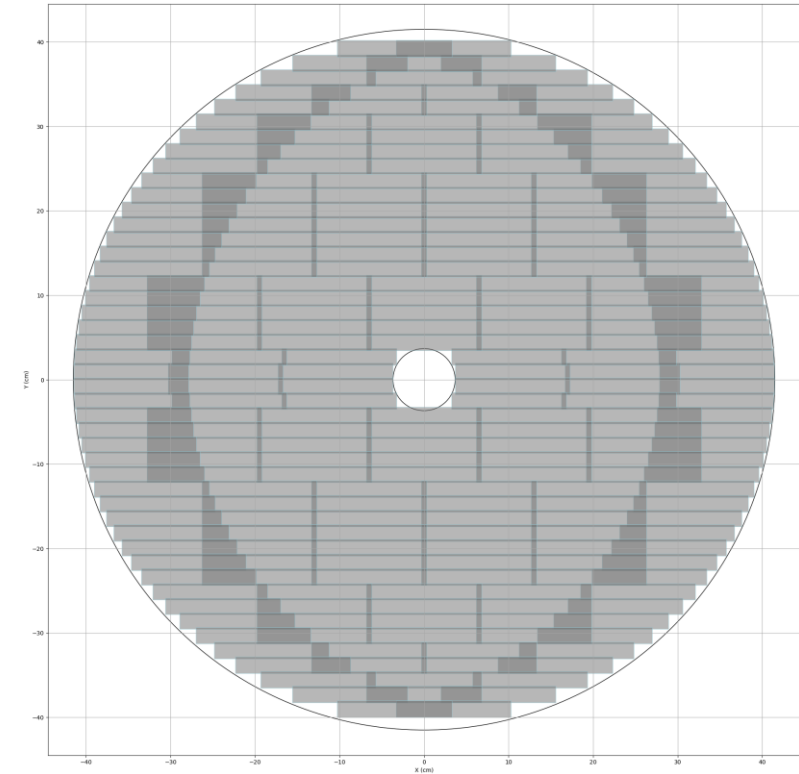


FPC design not final – just a representation

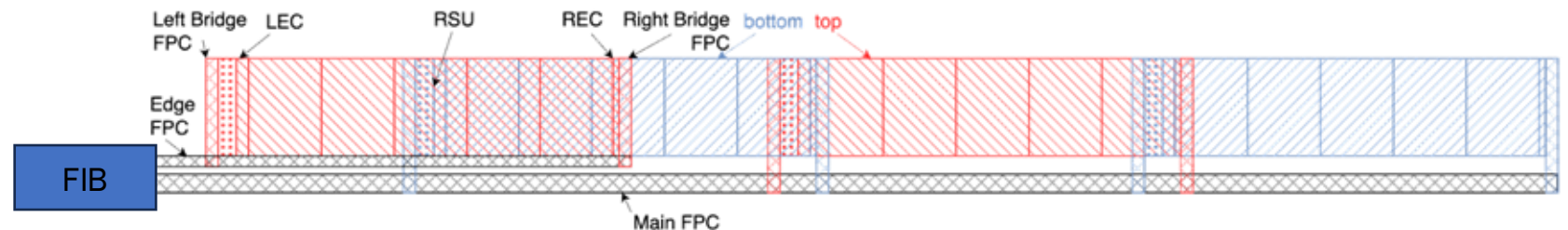
Sensor layout & grouping

- **Consistent** overlap of EIC-LAS in **center** of the disk
 - Served by one type of **main FPC**
- **Larger** overlap of EIC-LAS at **outer** radii
 - Connected to an **edge FPC**
- Large $|y|$ has groupings of <4 sensors in one row
 - Will need to be paired with other rows into one FIB to reduce inefficiencies
- FIB must accommodate main and edge FPCs
- Disk FIBs will be based on the OB L3 FIB with small modifications allowing for multiple FPCs into one board

Not final: Update coming

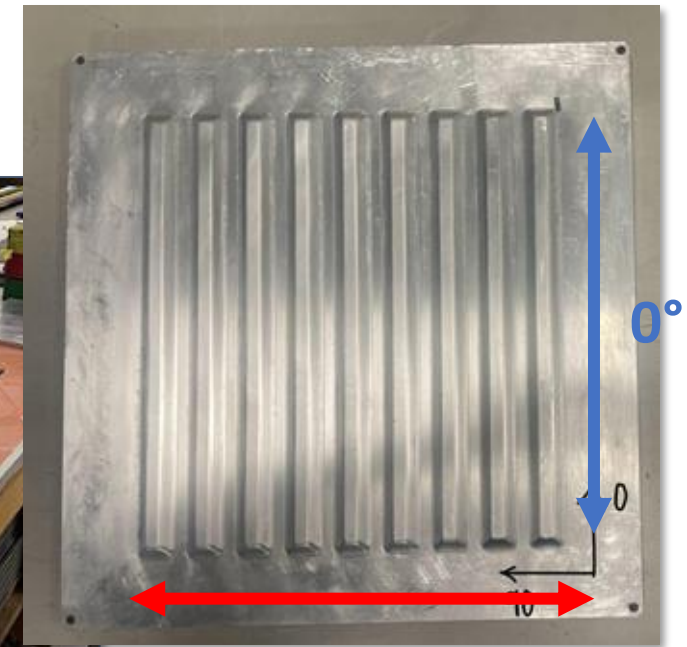
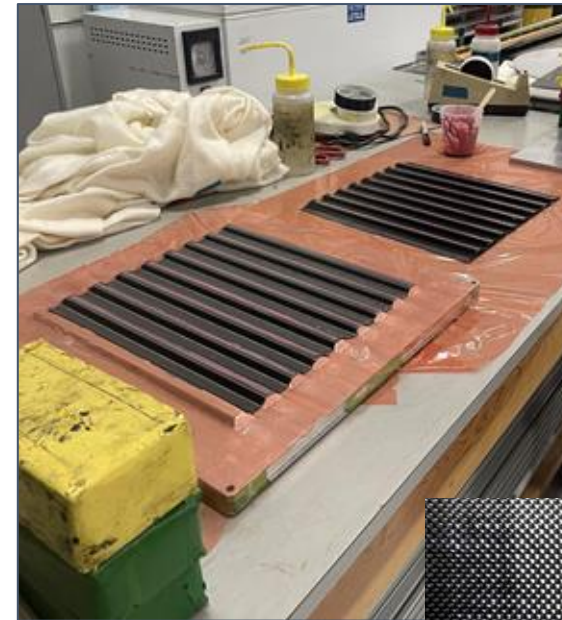
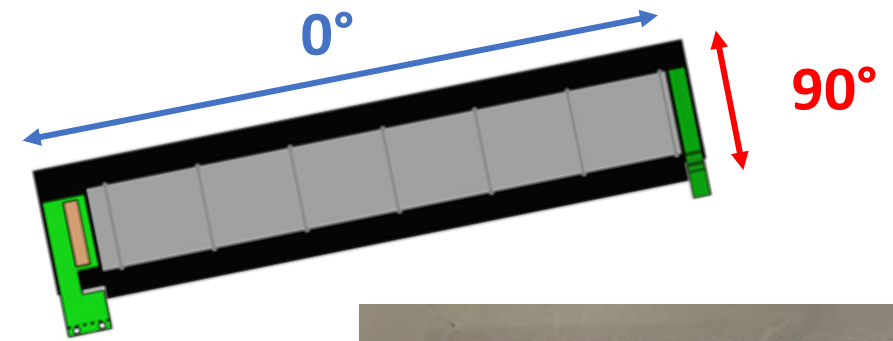


OB L3 FIB



Carbon composite & layup

- **K13C2U** Carbon Fiber pre-preg (modules) & **1K plain weave** CF pre-preg (corrugation)
- **0°: along the corrugation**
- **90°: against the corrugation**
- Two different configurations
 - **Flat sheet: 0/90/0** → thermal advantage
 - **Corrugation: -45/45** → mechanical advantage for corrugation
- All carbon composite pieces created in LBNL Composite Shop in 5x10 ASC Autoclave
- New tooling is needed for full-size test pieces

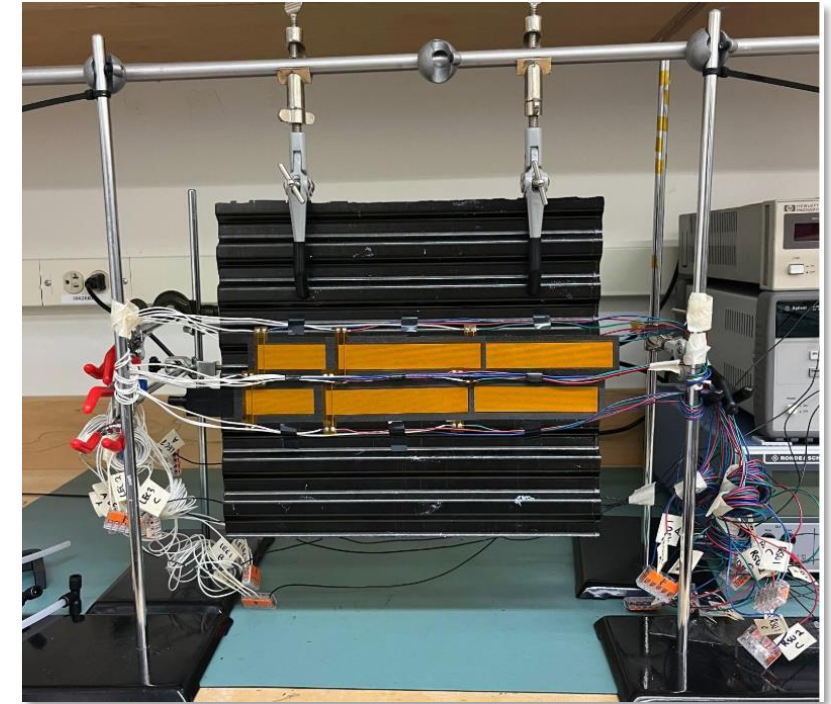
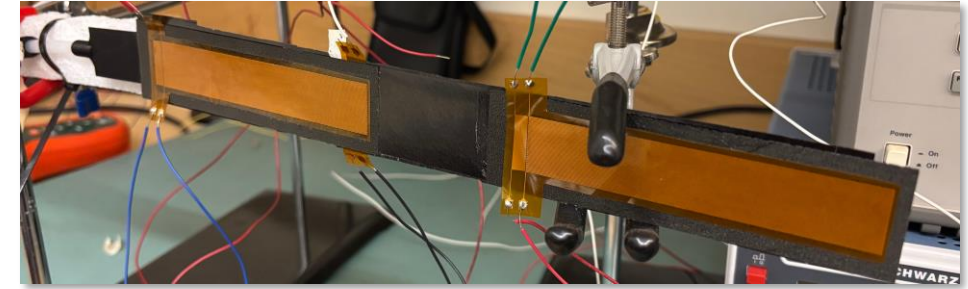


Disk thermal test pieces

- Temperatures measured with thermal camera

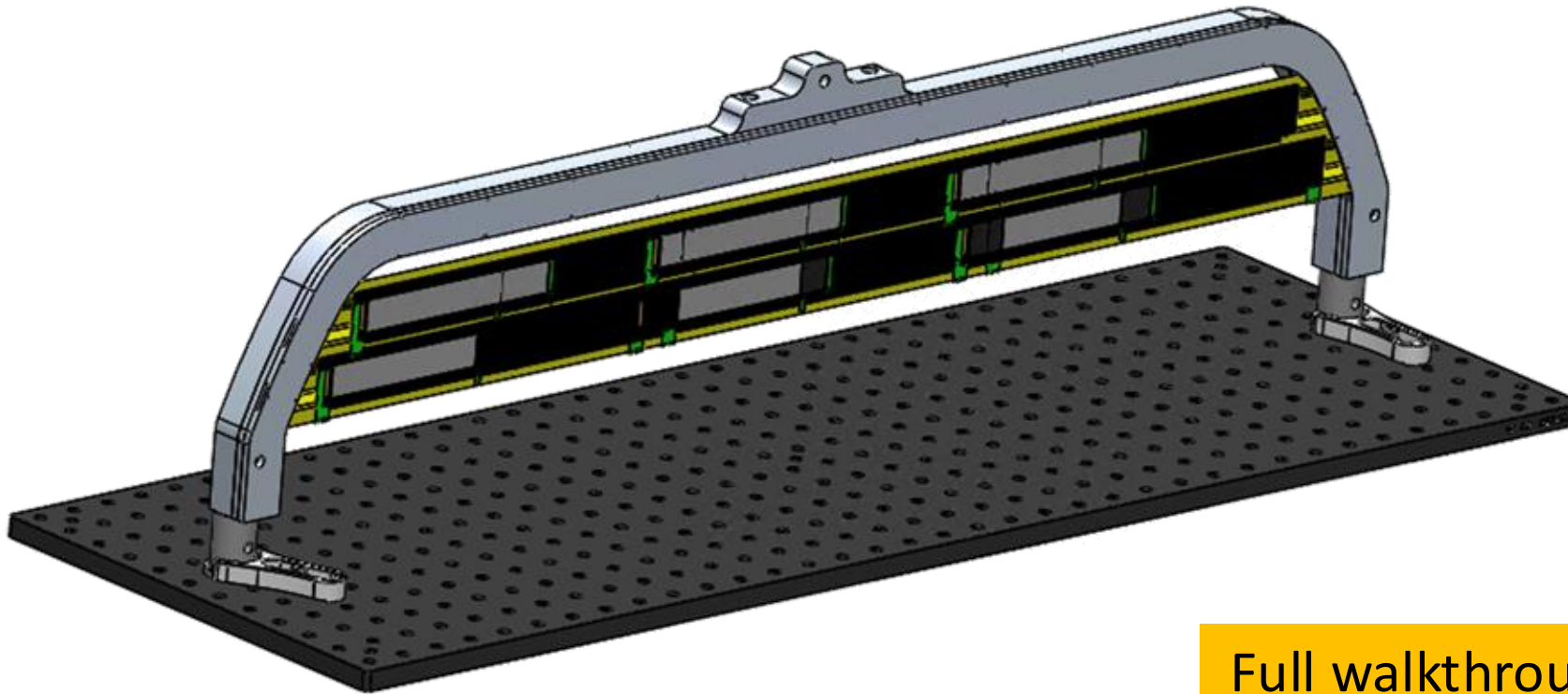
⑩ $\Delta T = T_{\text{BrightTemp}} - T_{\text{DarkTemp}}$

- Dark temp taken with air flowing, but no power
 - Bright temp taken with air flow and power on
-
- Single corrugation pieces
 - Isolate natural and forced convection and provide input to the thermal model
 - Larger scale pieces
 - Closer approximation to the disks
 - Study effects of neighboring rows



Partial disk test piece

3 corrugation sections (2 front, 1 back)
Chosen right above the beam pipe (longest)



Full walkthrough in Elaine's talk

Adjustable → can stand upright (testing) or lay flat (assembly)

Assembly

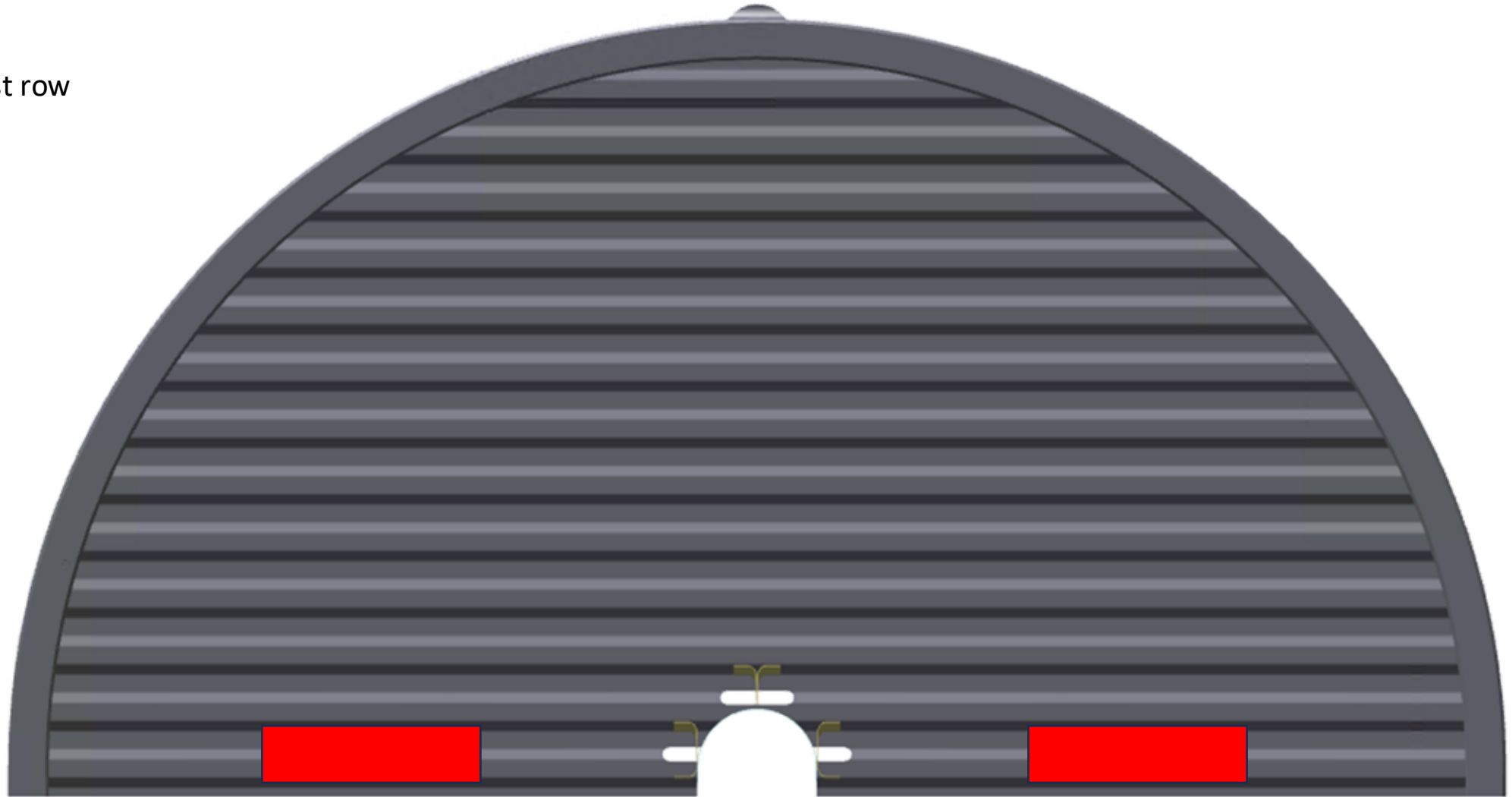
Disk assembly: One disk

- Time estimate assumptions (per site):
 - One gluing station
 - One connection/testing station
 - Top & bottom half disks are done in parallel
 - Both stations are always in use (rotate top & bottom)
- Rim is glued before module placement begins
- Gluing & connecting ~one row at a time
- Complete one side before working on the opposite side
- Begins 3-6 months after module assembly

Not to scale
Generalization only

Disk assembly

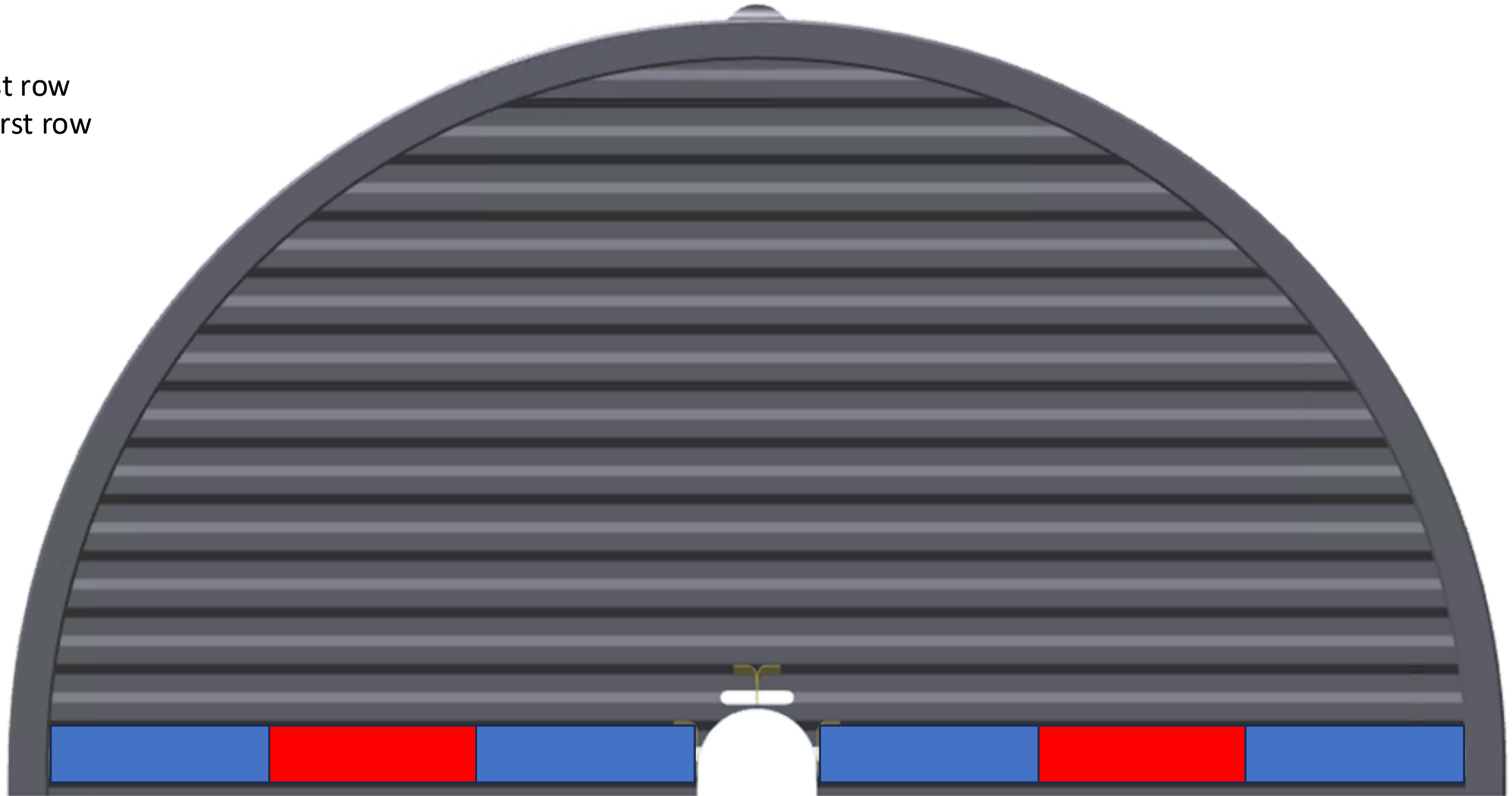
Glue inward modules in first row



Not to scale
Generalization only

Disk assembly

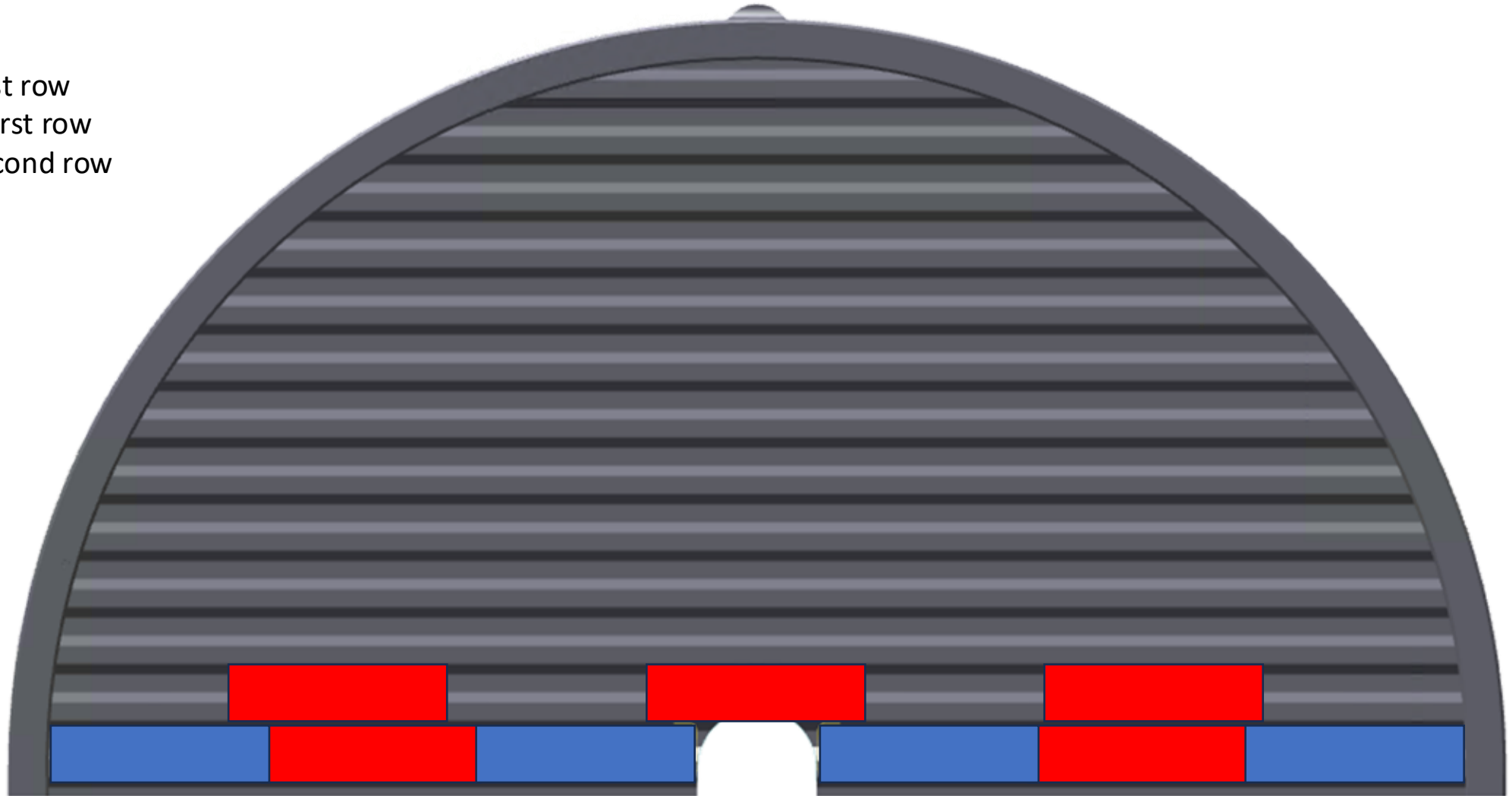
Glue inward modules in first row
Glue outward modules in first row



Not to scale
Generalization only

Disk assembly

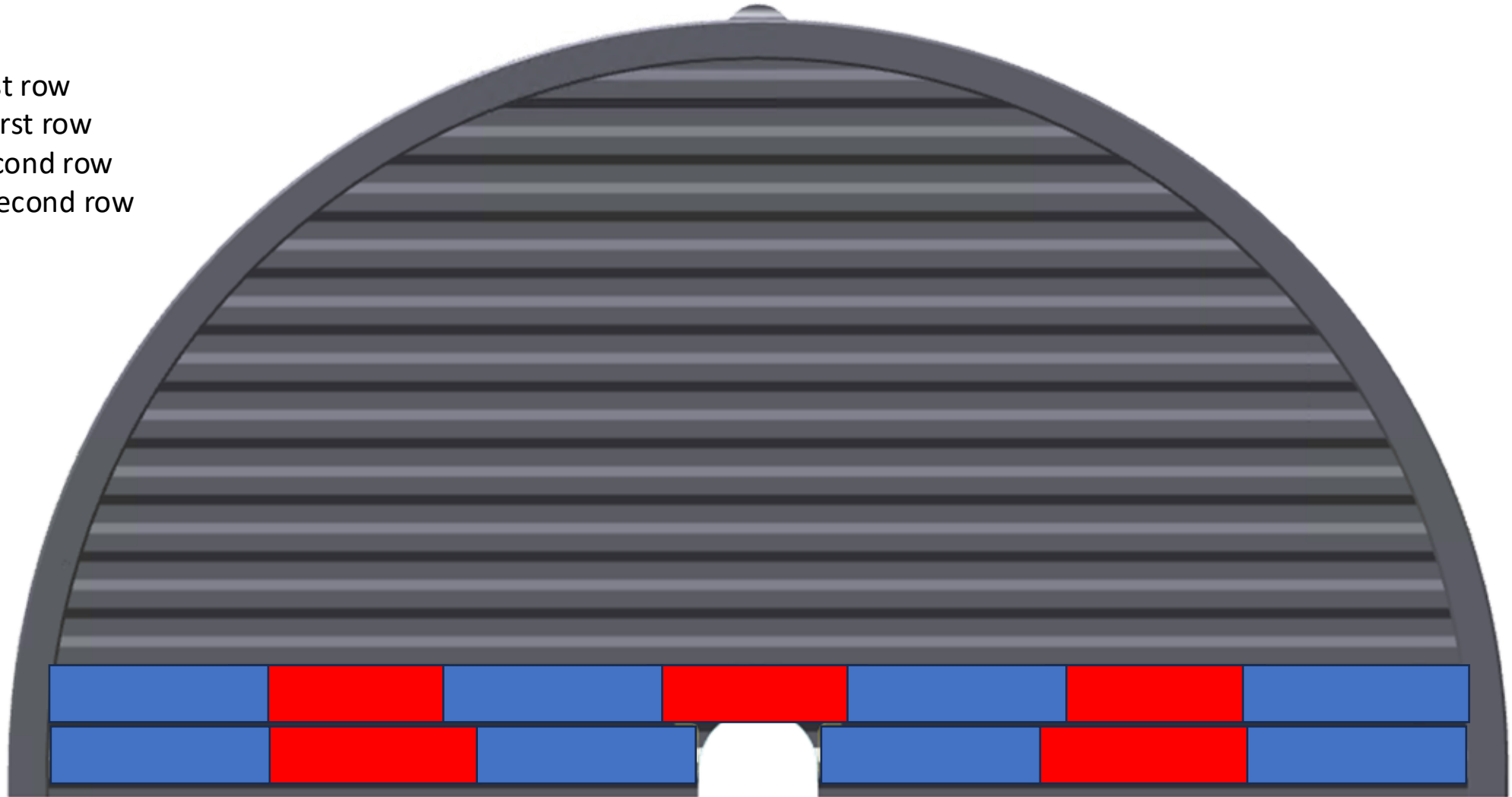
Glue inward modules in first row
Glue outward modules in first row
Glue inward modules in second row



Not to scale
Generalization only

Disk assembly

Glue inward modules in first row
Glue outward modules in first row
Glue inward modules in second row
Glue outward modules in second row



Not to scale
Generalization only

Disk assembly

Glue inward modules in first row
Glue outward modules in first row
Glue inward modules in second row
Glue outward modules in second row
Glue main & edge FPCs



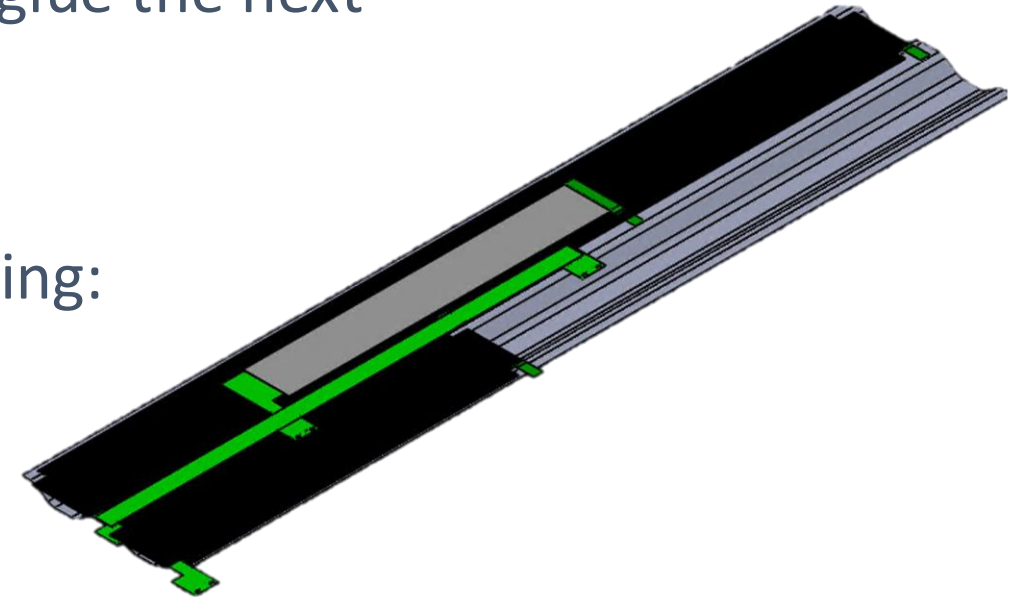
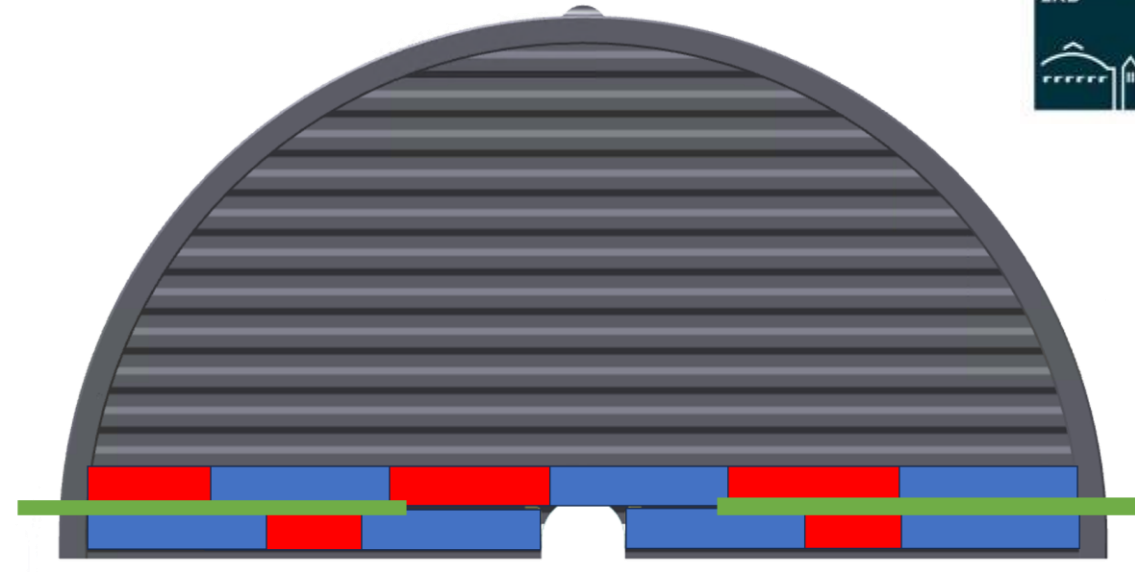
Disk assembly

- Make connections between bridge FPCs & main/edge FPC
- Test the row
- Next day: Move half disk back to gluing table, glue the next row of modules & main FPC

With two stations, alternating top & bottom gluing:

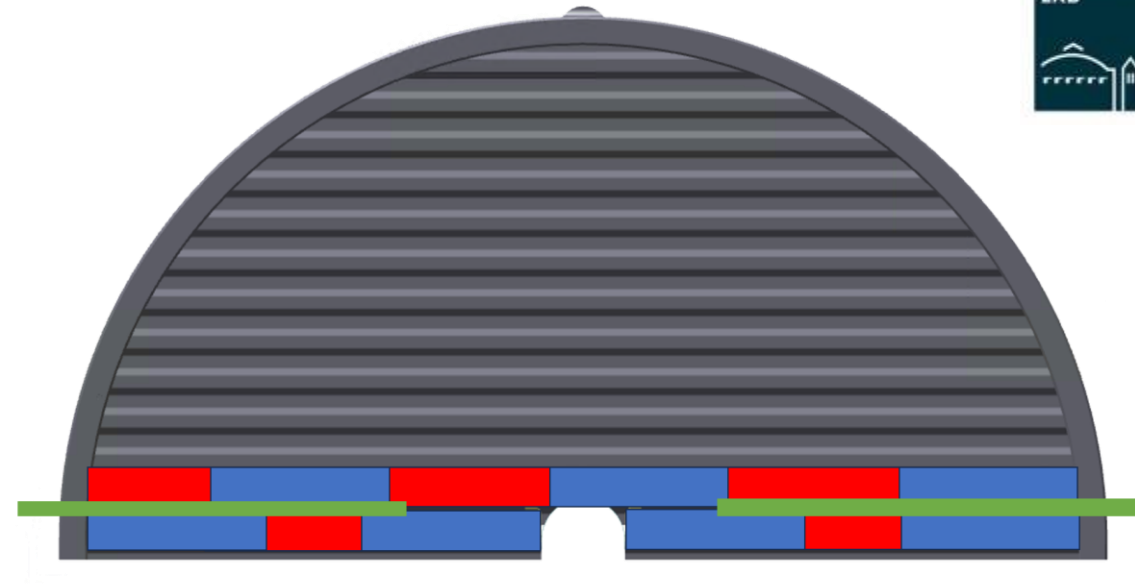
One (large) disk ~2-3 months

2 sites → 1-1.5 years to complete



Disk tooling

- Alignment & gluing jig
- Electrical connection jig
- Test stand
- Needs to be adaptable for both front and back side of disks



(some) Open questions

- Alignment all done mechanically?
- Do we align optically at all or just use for metrology?
- How many EIC-LAS chains can we test at one time?
- Cooling?

Outlook

- Sensor layout complete
 - Being implemented in simulations and CAD
- Validated air flow through small scale test pieces
- Partial disk prototype (Elaine's talk) will give further information on
 - Rim design & assembly procedure
 - Structural stability
 - Thermal performance & manifold design
 - Disk tooling & module placement