pfRICH General Meeting End Ring and Cobonding updates
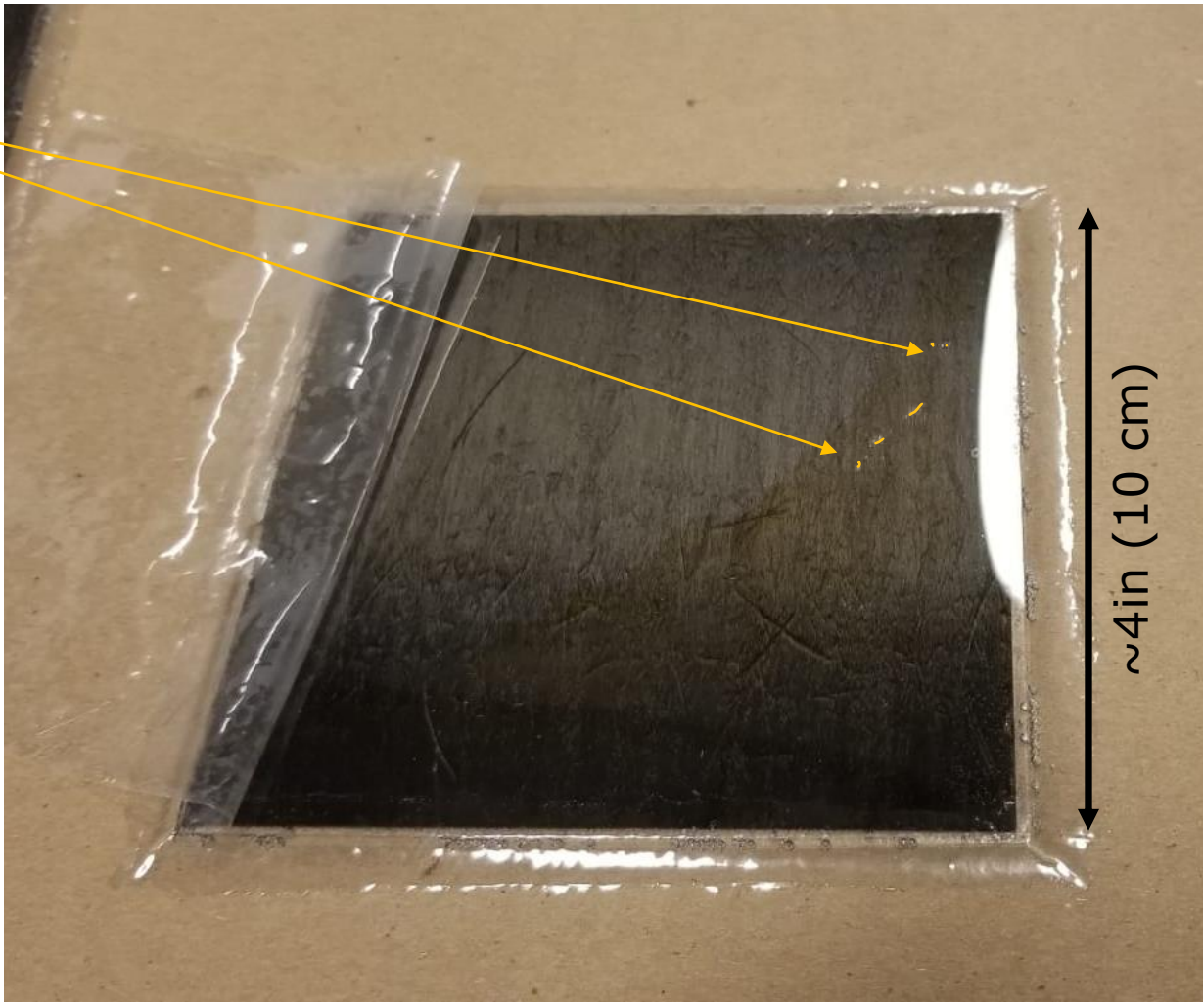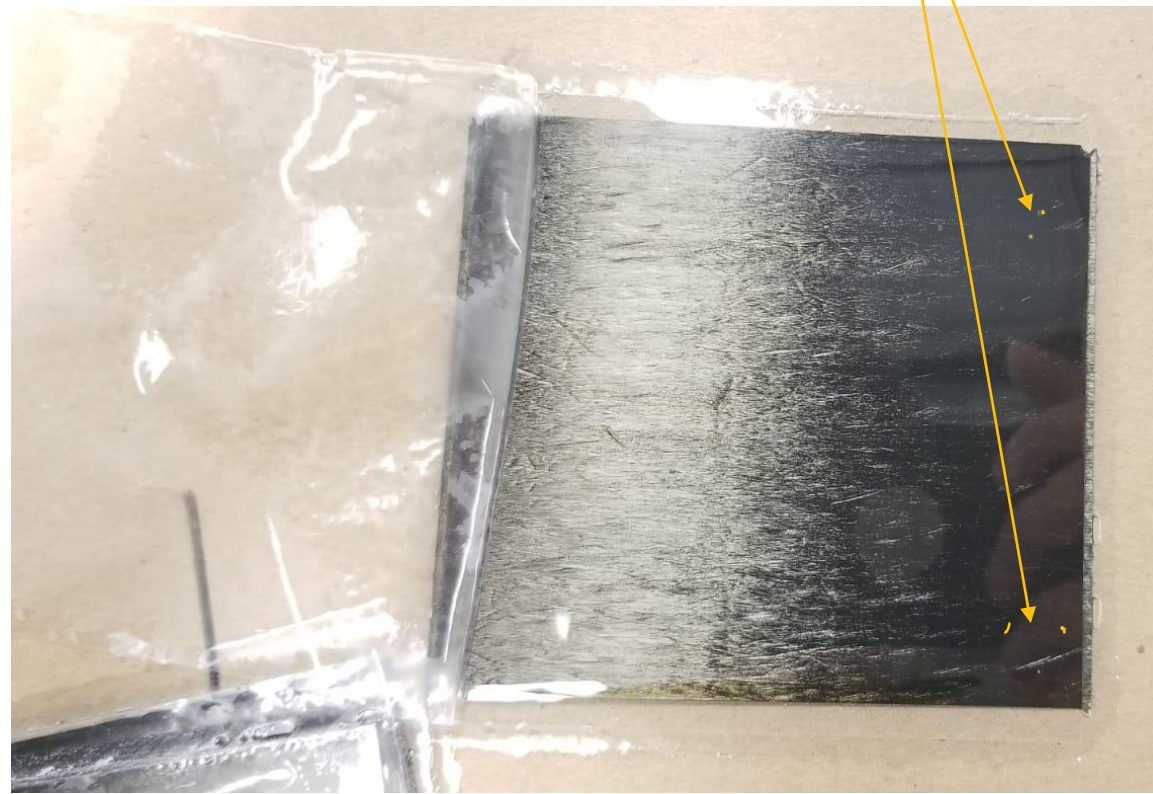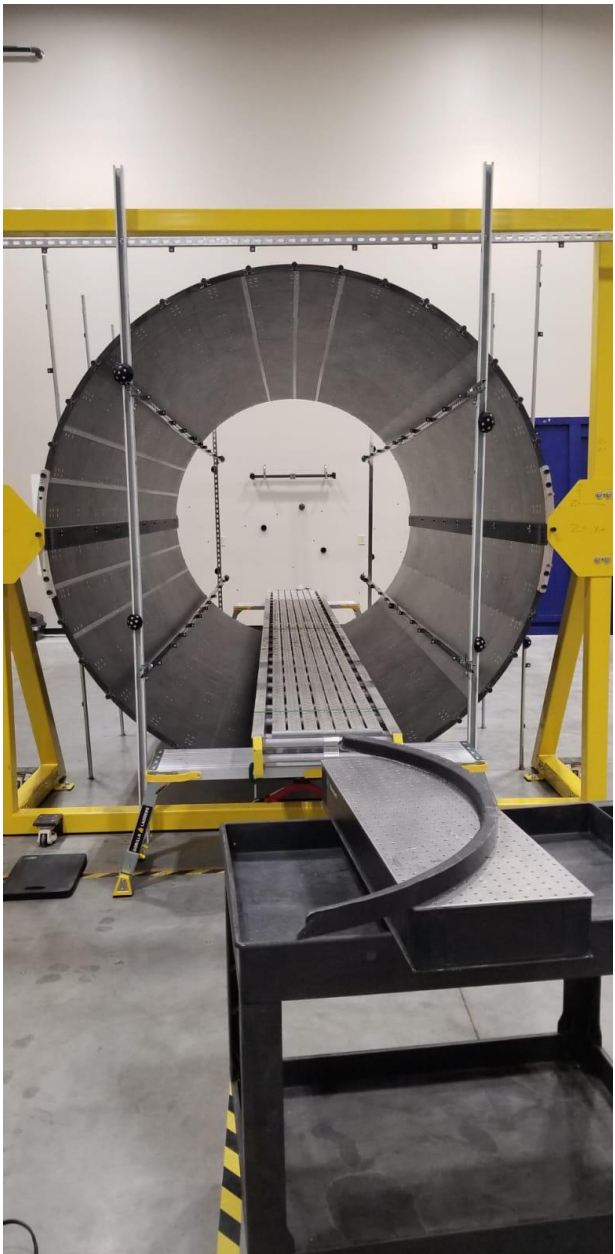
Sushrut Karmarkar, Andy Jung

28 March 2024

- Almost perfect –Most of the voids left – highlighted in the sample in yellow are under 1 mm in diameter

- Alexander Kiselev – this should be acceptable
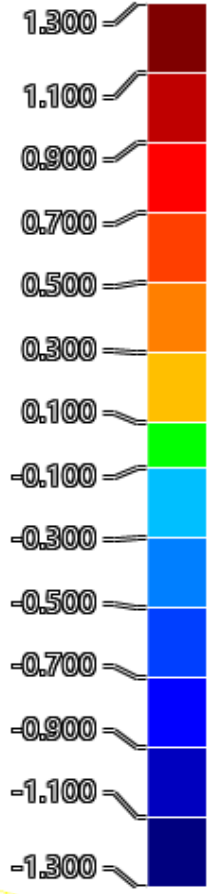
- Comments from SBU (?)

- Used West System Epoxy resin

~4in (10 cm)

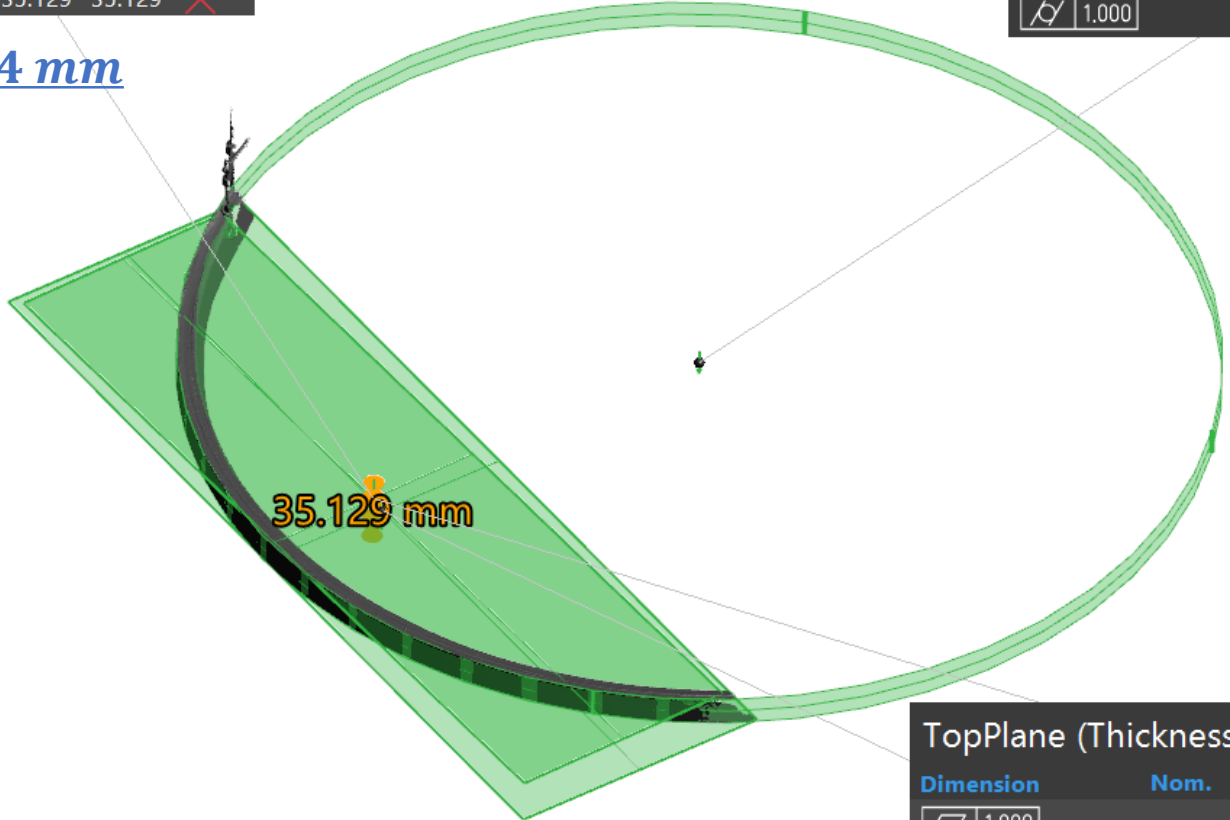Demolding process

2 metrology set ups

Metrology results

unit: mm

Thickness - SFE1

Dimension	Nom.	Val.	Dev.	State
3D±1.000	0.000	35.129	35.129	✗

$t = 25.4\ mm$

OuterCylinder SFE1 pfRICH

Dimension	Nom.	Val.	Dev.	State
Ø±1.000		1303.554		
1.000		1.246		✗

Pretty good cylindricity

35.129 mm

TopPlane (Thickness) SFE1 pfRICH

Dimension	Nom.	Val.	Dev.	State
1.000		2.089		✗

BasePlane (Thickness) SFE1 pfRICH

Dimension	Nom.	Val.	Dev.	State
1.000		0.463		✓

Cylinder measurements

ϕ1298.88

ϕ 1260.78

QC Passed!

OuterCylinder SOTE1 pfRICH

Dimension	Nom.	Val.	Dev.	State
Ø±1.000		1303.354		
1.000		0.836		✓

Inner Cylinder SOTE1 pfRICH

Dimension	Nom.	Val.	Dev.	State
Ø±1.000		1249.795		
1.000		2.441		✗
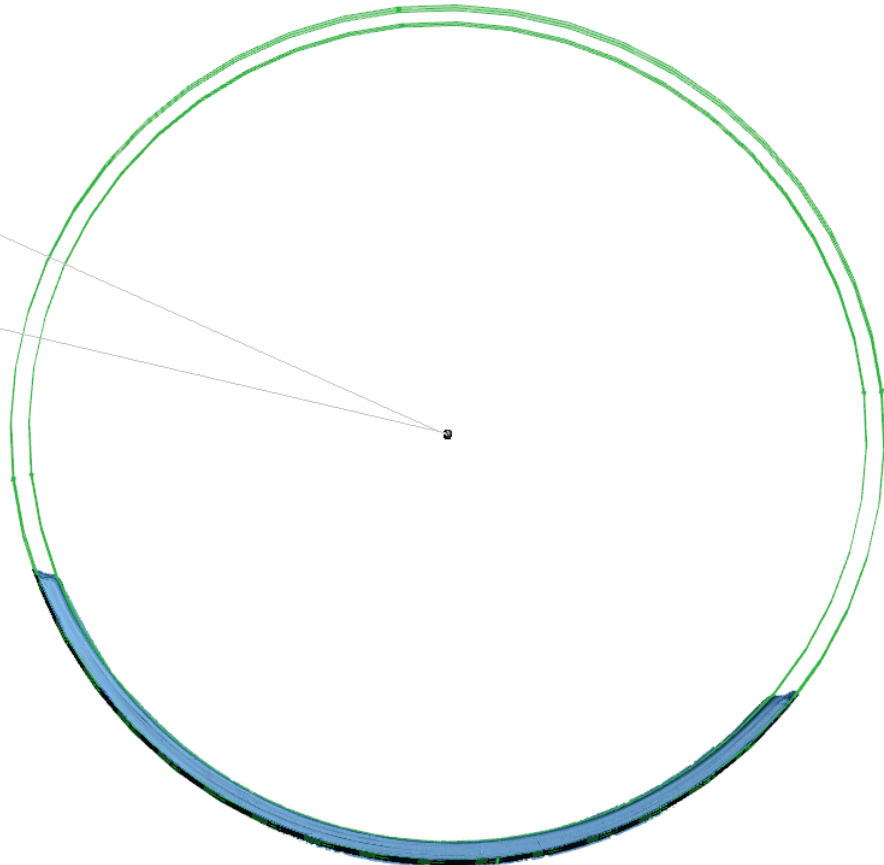
200 mm

Plies for end ring quarters 2, 3 and 4 cut !

Base Numbering Design

25.40

Base parameter:
- Endring Inner diameter: 126.078 cm, 49.637
- Endring thickness: 2.54 cm, 1"
- End-End vessel length: 43.095 cm, 16.967"

Material thickness:
- Carbon Fiber Thickness: 0.5mm
- Honeycomb thickness: 1.905 cm, 0.75"
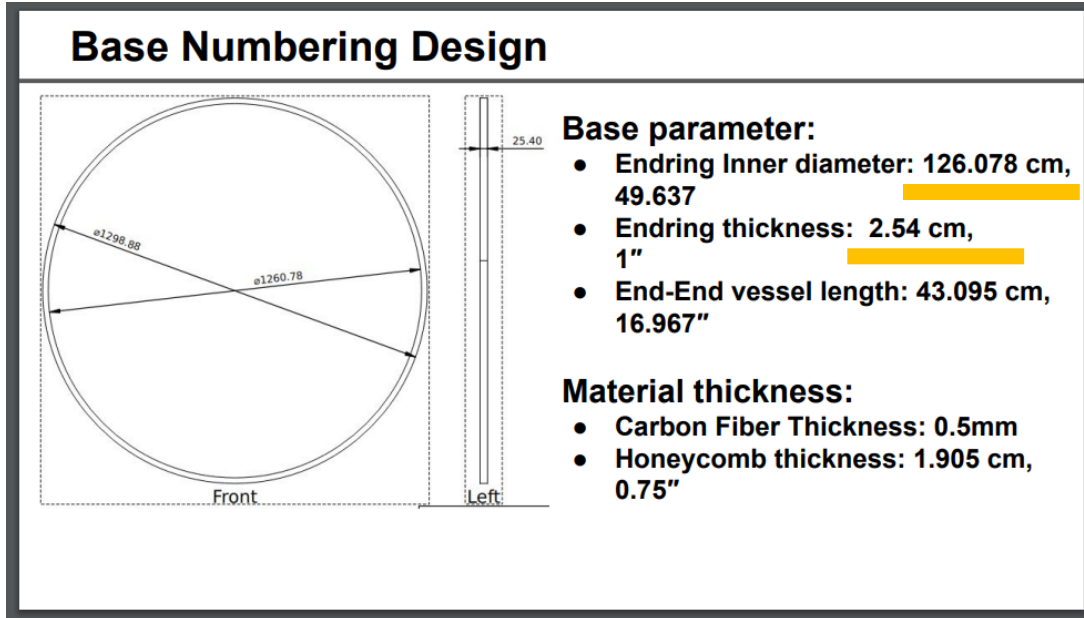
Dimensions from Alex / Bill's presentation on 8th Jan.

https://indico.bnl.gov/event/21695/contributions/85335/attachments/51825/88619/2024_1_4_%20pfRICH_dimension.pdf

⬡ Confirming these parameters one last time before starting machining design / CAM work

⬡ This inner diameter (126.078 cm) takes into account the adhesive layer thickness offset needed for bonding the end ring to the facesheet – **True / False ?**

⬡ Can Charles + Bill + Alex all sign off on this dimension check before machining ?

⬡ I will start machining CAM design next week

⬡ Thermal simulation to see what deformation is expected during beam bake out in the inner most mirrors ?

⬡ Beam bake out will be at ~ 100°C over 3 – 6 weeks (or more)- the inner tube will see around 70°C temperature – this causes the inner mirrors to be at about 60°C ((WAIT FOR DETAILED ANALYSIS RESULTS)) this is on-going

⬡ Thermal cycling test for lexan + epoxy resin + CFRP base – on-going to see if we get any delamination and/or unexpected expansions from micro-voids leading to surface defects on mirror surfaces.

⬡ First iteration of the sensor plate (T-support) frame started

⬡ Second end ring quarter layup on-going

Forum on Tracking Detector Mechanics 2024
Purdue University, West Lafayette, USA
29-31 May 2024

- Mechanics
- Materials
- Thermal Management
- Simulation Tools
- System Management
- Environmental Control

⬡ Satellite event --
https://indico.cern.ch/event/1371986/

EPIC Detector Mechanics & Integration workshop

28 May 2024
Purdue University
America/Indiana/Indianapolis timezone

09:00 → 10:30	Introduction & local welcome: Working Title: TBA	
10:30 → 11:00	Coffee break	30m
11:00 → 12:30	Session I: Global Mechanics & Integration	
12:30 → 14:00	Lunch break	1h 30m
14:00 → 15:30	Session II: Subdetector mechanics	
15:30 → 16:00	Coffee break	30m
16:00 → 17:30	Session III: Subdetectors / Open discussion	

Forum on Tracking Detector Mechanics link –

https://indico.cern.ch/event/1336746/