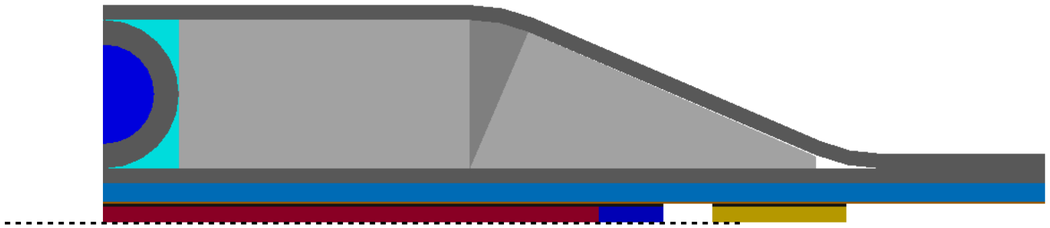
INTT Weekly Meeting, 22/July/2020

Updates on the Glue Thickness for Geant4 Model

Genki Nukazuka (RBRC)

Thickness of the Silicon Sensors

Updated model



formed CFRP, **300 μm thickness**

flat CFRP plate, 300 μm thickness

HDI kapton, 380 μm thickness

HDI copper, **37.6 μm thickness**

Glue (silver) , 50 μm thickness

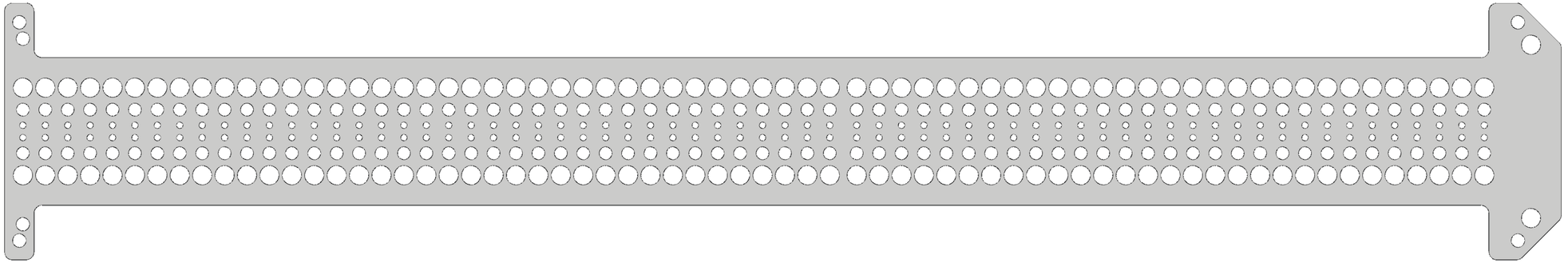
Silicon sensor

Realistic value should be input!

Thickness of the Silicon Sensors

INTT Sensor Glue Mask

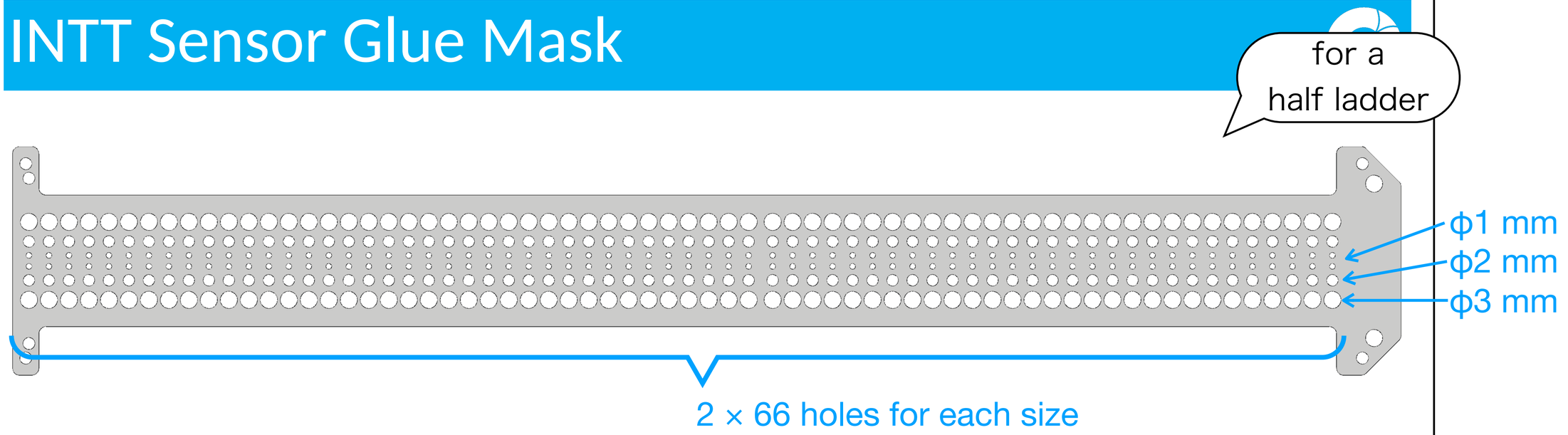
for a
half ladder



- The mask is 50um thick.
- The holes are 3mm, 2mm and 1 mm is diameter from the edge to the center of a sensor.
- The gap between 3mm holes is 0.5mm.
- May negatively impact cooling. Need to check (FEA).

Thickness of the Silicon Sensors

INTT Sensor Glue Mask



- The mask is 50um thick.
- The holes are 3mm, 2mm and 1 mm is diameter from the edge to the center of a sensor.

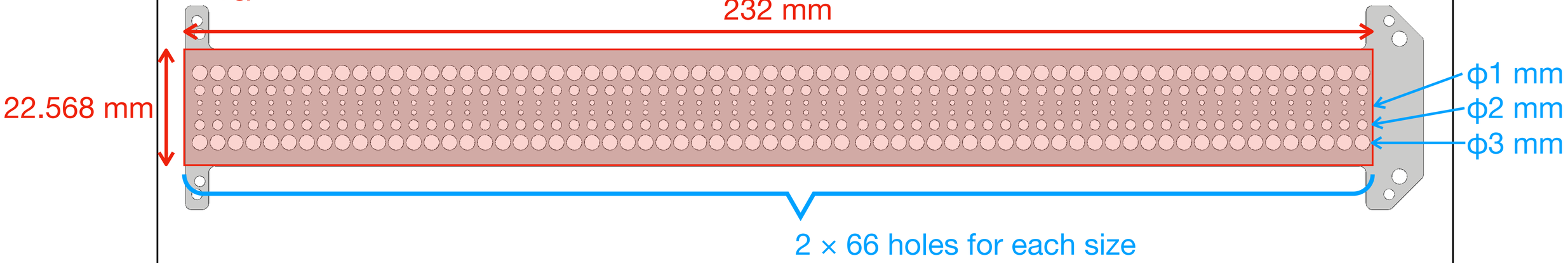
$$S_{holes} = 2 \times 66 \times (S_{\phi 1} + S_{\phi 2} + S_{\phi 3}) = 2 \times 66 \times (0.25 + 1 + 2.25) \times \pi \text{ mm}^2 \sim 1451 \text{ mm}^2$$

Thickness of the Silicon Sensors

INTT Sensor Glue Mask

for a half ladder

S_{Si} ~ 5236 mm²



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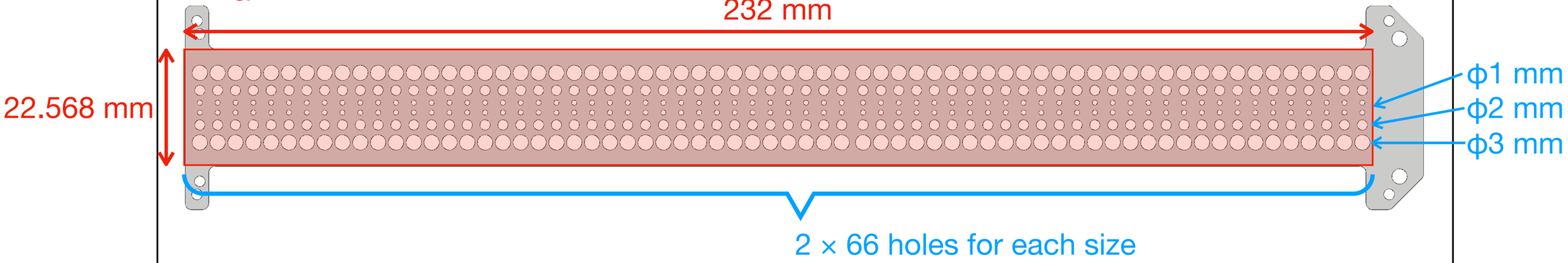
Thickness of the Silicon Sensors

INTT Sensor Glue Mask

for a half ladder

S_{Si} ~ 5236 mm²



- The mask is 50um thick.
- The holes are 3mm, 2mm and 1 mm is diameter from the edge to the center of a sensor.

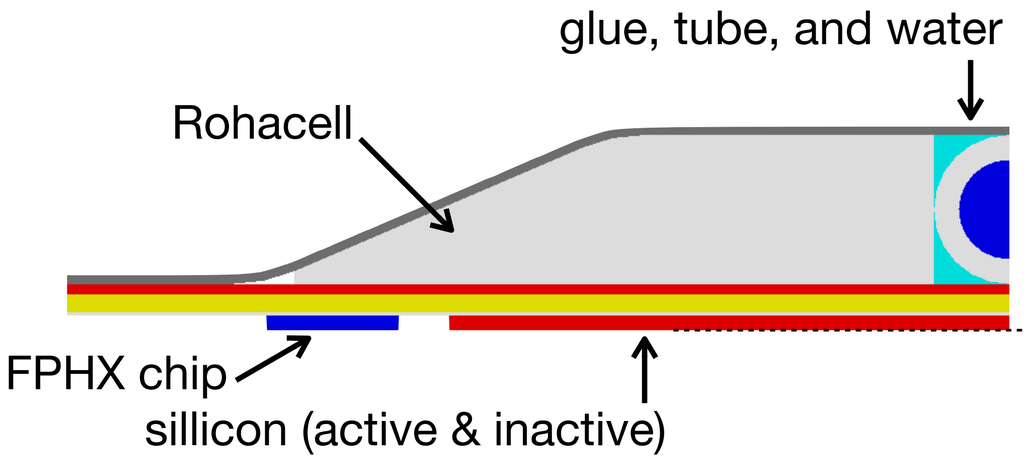
$S_{holes} = 2 \times 66 \times (S_{\phi 1} + S_{\phi 2} + S_{\phi 3})$
$= 2 \times 66 \times (0.25 + 1 + 2.25) \times \pi$ mm²
~ 1451 mm²

Effective thickness $t_{eff} = t \times (S_{holes} / S_{Si})$
$= 50\ \mu m \times 0.277$
$\sim 14\ \mu m$

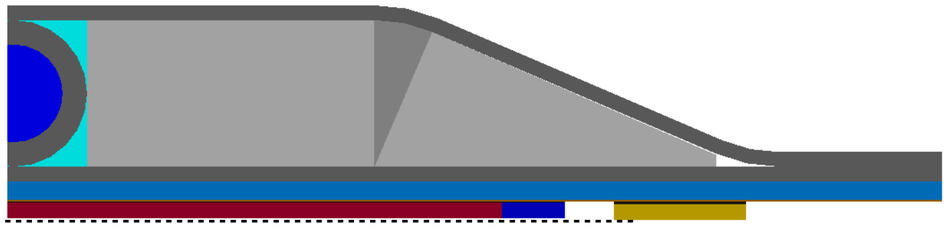
Summary of Geometry of the ladder

Ver 22.Jul 2020

Model in the current repository



Updated model



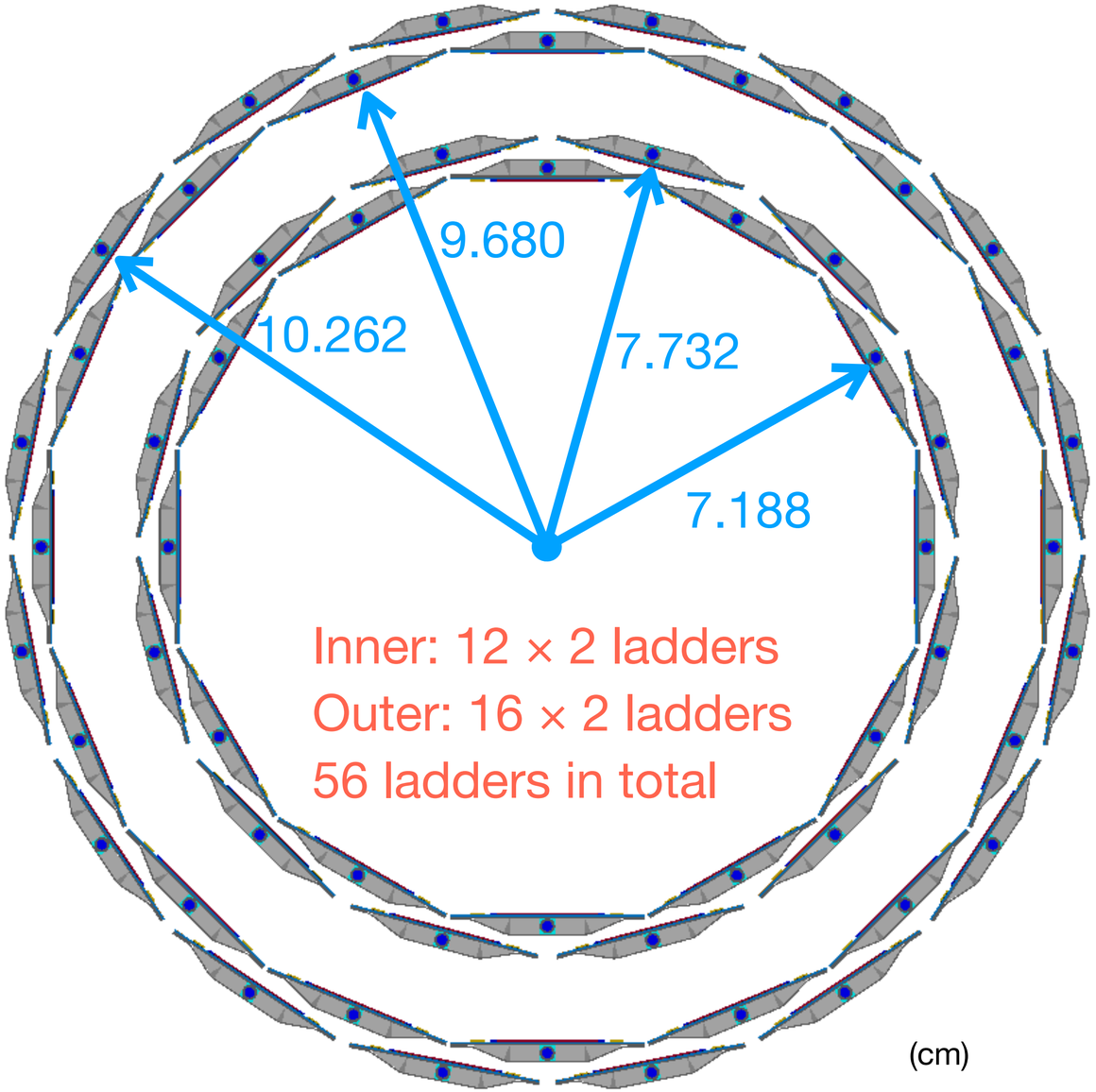
Top	Name	Material	X0 (mm)	Thickness (μm)	X/X_0
	formed CFRP	CFRP	256.41	190.5	0.07%
	Rohacel, CFRP tube, water				0.13%
	PGS	CFRP	256.41	200	0.08%
	Kapton of HDI	Kapton	285.70	380	0.13%
	Copper of HDI	Copper	14.36	52	0.36%
	Sillicon/FPHX chips	Sillicon	93.70	320	0.34%
Bottom					1.12%

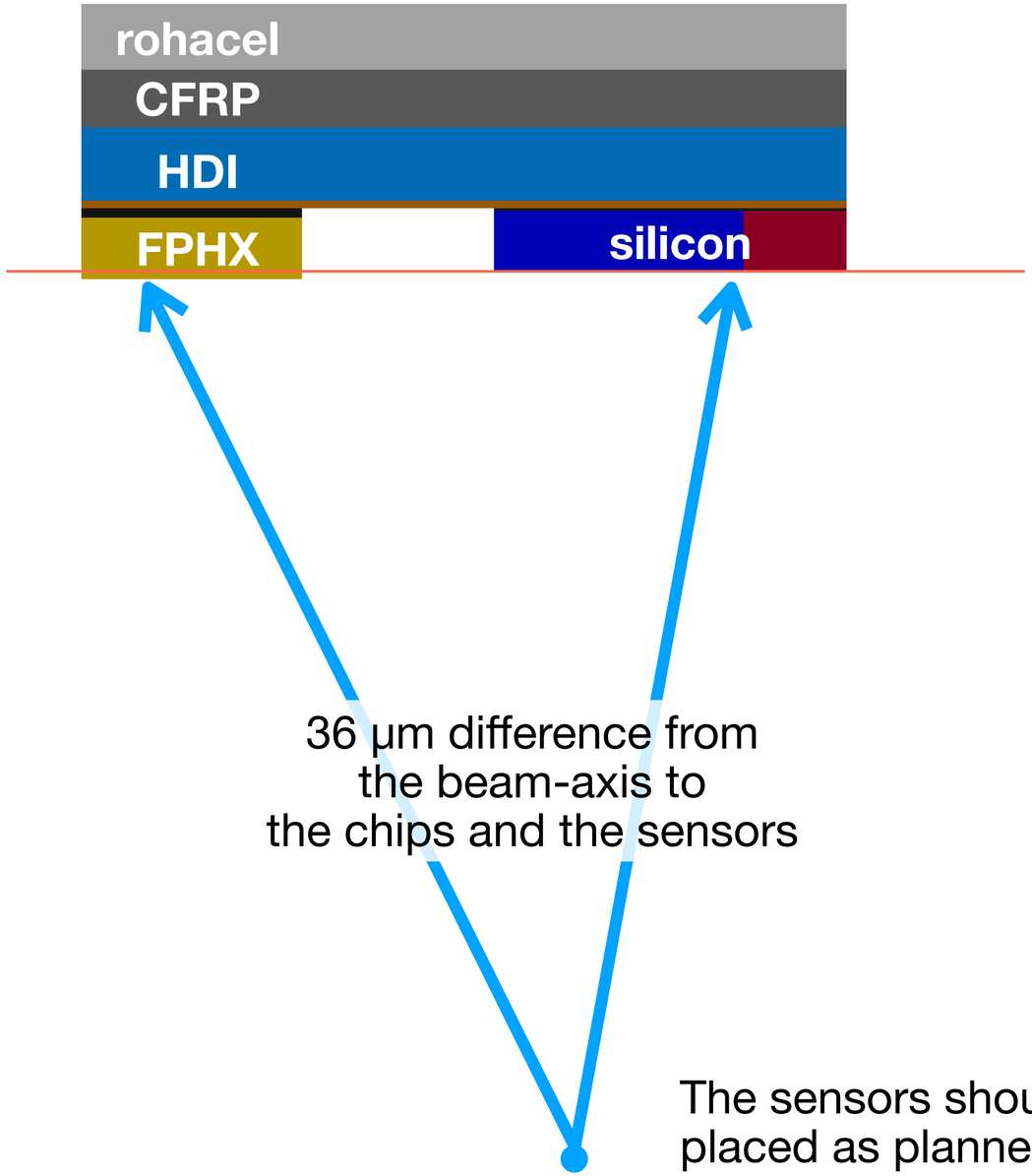
Top	Name	Material	X_0 (mm)	Thickness (μm)	X/X_0
	formed CFRP	CFRP	256.41	300	0.12%
	Rohacel, CFRP tube, water				0.13%
	flat CFRP	CFRP	256.41	300	0.12%
	Kapton of HDI	Kapton	285.70	380	0.13%
	Copper of HDI	Copper	14.36	37.6	0.26%
	Silver epoxy glue	Ag, epoxy	36.70	14	0.04%
	Sillicon/FPHX chips	Sillicon	93.70	320	0.34%
Bottom					1.14%

it was 0.14%

for the sensor area

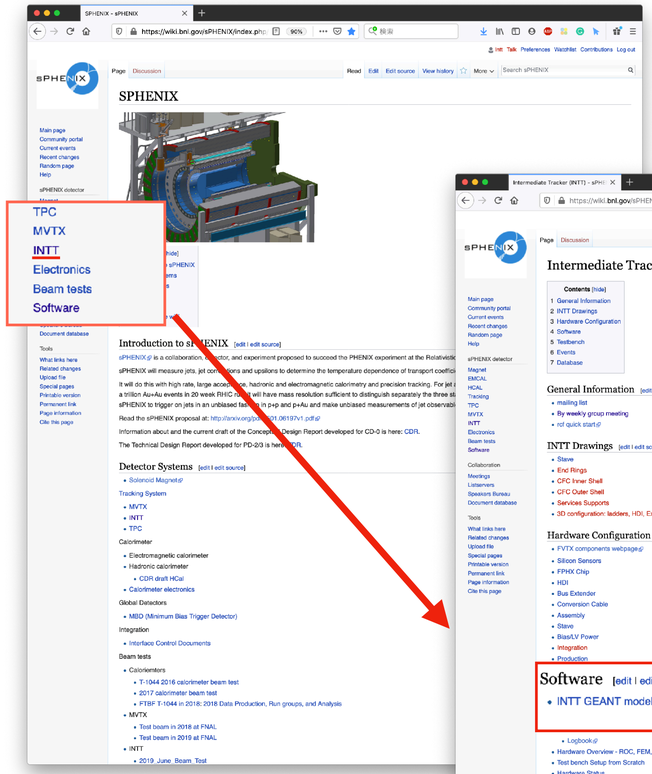
Distance of layers from the beam-axis

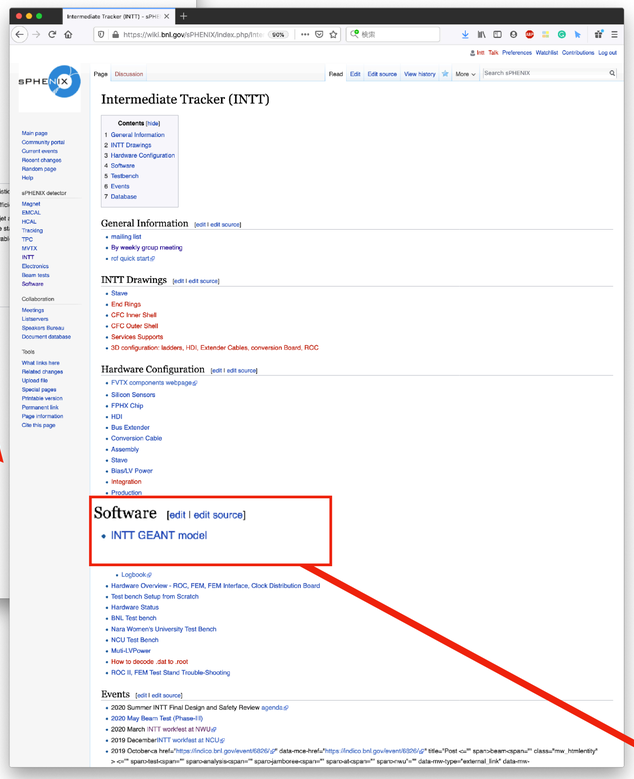


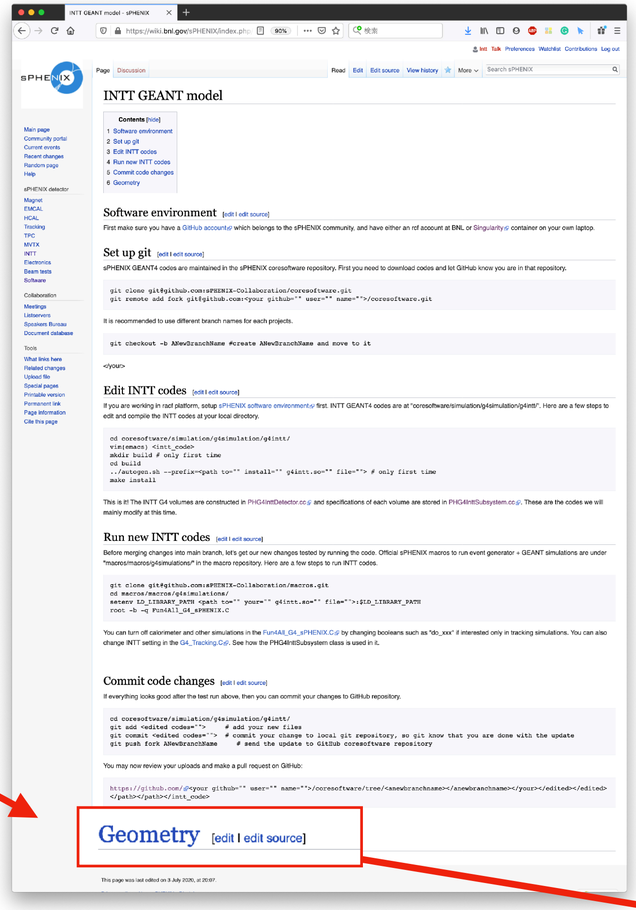


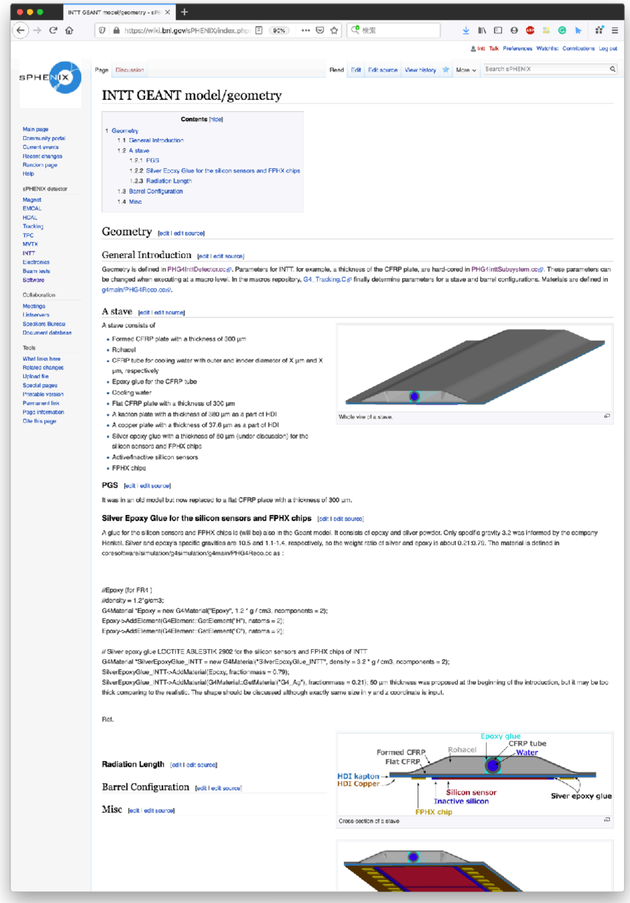
Information: Wiki

under construction…









https://wiki.bnl.gov/sPHENIX/index.php/INTT_GEANT_model/geometry