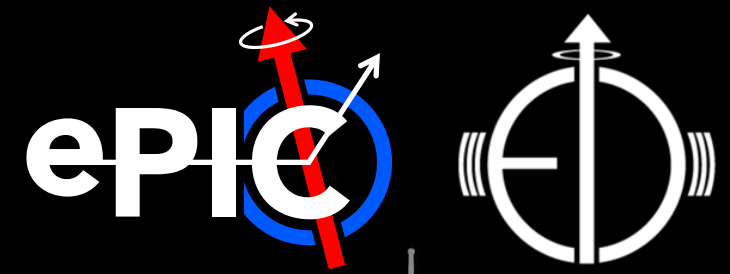




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ePIC SVT Outer Barrel Layout

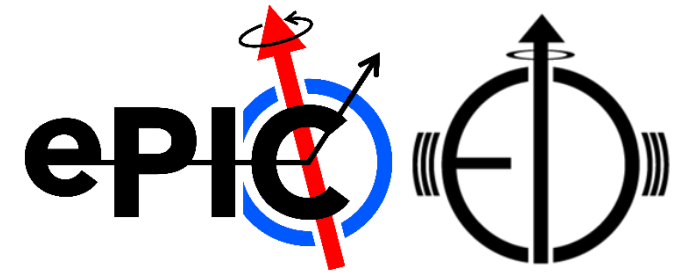
James Glover

EIC-UK WP1 (MAPS)

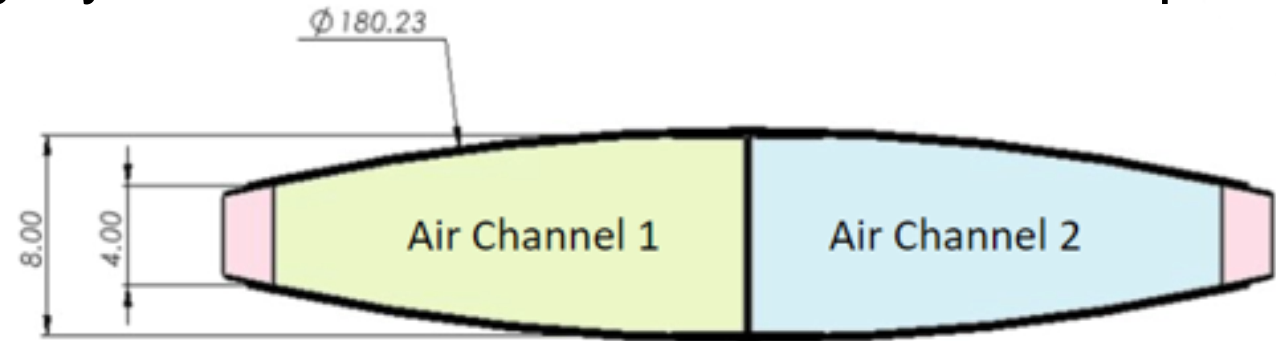
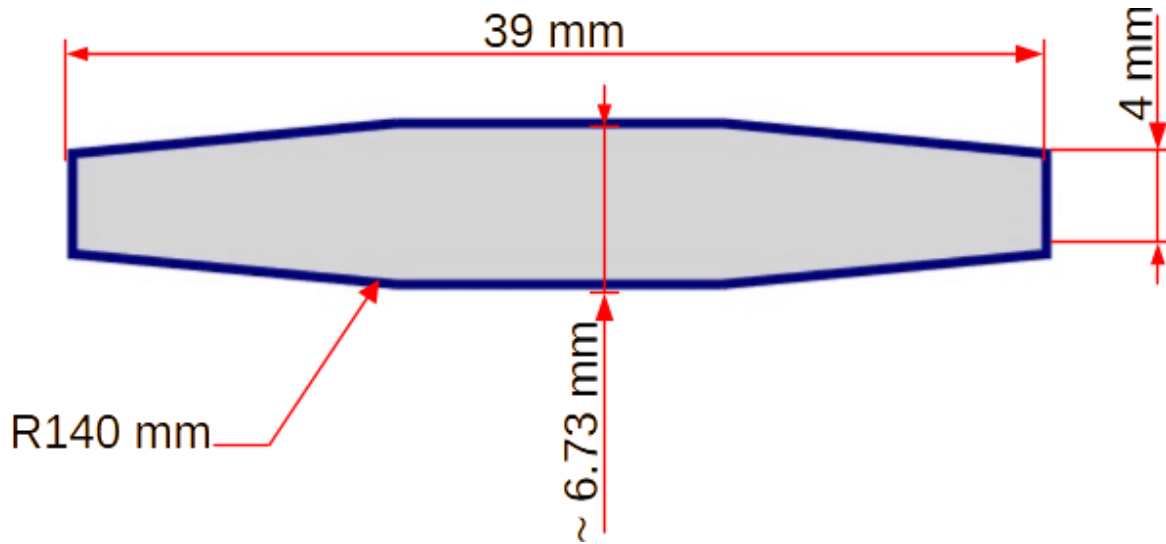
Wed, 19th June 2024



Multiple stave designs existed

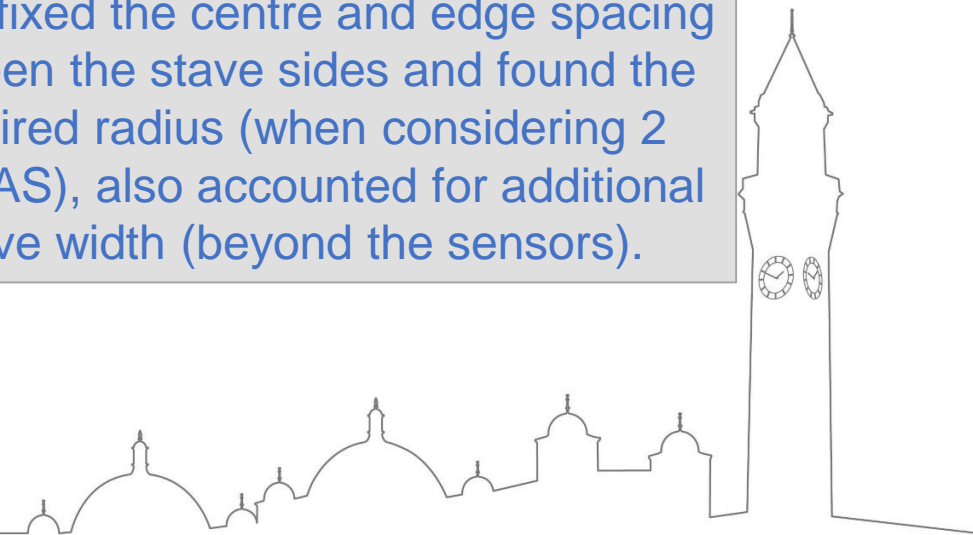


As a few of us have been looking at different elements of the stave structure/design, each designer has slightly different versions of the same concept.



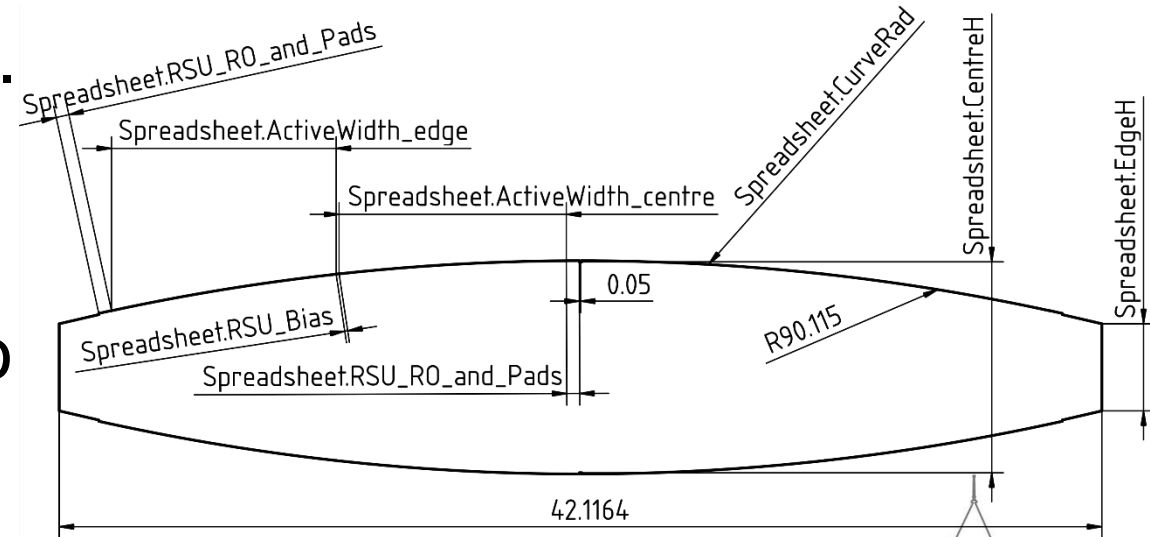
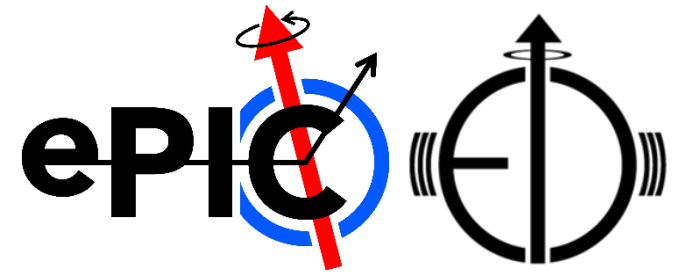
Adam fixed the centre and edge spacing between the stave sides and found the required radius (when considering 2 EIC-LAS), also accounted for additional stave width (beyond the sensors).

James focused on area of sensor only (no excess width), fixed the width and adjusted radius to get the right arc length for 2 EIC-LAS.



Converging on dimensions

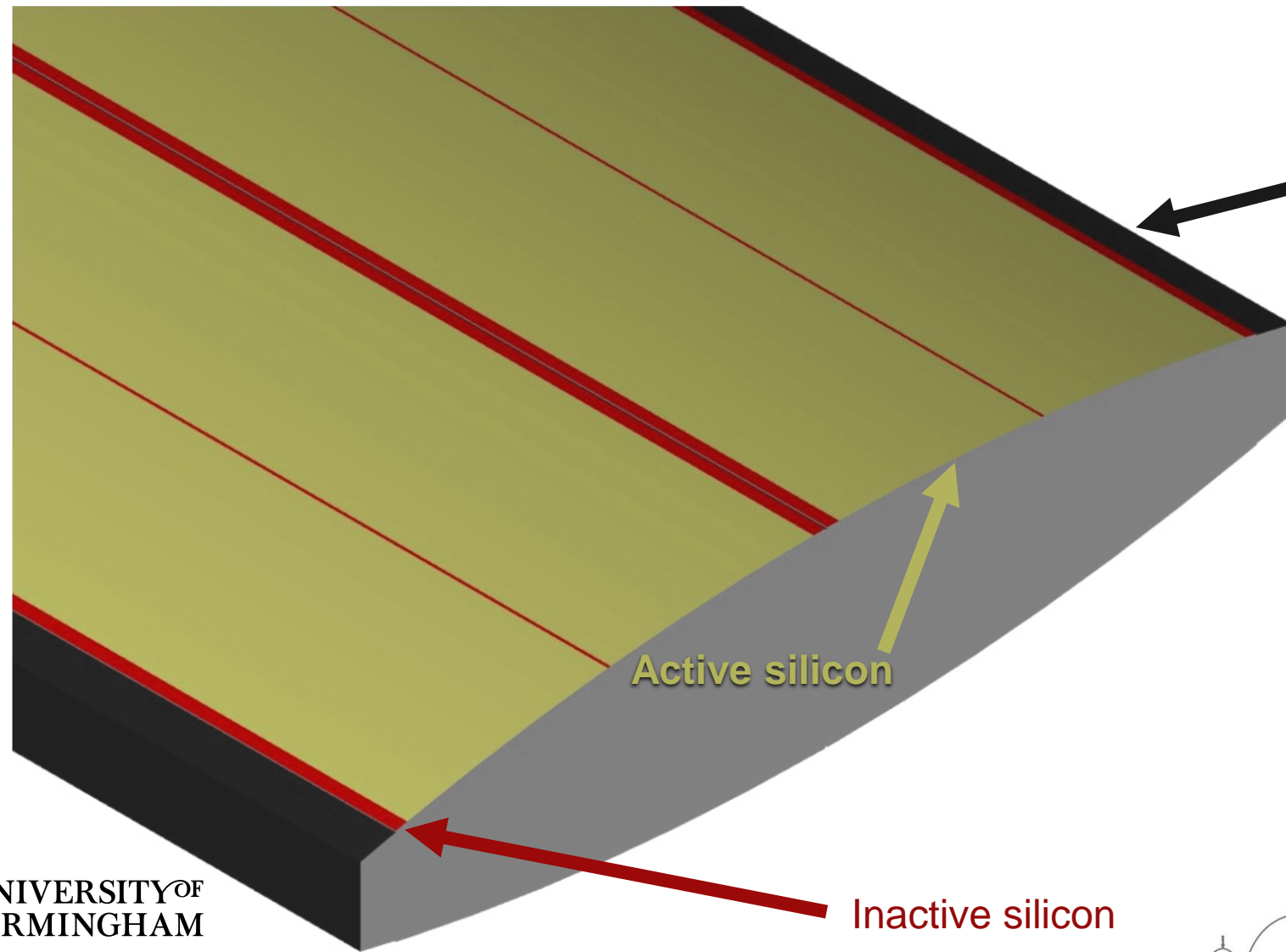
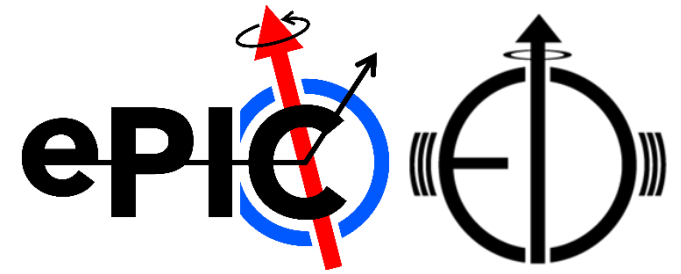
- [Meeting held \(21st May\)](#) to try and converge on dimensions to focus on.
- Chose to focus on Adam's dimensions.
- James has implemented (as close to Adam's dimensions as possible) a simplified version.
- Enable volume of stave to be considered, while showing the active/dead areas of the RSUs.



Dimensions defined in a spreadsheet within the model (example shown in the [backup](#)).



Updated stave model



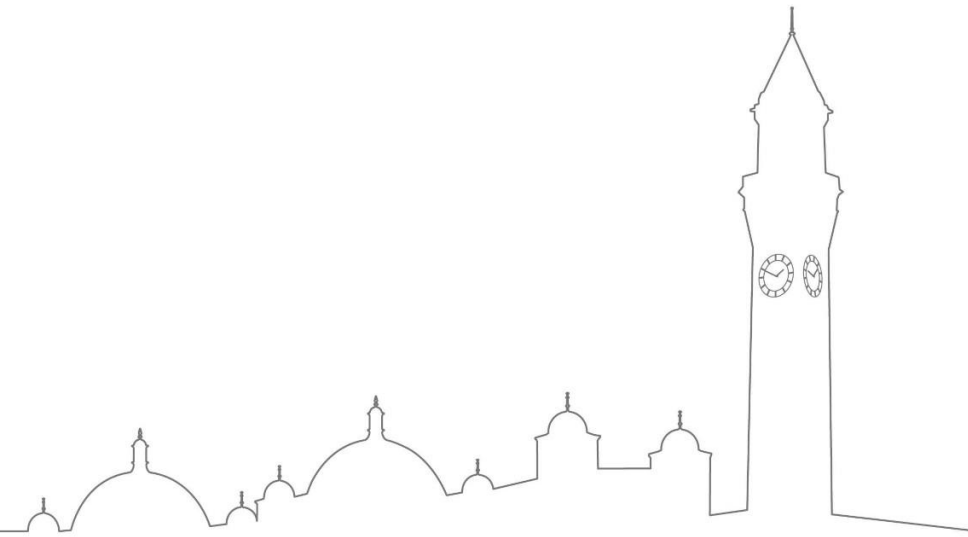
Areas of no silicon (includes a 100 μm gap between EIC-LAS)

Active silicon

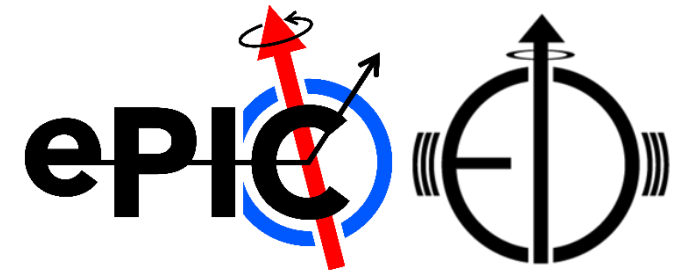
Inactive silicon



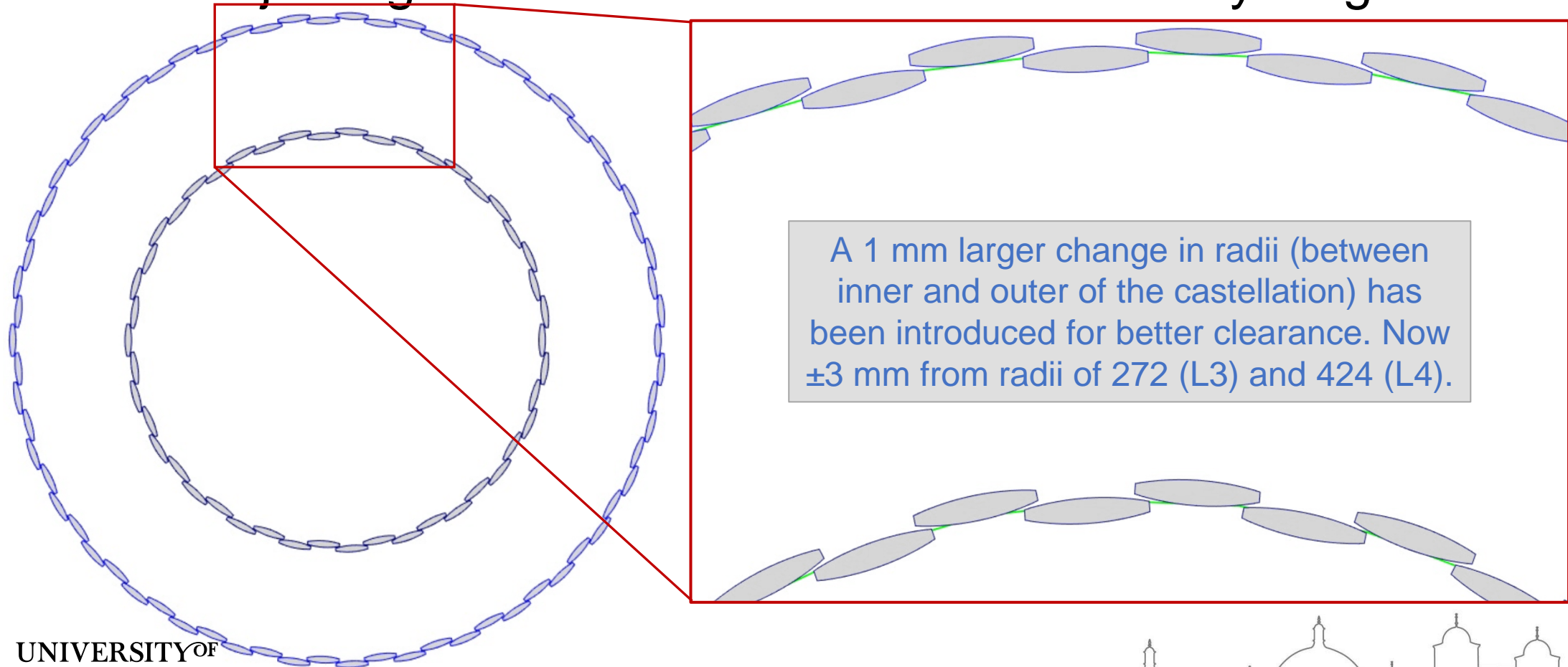
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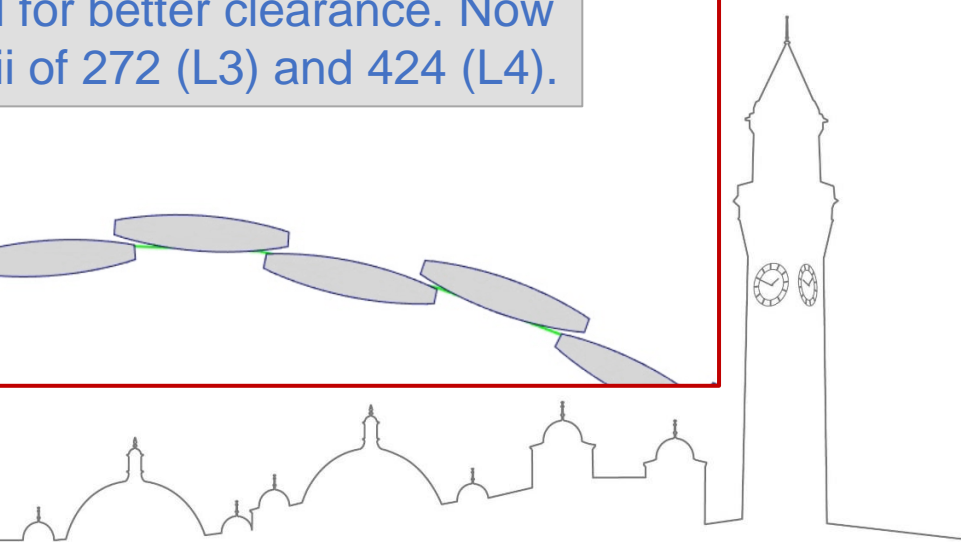
Staves still fit!



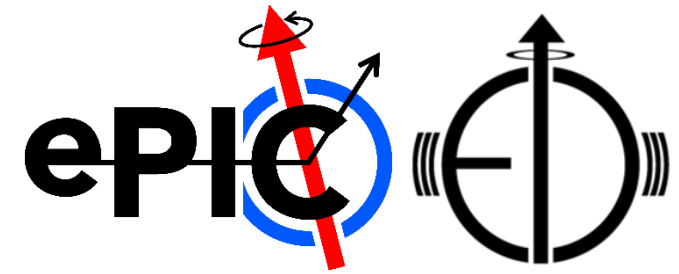
Without adjusting the radii or number of staves everything still fits!



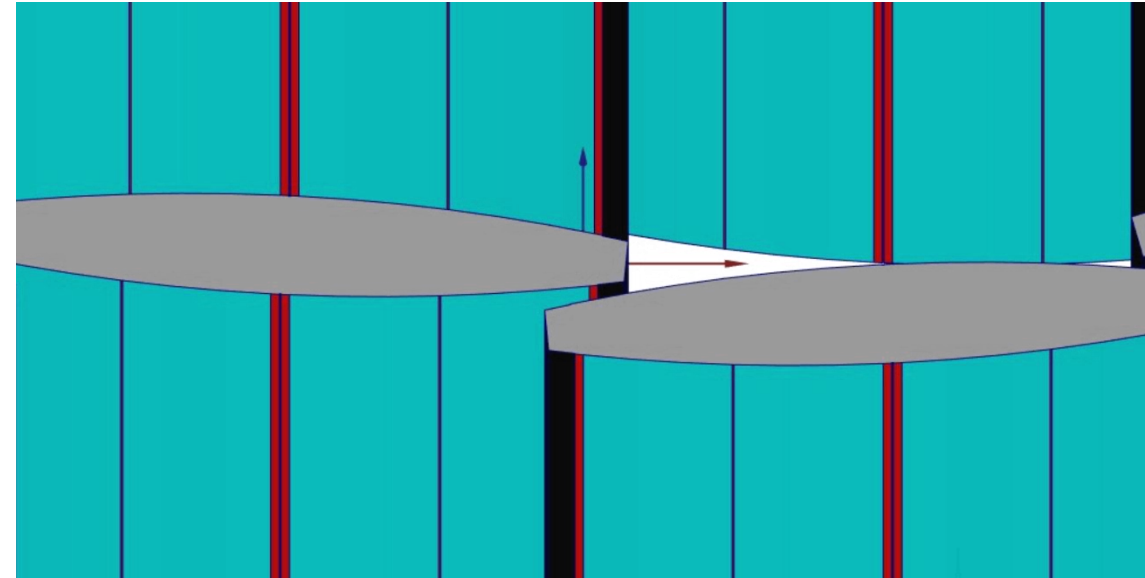
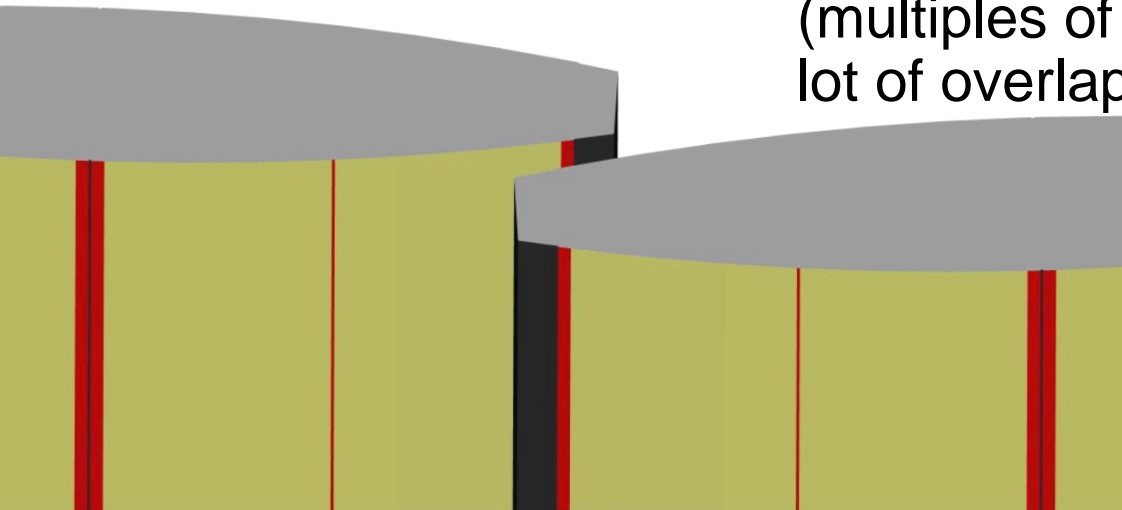
A 1 mm larger change in radii (between inner and outer of the castellation) has been introduced for better clearance. Now ± 3 mm from radii of 272 (L3) and 424 (L4).



Overlaps yet to be defined



- Overlaps are still to be (fully) accounted for.
- Fine tuning of overlaps will be done with adjustments to radii.
- Adding more staves (multiples of 2) adds a lot of overlap.

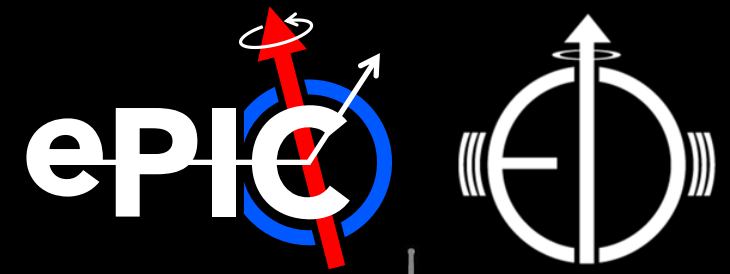


Started to look at minimum p_t to estimate worst case curvature of track (WIP).





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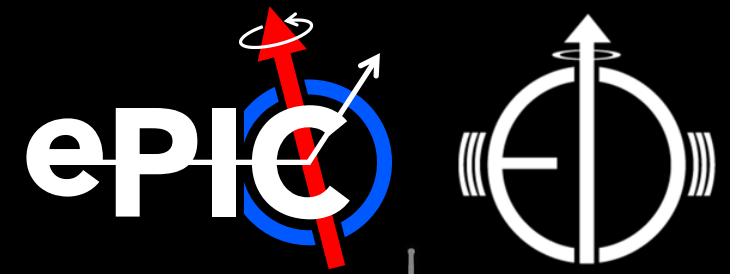
Thank you very much!

Any questions?

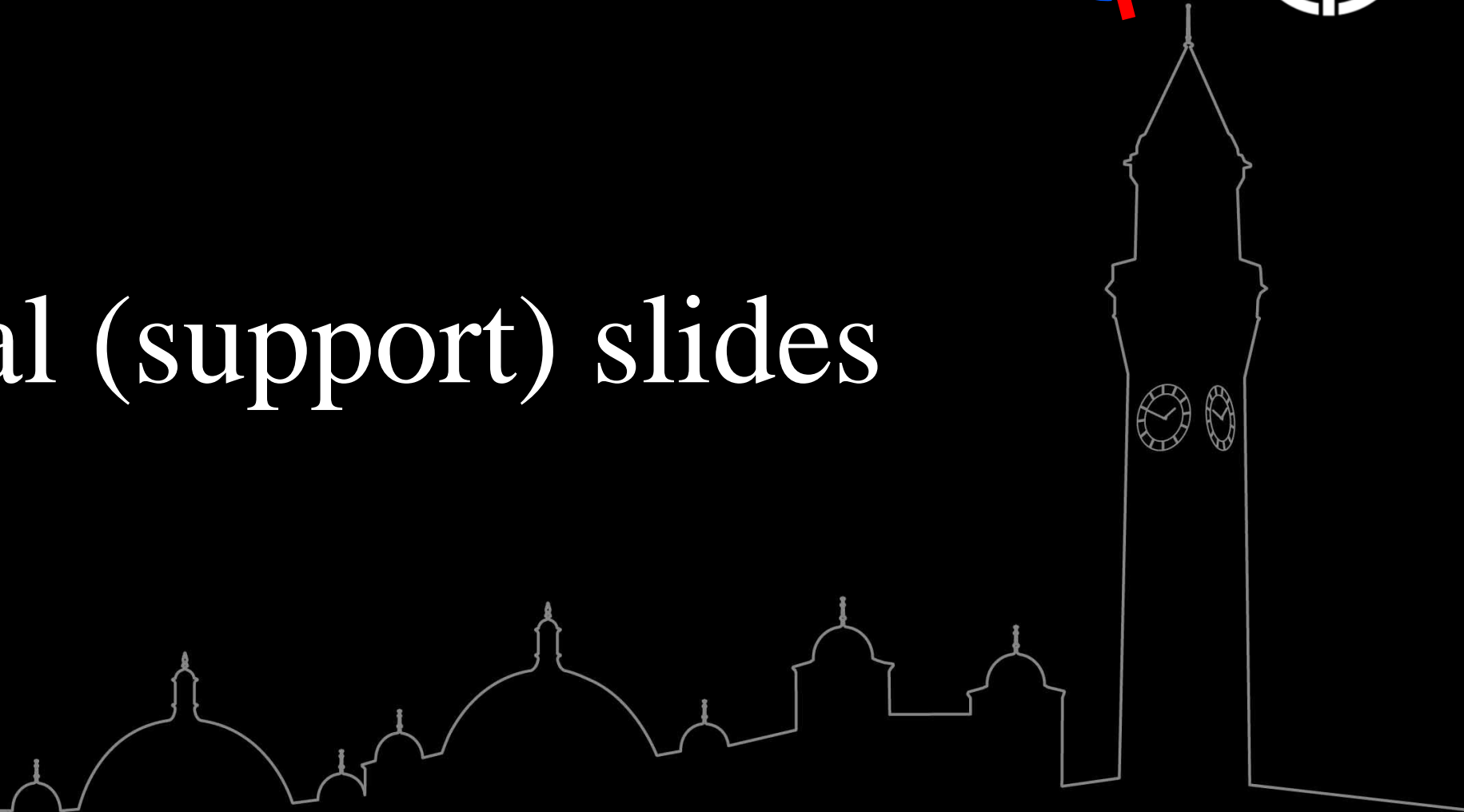




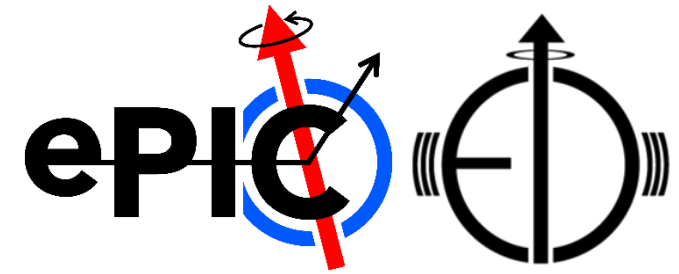
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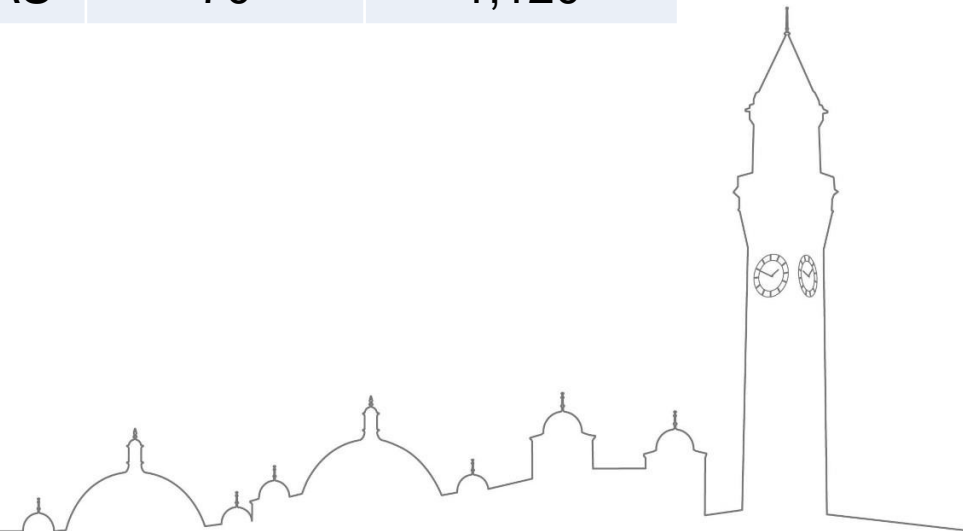
Additional (support) slides



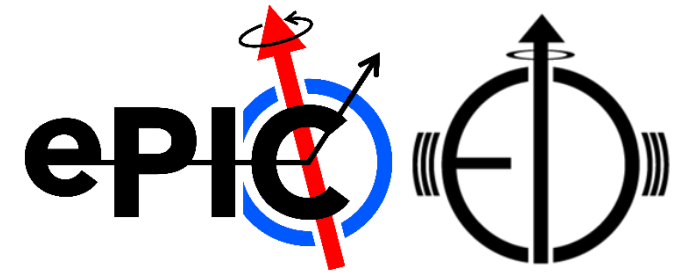
Structural findings



Layer	Radial Aim	Inner most Radii	Outer most Radii	#RSU per EIC-LAS	#Staves per layer	#EIC-LAS per layer
L3	272 mm	264.75 mm	279.25 mm	6RSU-LAS	46	368
L4	424 mm	416.75 mm	431.25 mm	5RSU-LAS	70	1,120



Spreadsheet for CAD model



	A	B	C
Centre Height		8.5000 mm	4.2500 mm
Edge Height		3.5100 mm	1.7550 mm
Curved Surface Diameter		180.2300 mm	90.1150 mm
Centre Height (min)		8.0000 mm	
Edge Height (min)		3.3600 mm	
# L4 Staves		70	35
# L3 Staves		46	23
Ideal L4 Radius		424.0000 mm	
Ideal L3 Radius		272.0000 mm	
Radius Offset		3.0000 mm	
HU Pads & Dicing Space		0.3250 mm	
HU Readout Periphery		0.2000 mm	
HU Biasing Space		60.0000 μm	
HU Width		9.7820 mm	
RSU Readout & Pads		0.5250 mm	
RSU Bias Backbone		0.1200 mm	
HU Active Width		9.1970 mm	
Stave's Central Active Width		9.1779 mm	
Stave's Edge Active Width		9.0743 mm	

Centre Height	"CentreH" = 8.5 mm	"CentreH_half" = "CentreH" / 2 (= 4.25 mm)
Edge Height	"EdgeH" = 3.51 mm	"EdgeH_half" = "EdgeH" / 2 (= 1.755 mm)
Curved Surface Diameter	"CurveDiam" = 180.23 mm	"CurveRad" = "CurveDiam" / 2 (= 90.115 mm)
# L4 Staves	"L4Staves" = 70	"L4Staves_half" = "L4Staves" / 2 (= 35)
# L3 Staves	"L3Staves" = 46	"L3Staves_half" = "L3Staves" / 2 (= 23)
Ideal L4 Radius	"L4Rad" = 424 mm	
Ideal L3 Radius	"L3Rad" = 272 mm	
Radius Offset	"RadOffset" = 3 mm	
HU Pads & Dicing Space	"HU_Pads" = 325 μm	
HU Readout Periphery	"HU_RO" = 200 μm	
'HU Biasing Space	"HU_Bias" = 60 μm	
HU Width	"HU_Width" = 9.782 mm	
RSU Readout & Pads	"RSU_RO_and_Pads" = "HU_Pads" + "HU_RO" (= 525 μm)	
RSU Bias Backbone	"RSU_Bias" = "HU_Bias" * 2 (- 120 μm)	
HU Active Width	= "HU_Width" - ("HU_Pads" + "HU_RO" + "HU_Bias") (= 9.179 mm)	
Stave's Central Active Width	"ActiveWidth_centre" = 9.1779 mm	
Stave's Edge Active Width	"ActiveWidth_edge" = 9.0743 mm	

