ITS3 – Stitched Sensor

- Updated size specifications

LoI: RSU = 18.85 x 30 mm^2, 9 RSUs per segment, active length = 270 mm

ER1: RSU = 18.516 x 21.666 mm^2, 12 RSUs per segment, active length = 260 mm

ER2: RSU = 19.564 x 21.666 mm^2, 12 RSUs per segment, active length = 260 mm

ER2 Stitched Sensor

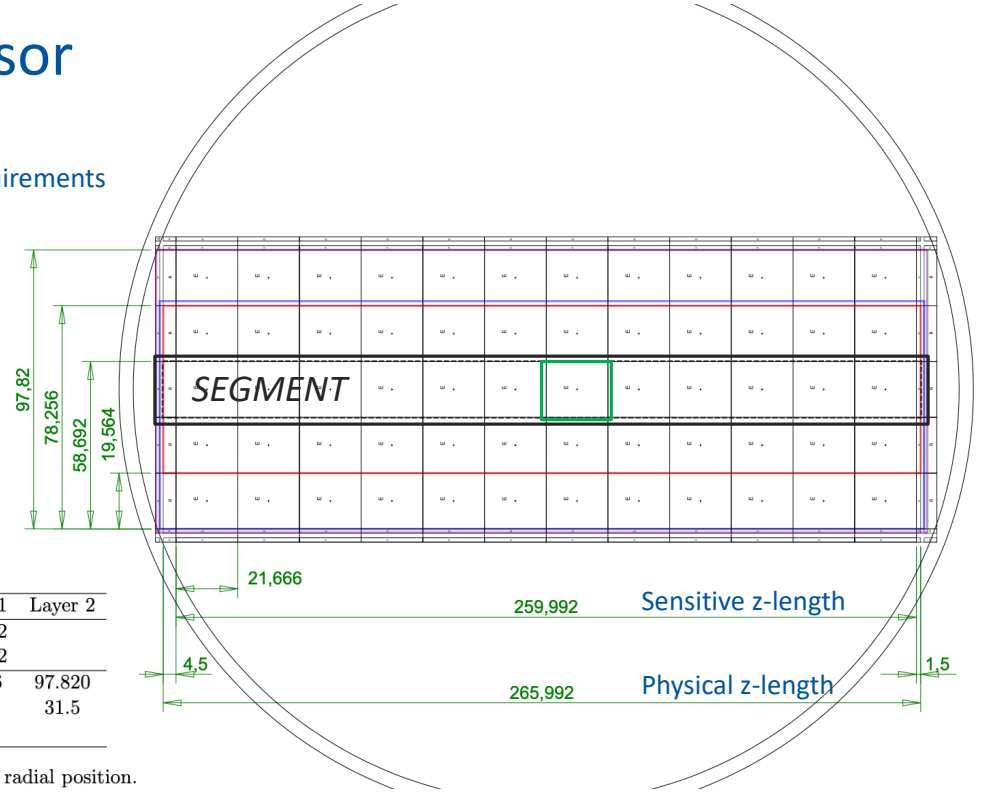
ER2 Sensor aims to meet the ITS3 requirements

Layer 0: 12 x 3 repeated units+endcaps

Layer 1: 12 x 4 repeated units+endcaps

Layer 2: 12 x 5 repeated units+endcaps

Repeated (Stitched) Sensing Unit



AZIMUTHAL WIDTH UPDATED

IB Layer Parameters	Layer 0	Layer 1	Layer 2
Sensor length [mm]		265.992	
Sensitive length [mm]		259.992	
Sensor azimuthal width [mm]	58.692	78.256	97.820
Radial position [mm]	19.0	25.2	31.5
Equatorial gap [mm]		1.0	

Table 3.2: Design dimensions of the sensor dies and radial position.

ITS3 – Stitched Sensor

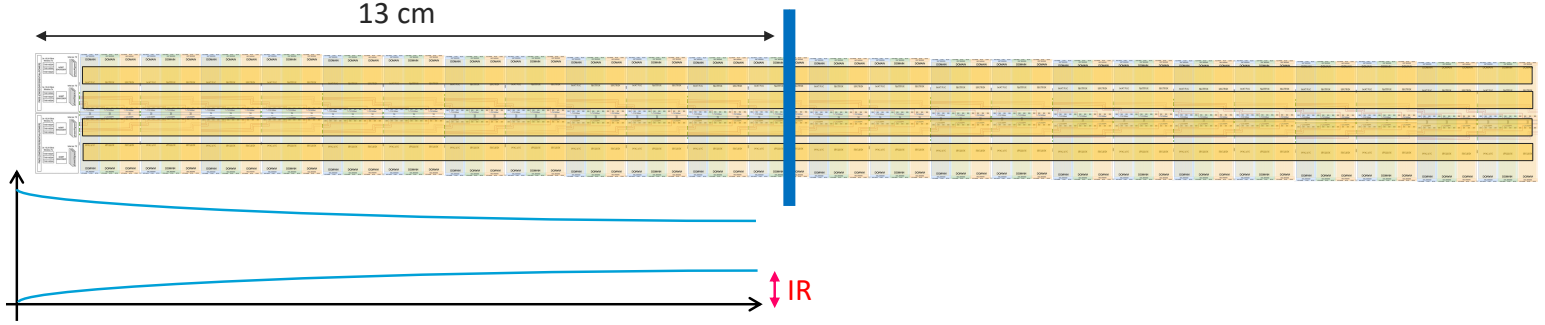
- IR drop

Concern over IR drop over the length of the stitched sensor.

Mitigation is to supply power from both ends of the sensor; readout at one end

Need to allow for endcaps (periphery) at both ends (4.5 mm and 1.5 mm, respectively)

IR Drops



P_s [mW/cm2]	J_s mA/cm	I_s mA	Rail R Ohm	IR V		2*IR [V]	GVDD_in [V]
10	8.3	108.3	3.68	0.20		**0.40**	2.00
20	16.7	216.7	3.68	0.40		**0.80**	2.40
30	25.0	325.0	3.68	0.60		**1.20**	2.80
40	33.3	433.3	3.68	0.80		**1.60**	3.20
50	41.7	541.7	3.68	1.00		**2.00**	3.60

L=13 cm

Current Metal (ER1)

V_{core} = 1.2V

P_s [mW/cm2]	J_s mA/cm	I_s mA	Rail R Ohm	IR V		2*IR [V]
10	8.3	108.3	0.321	0.017		0.035
20	16.7	216.7	0.321	0.035		0.069
30	25.0	325.0	0.321	0.052		0.104
40	33.3	433.3	0.321	0.069		0.139
50	41.7	541.7	0.321	0.087		0.174

L=13 cm

Fat Metal (request for ER2)

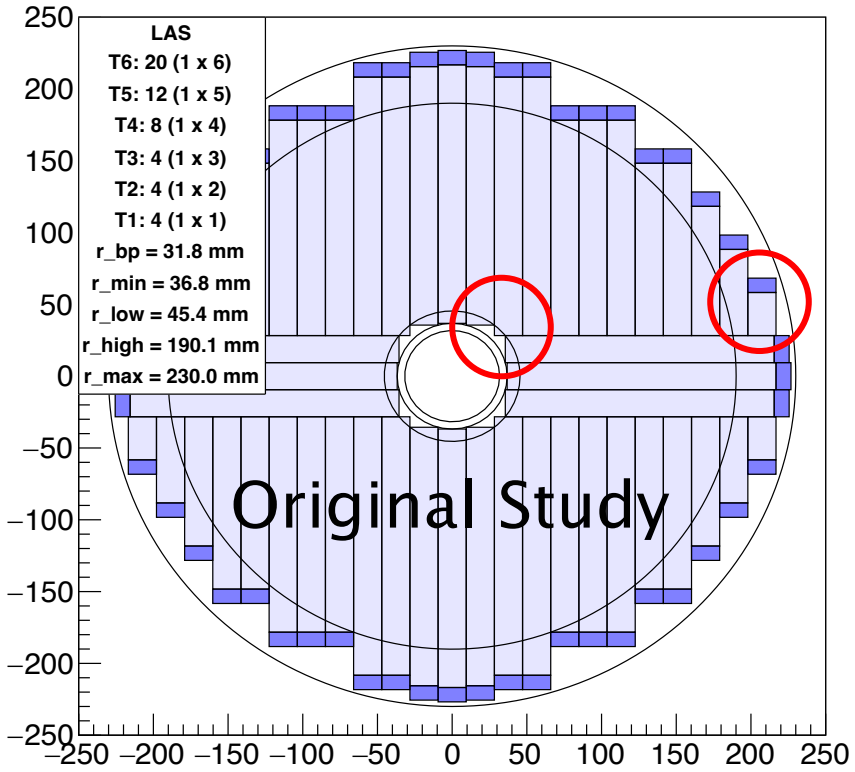
V_{core} = 1.2V

ePIC Disk Layout Studies – Disk 0 (ED0/HD0)

- Updated for new sensor size specification

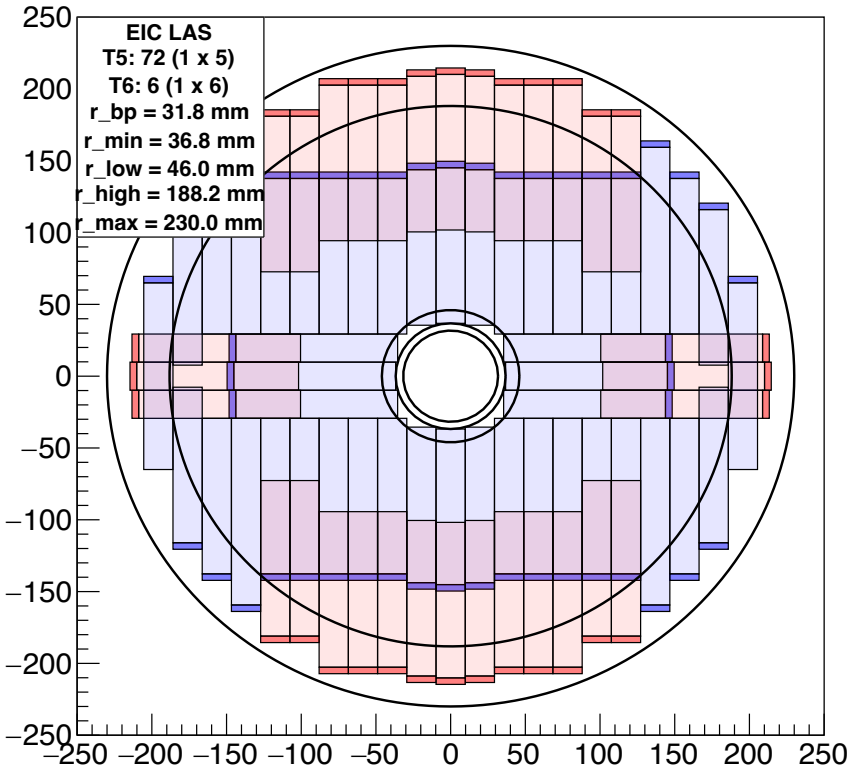
First study: set maximum sensor length to 6 RSU and limit to two different lengths (foundry rule)

EIC-SVT Disk-1 Tile



z = +/- 250 mm
Cruciform = 3 x 3 sensors

ePIC-SVT ED0/HD0 Tile



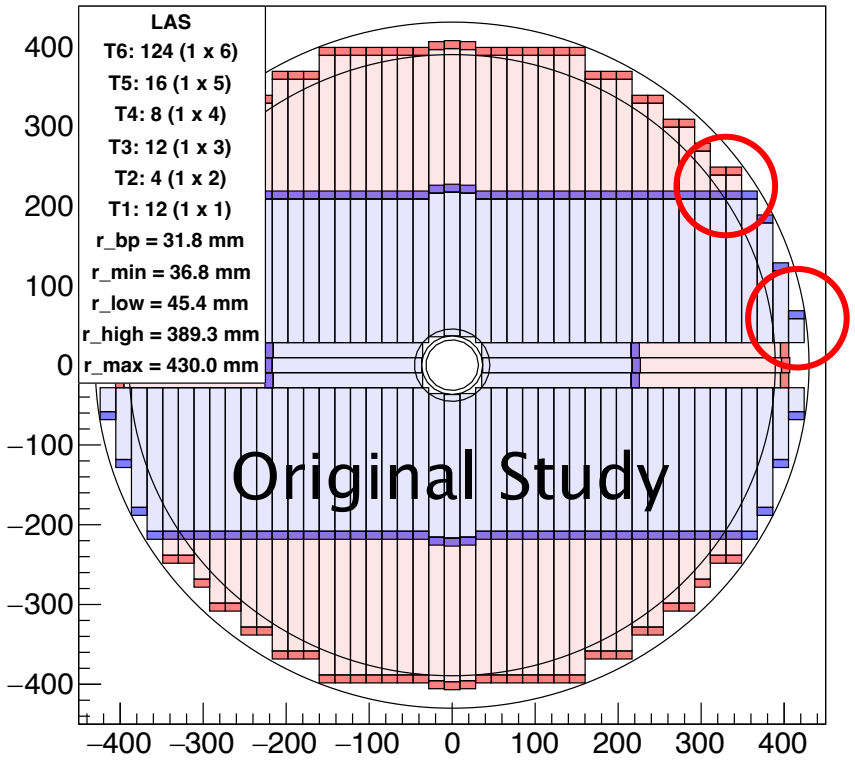
Max. required length = 8 RSU
Note: second endcap not included yet

ePIC Disk Layout Studies

- Updated for new sensor size specification

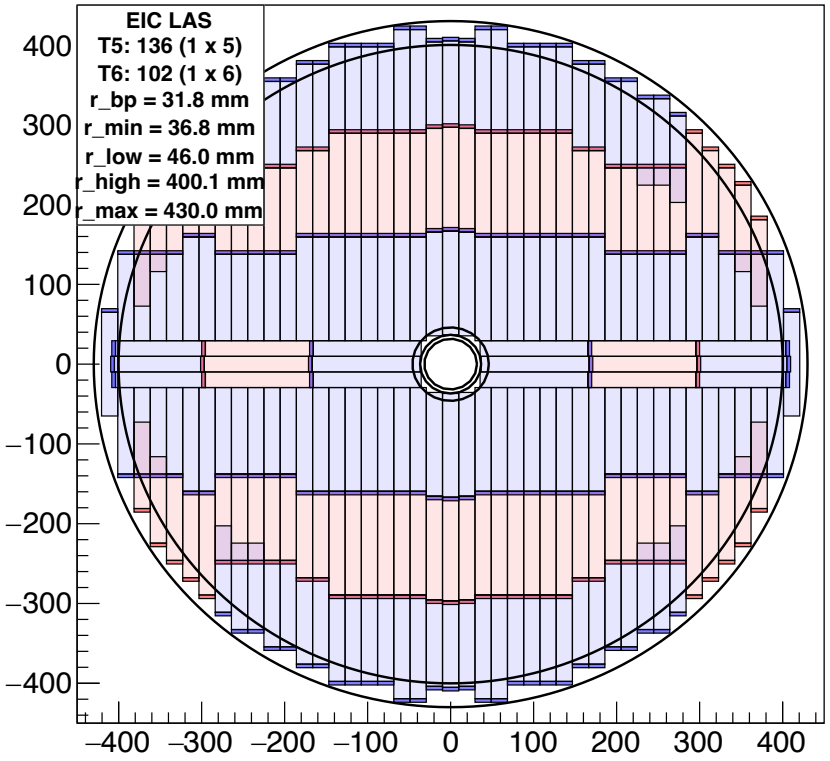
First study: set maximum sensor length to 6 RSU and limit to two different lengths (foundry rule)

EIC-SVT Disk-2/3n Tile



z = +/- 450 mm; - 700 mm
Cruciform = 3 x 3 sensors
Maximum sensor length = 6 RSU

EIC-SVT ED1/HD1/ED2 Tile



Max. required length = 17 RSU
Note: second endcap not included yet