SVT Upgrade Status

Tim Nelson - *November 27, 2017*

Three Significant Subprojects

new sensors

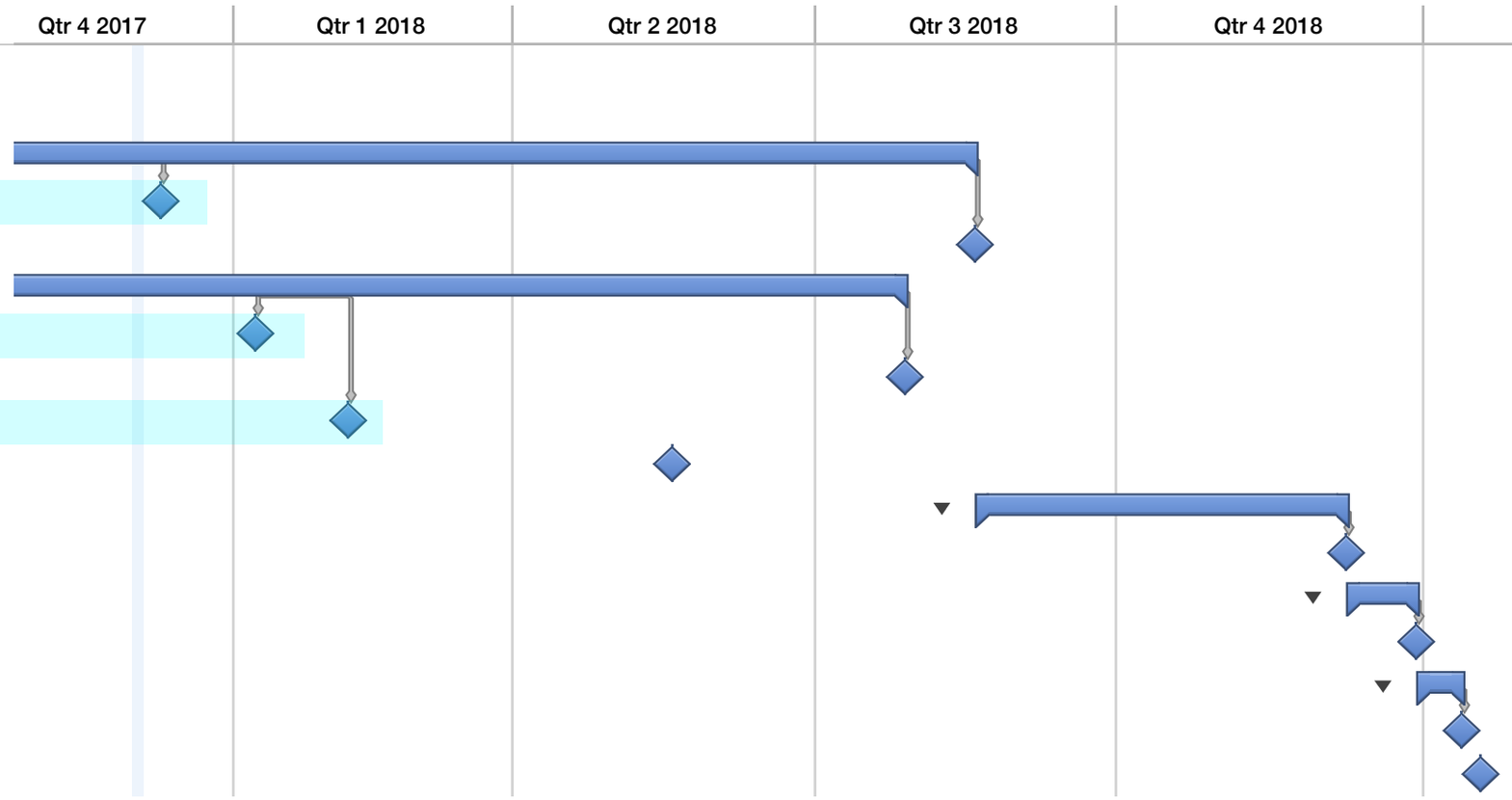
new hybrids + *assembly and testing*

new mechanics

- module supports
- lever blocks
- shims for L2 and L3

Schedule

Title	End
1) Project Approved	7/10/17, 8:00 AM
2) Layers 1-3 @ SLAC	9/1/17, 6:00 AM
3) Sensors	**8/17/18, 2:00 PM**
3.2) Sensor Design Complete	12/1/17, 2:00 PM
3.7) Sensors Ready	8/17/18, 2:00 PM
4) Hybrids	**7/27/18, 2:00 PM**
4.3) Hybrid Layout Complete	1/12/18, 2:00 PM
4.7) Hybrids Ready	7/27/18, 2:00 PM
9) Mechanical Design Complete	2/9/18, 2:00 PM
10) Mechanics Complete	5/18/18, 2:00 PM
11) Module Assembly	**12/7/18, 2:00 PM**
11.6) Modules Complete	12/7/18, 2:00 PM
12) Final Assembly	**12/28/18, 2:00 PM**
12.6) Ready for shipping	12/28/18, 2:00 PM
13) Shipping	**1/11/19, 2:00 PM**
13.3) Ready for Installation	1/11/19, 2:00 PM
15) Project Complete	1/17/19, 2:00 PM



Will internally review the design of three significant components: sensors, hybrids, mechanics

Entire schedule is contingent upon completion of sensor design.

DELIVERY (ORIENTATIVE)

The expected delivery date is 5.5 working months after final layout approval by the client and reception of the masks or after the reception of the substrate 200 um thick wafers (whatever occurs the latest) and the reception of the first payment.

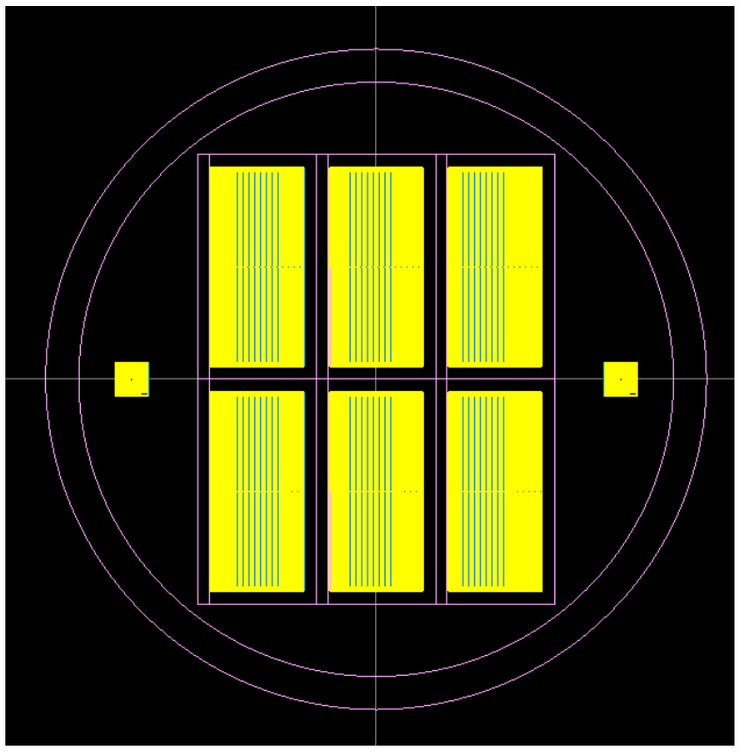
Sensor Design Status

Preliminary design delivered on Oct. 26

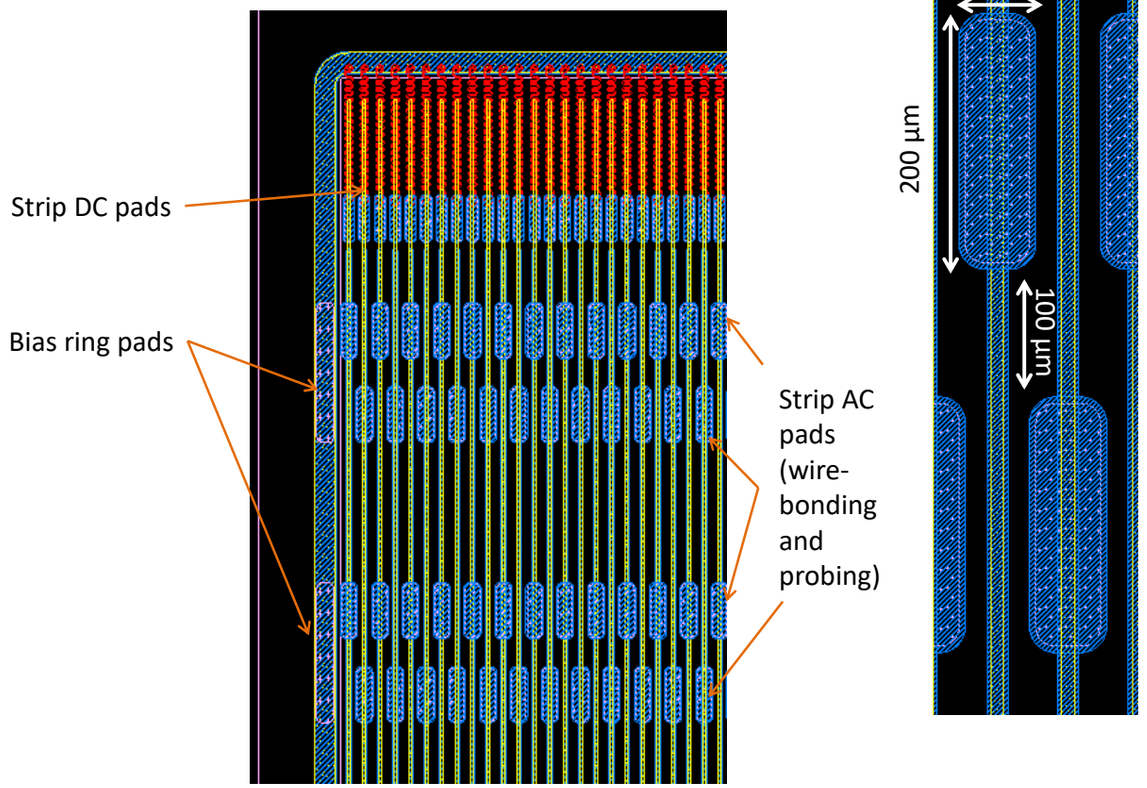
Discussion of key details ensued during first week of November.

Updated design proposal sent to Vitaliy on 11/16 and

…I only learned about this last night.



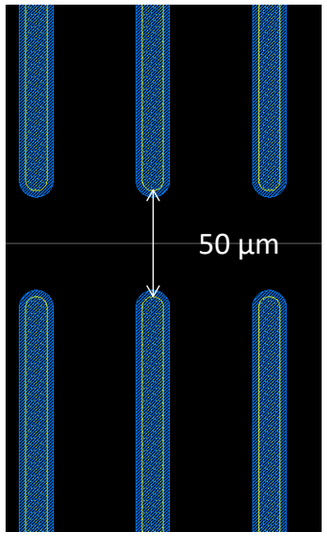
Electrical pads

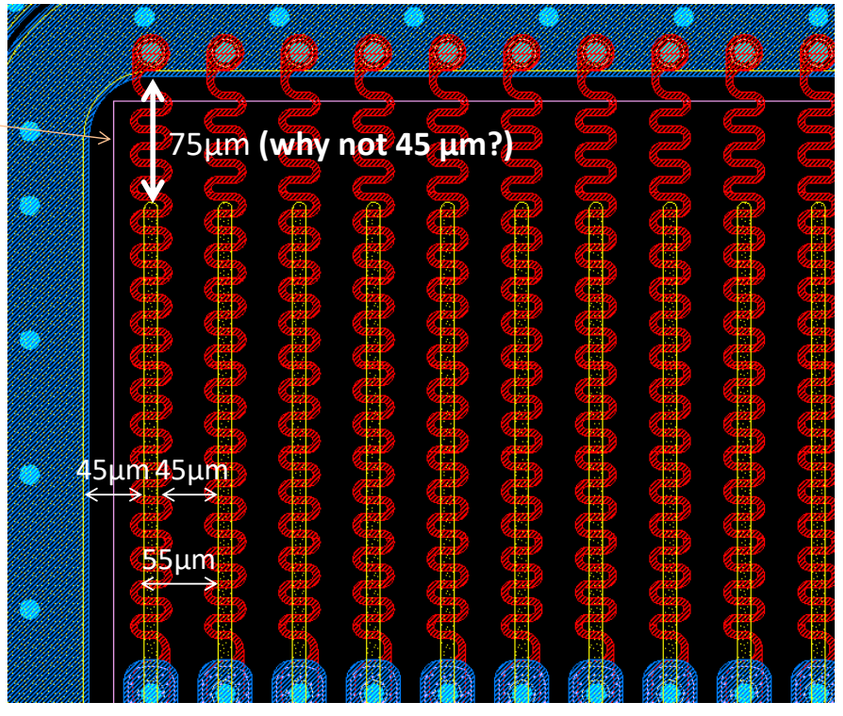


Active area

Active area 14025 x 30000 um2
Width = 255 strips x 55 um (pitch) = 14025 um
Length = (14900 um (length of each strip) x 2 + 50 um (gap between segments) = 29850 um

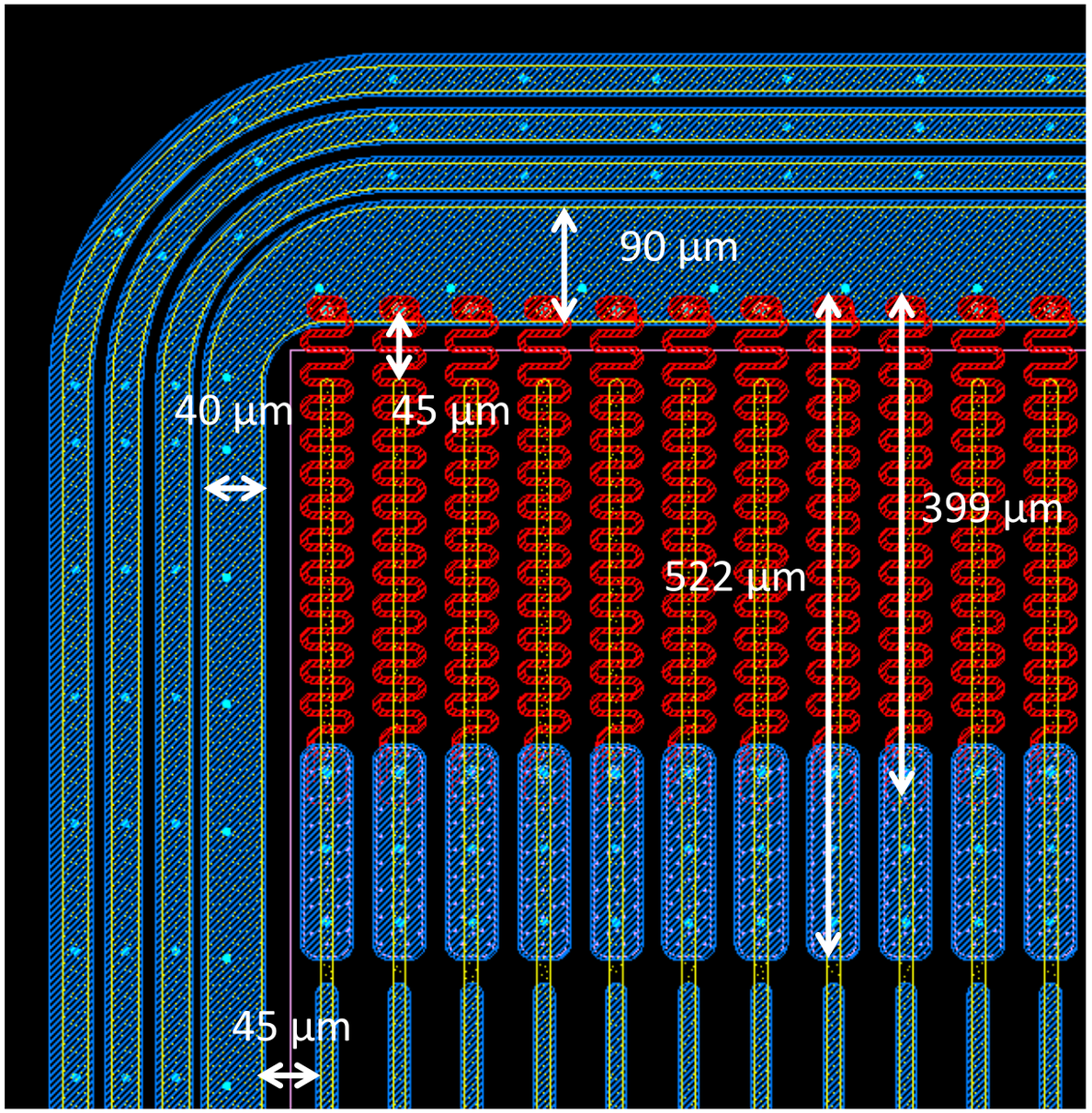
why 30000?





Final Sensor Design Candidate

255 strips, active area and bias ring

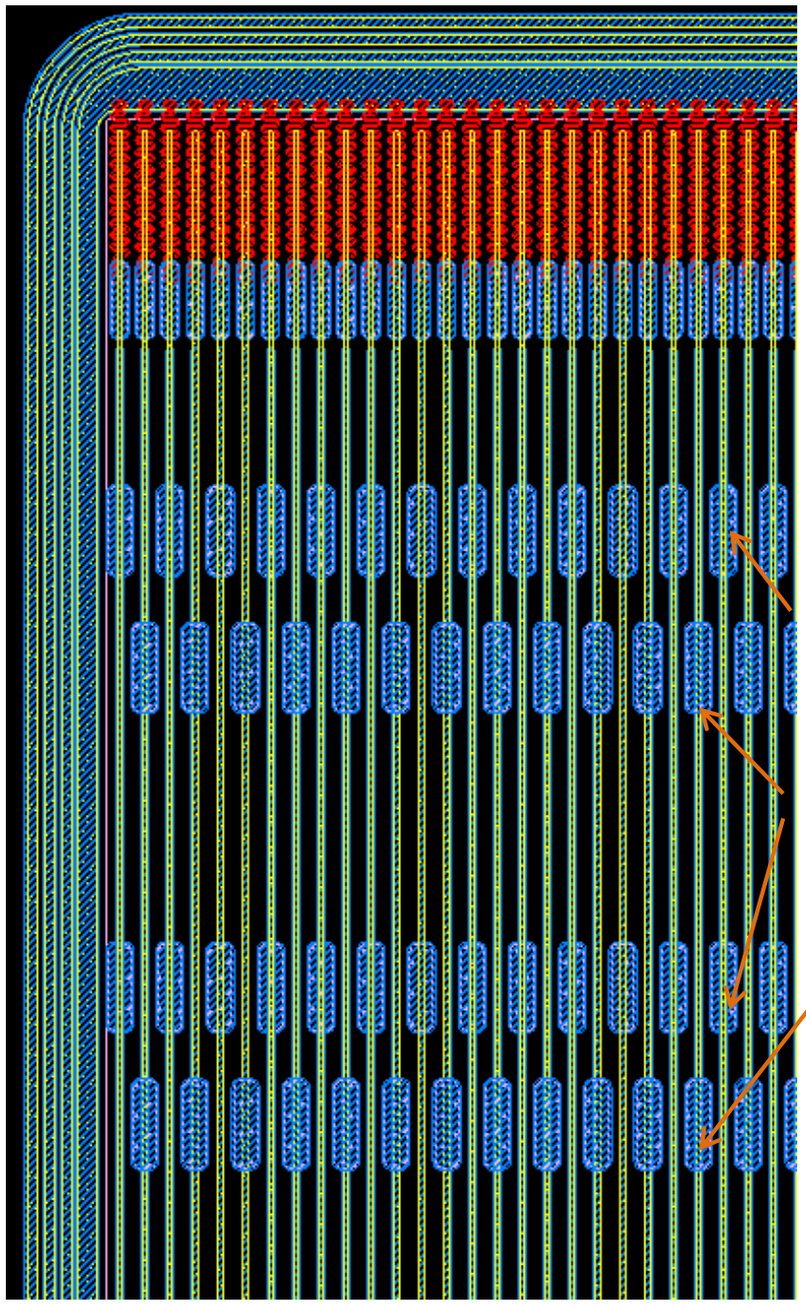


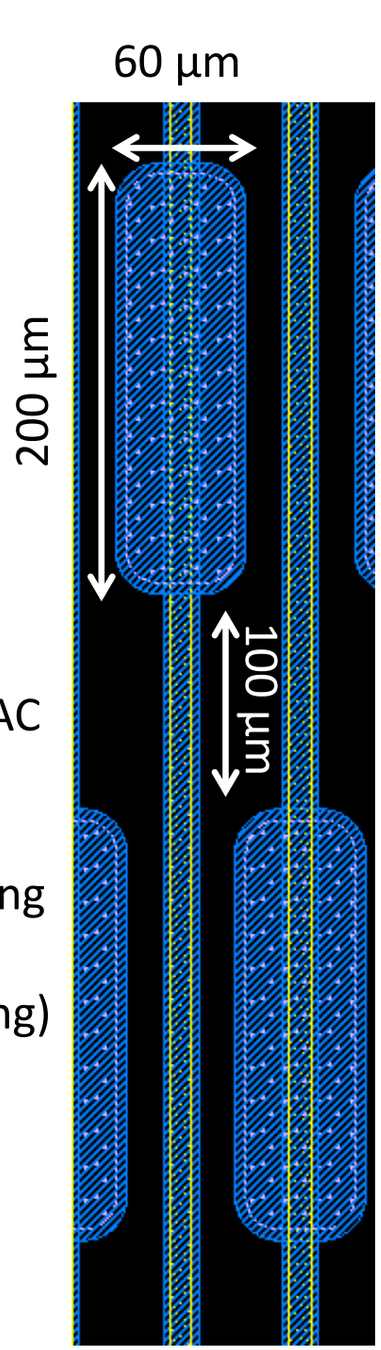
- Reduced resistance length = 399 µm (522 µm with DC metal pad).
- Strip length 14952 µm to have the same distance between the strips and the bias ring everywhere.
- Asymmetric bias ring = 40 µm in the slim edge side, 90 µm in the other sides.

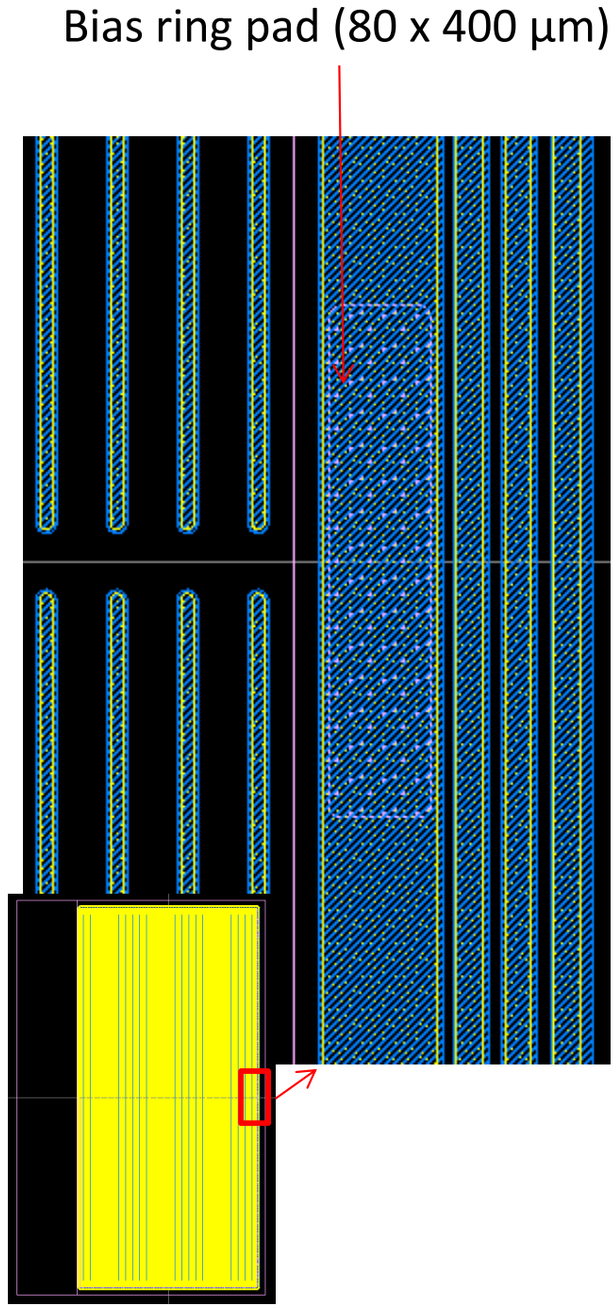
DC pad 170 x 40 µm^2

Final Sensor Design Candidate

Electrical pads

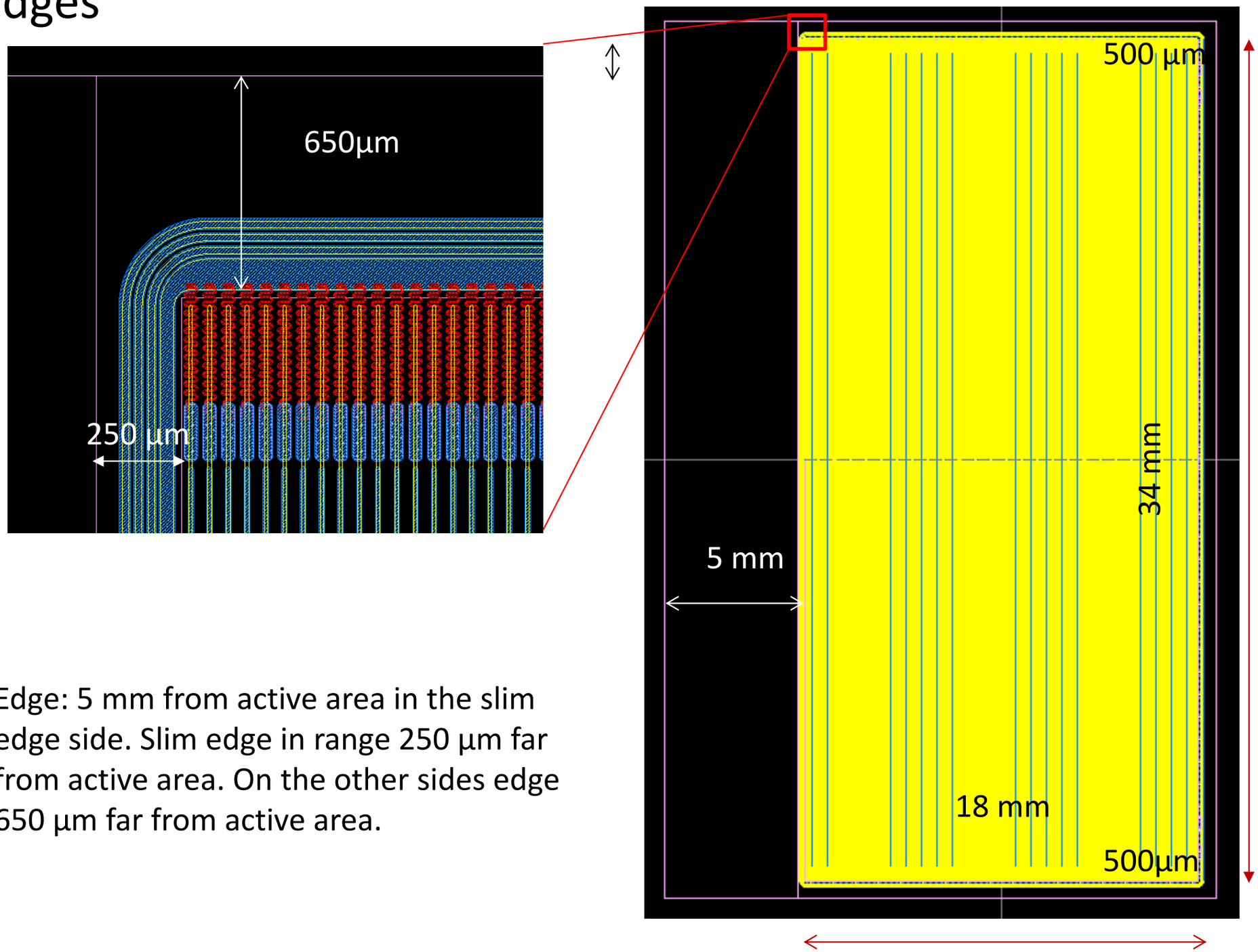






Final Sensor Design Candidate

Edges

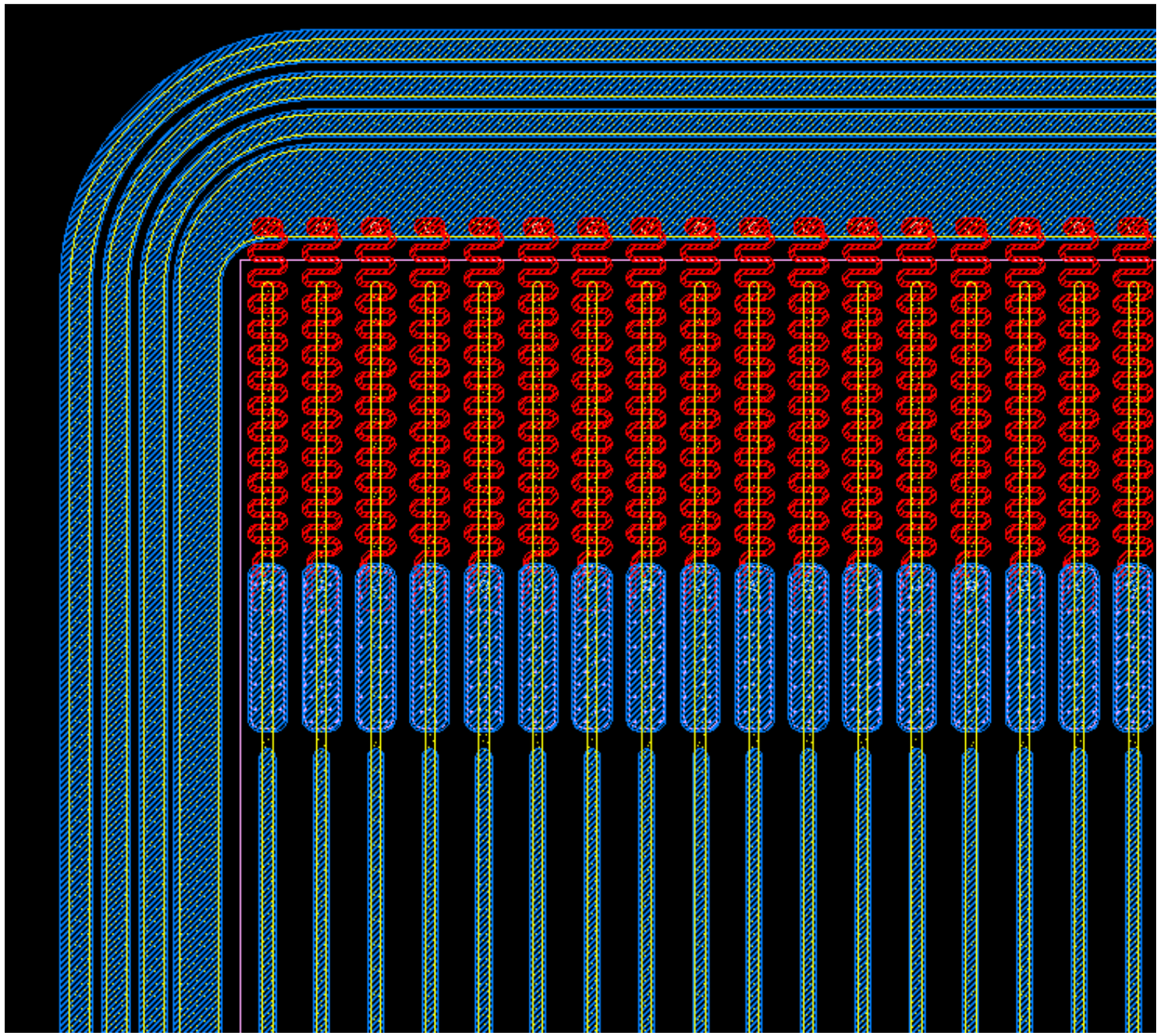


Edge: 5 mm from active area in the slim edge side. Slim edge in range 250 µm far from active area. On the other sides edge 650 µm far from active area.

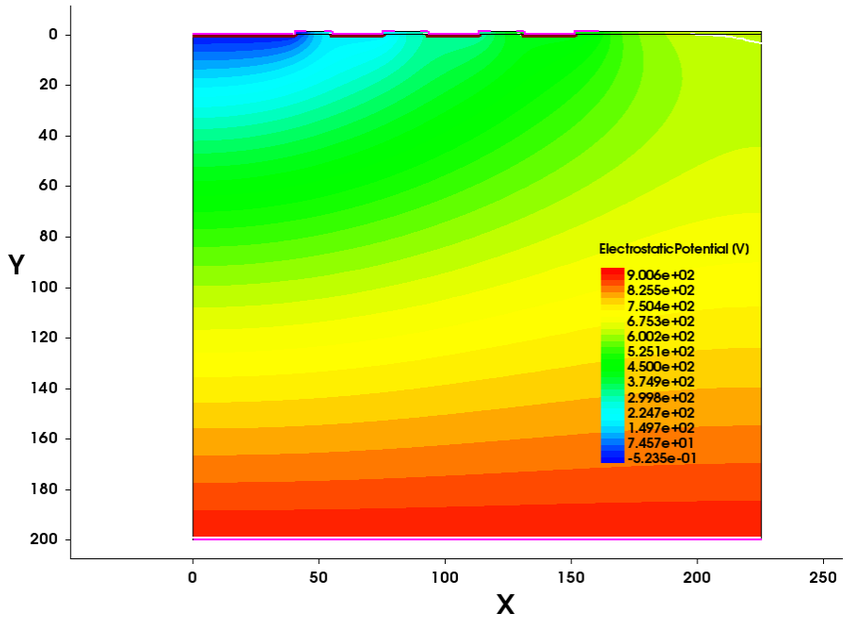
Final Sensor Design Candidate

Guard rings

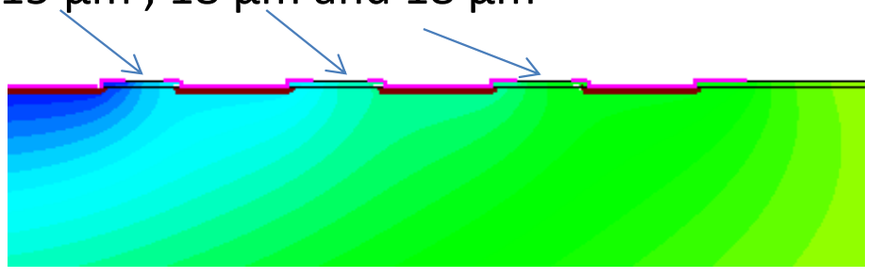
Three floating guard ring around the bias ring.



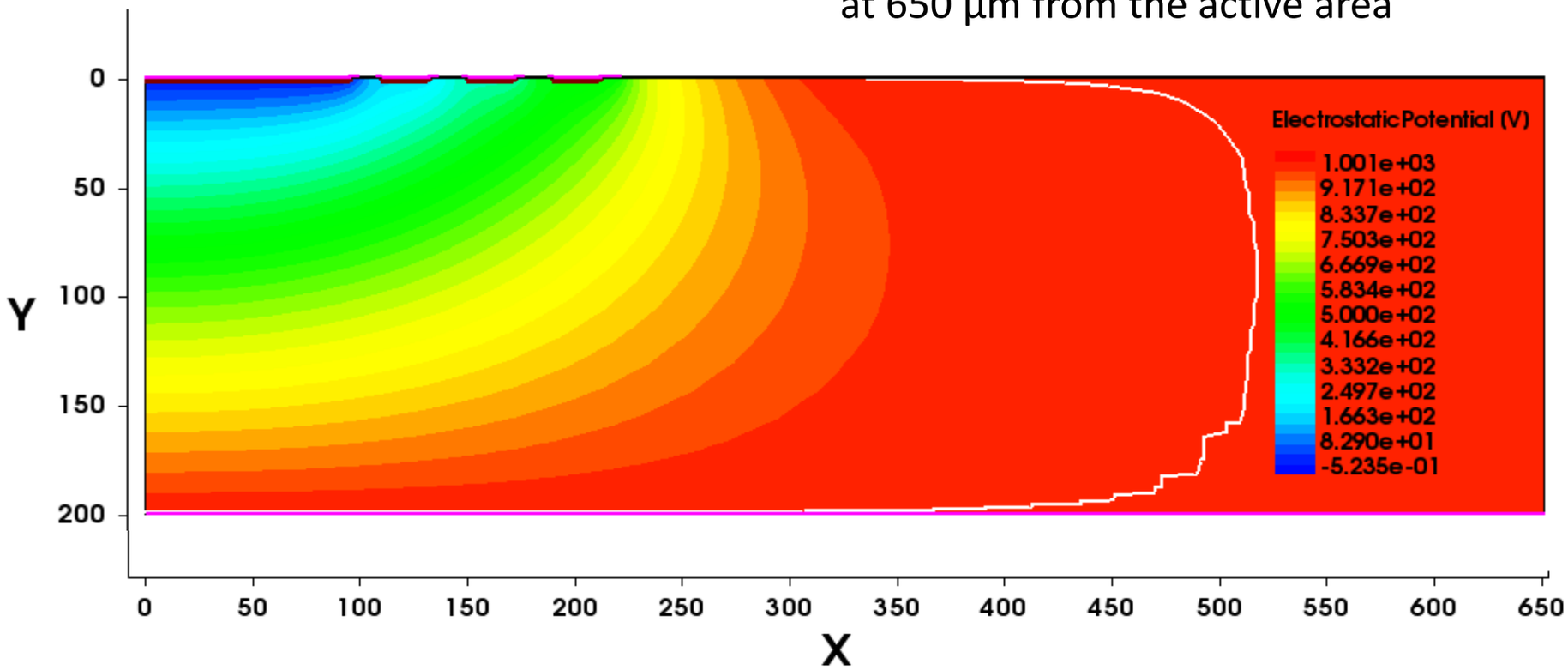
Final Sensor Design Candidate



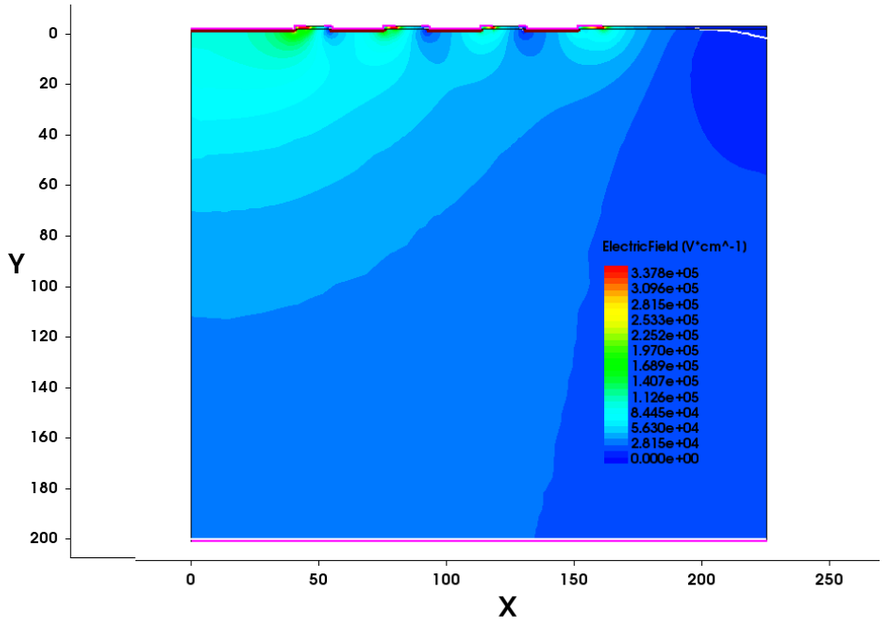
Three guard rings 20 µm wide at distance 15 µm , 18 µm and 18 µm



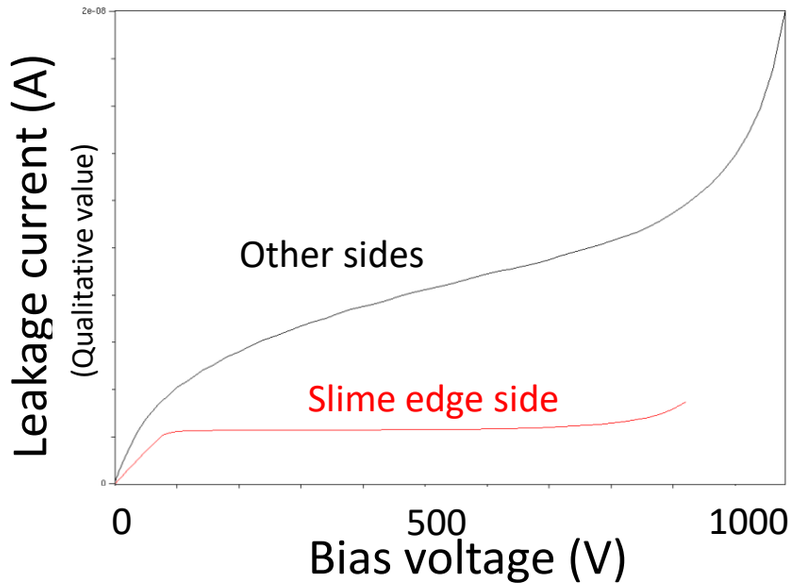
- Slime edge side: bias ring 40µm wide, cleaving at 250 µm from the active area
- Other sides: bias ring 90µm wide, saw cut at 650 µm from the active area



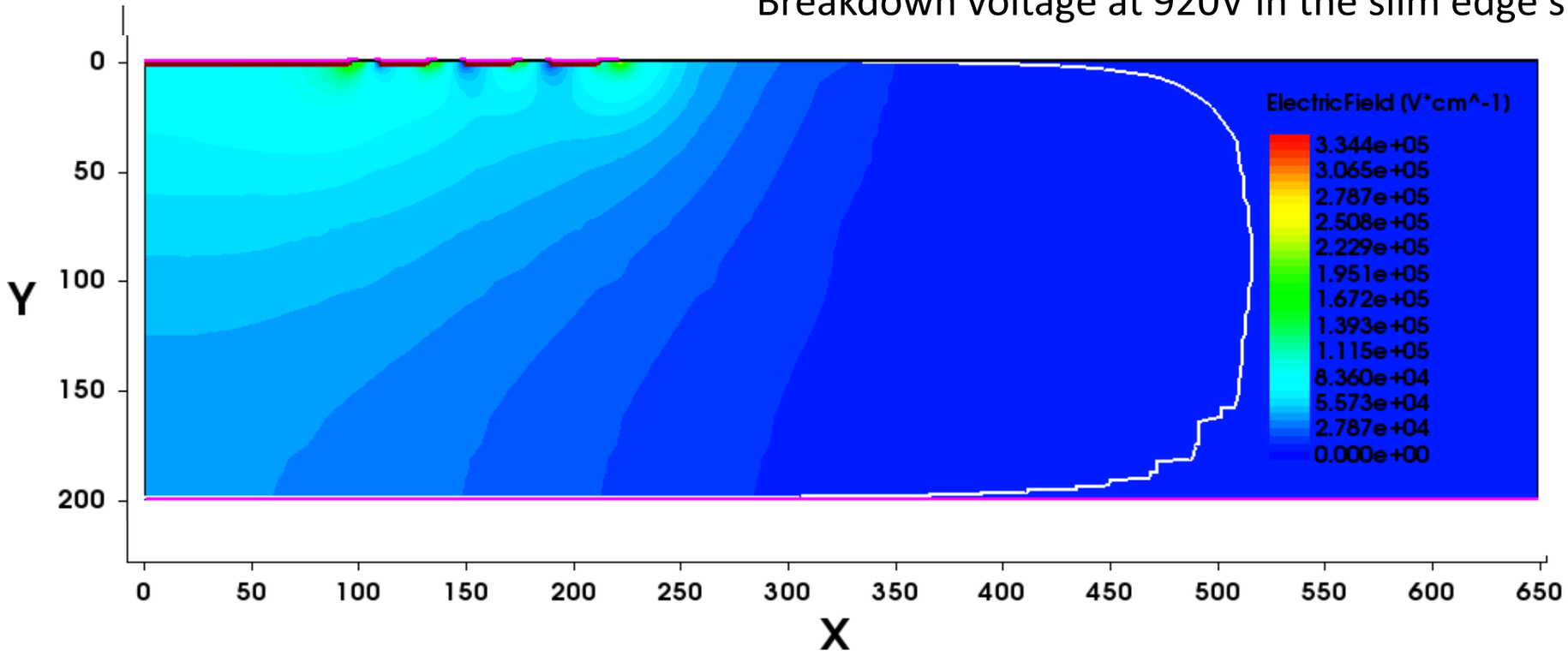
Final Sensor Design Candidate



*Value depends on carrier life time and real dimension of the device

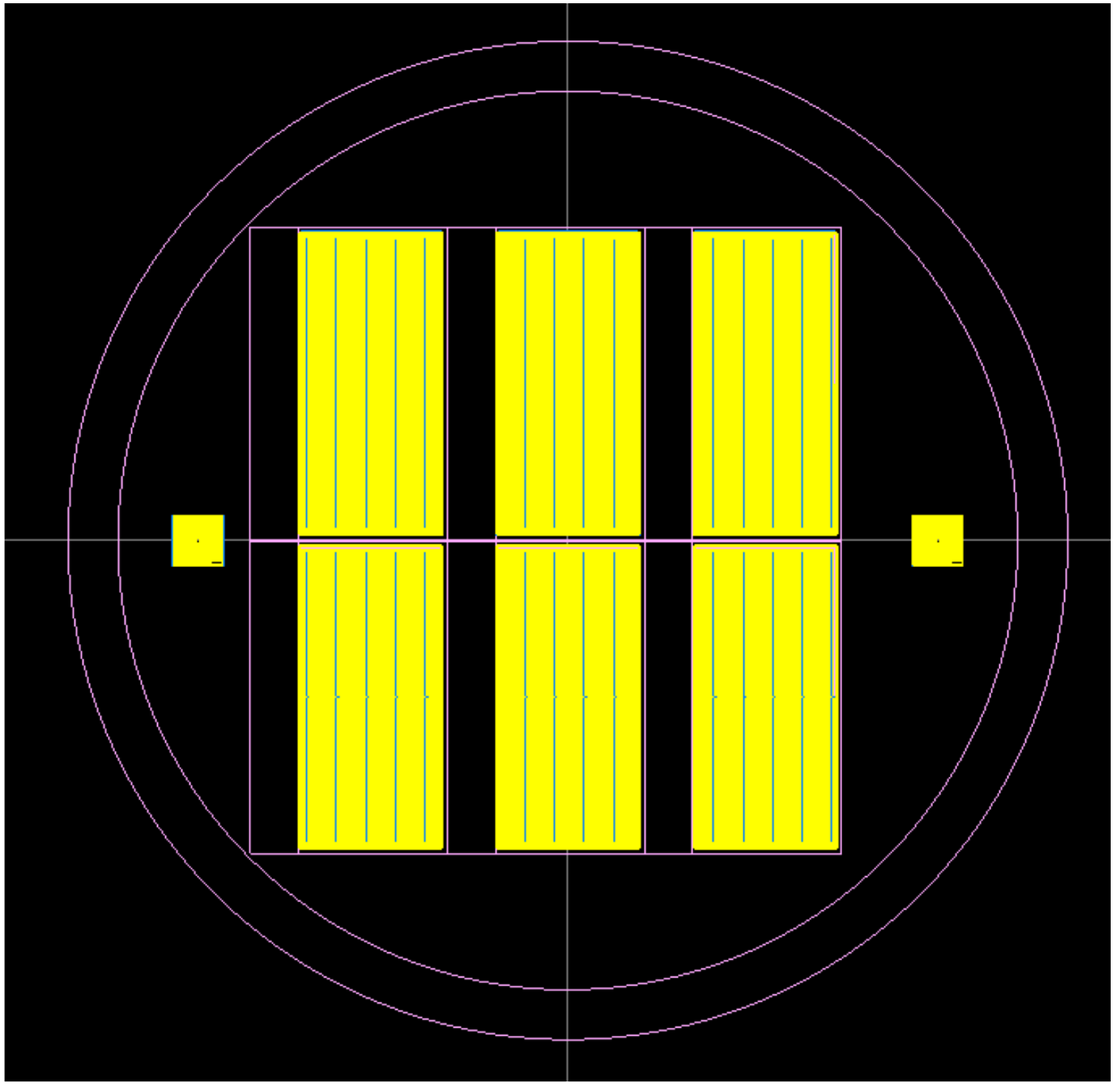


Breakdown voltage at 920V in the slim edge side

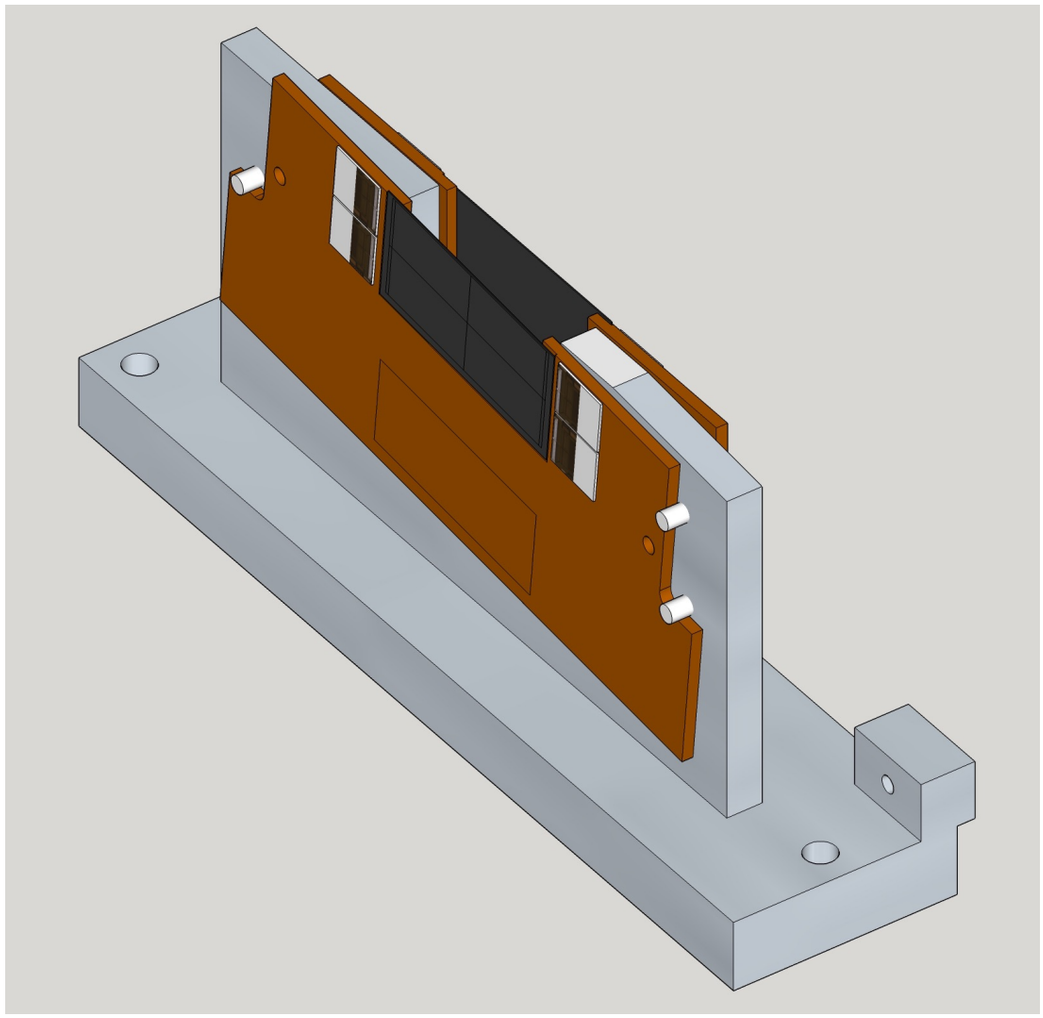


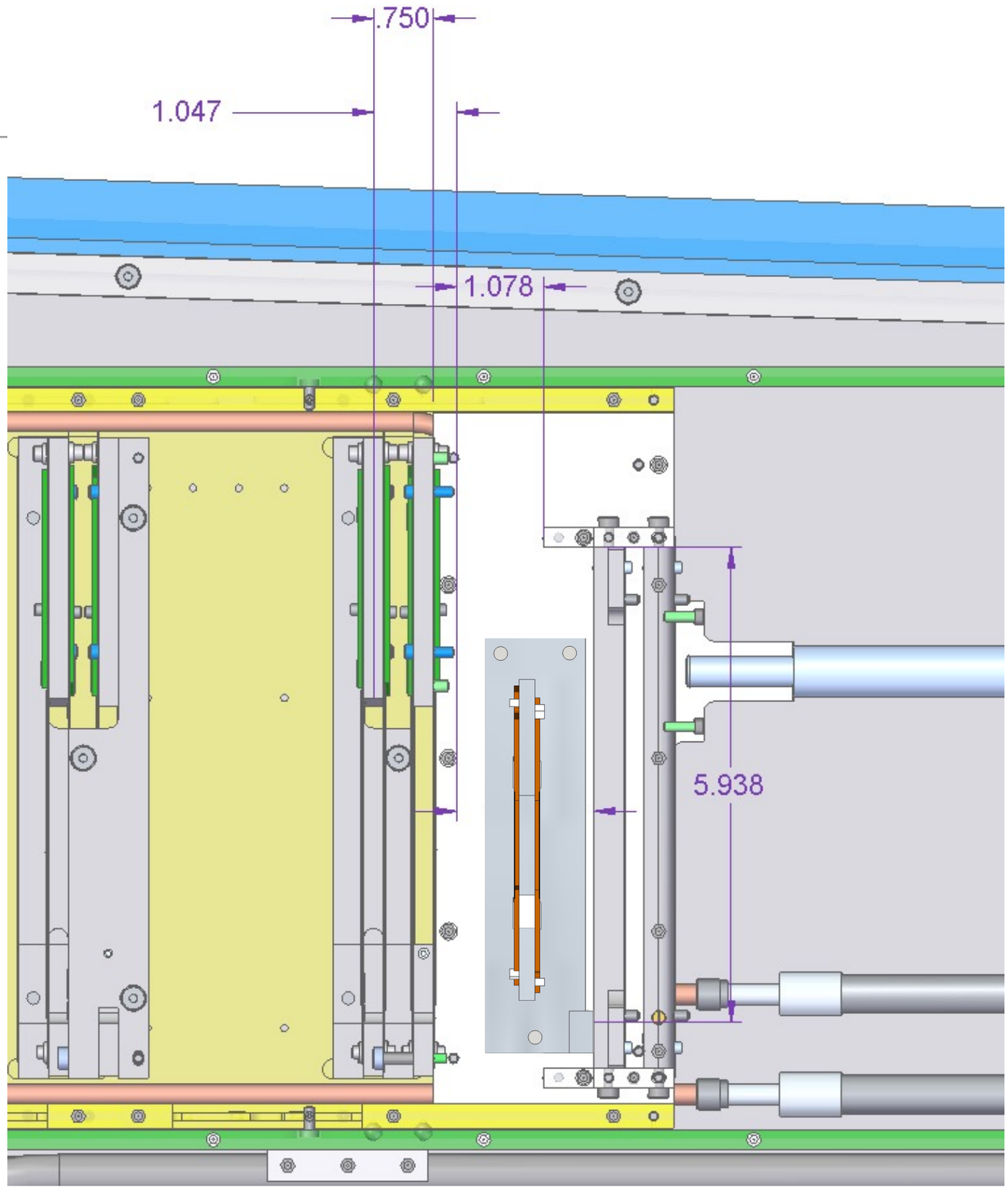
Final Sensor Design Candidate

Six devices in each wafer



Hybrid and Mechanics





Ready for layout and detailed dimensioning/tolerancing once final sensor design is in hand.

Summary and Outlook

- Focus is on critical path - sensor design - where we are late despite steady progress.

- We have completed other tasks, where details depend on sensor design, as much as possible without risking wasted effort

- I will apprise the EC when there is a completed sensor design and the results of the design review.

- Next milestones, hybrid and mechanical designs, are 4 and 8 working weeks respectively after sensor design completion. It makes sense to check back in on these timescales.