ROPPERI Update

Summary of KIT Bonding Visit & First Glance at the Data

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LCTPC WP Meeting
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Bonding Visit at KIT

- Next attempt to bond the Timepix ASIC to the PCB and read it out

- Earlier iterations were only stable for a very short time before the bond connections broke again, resulting in only on 'good' readout frame

- Gold stud bump bonding: Apply gold studs from gold wire to both ASIC and PCB, then flip-chip bond them at high pressure and temperature

- This time: PCB with lower CTE, more boards, immediate readout
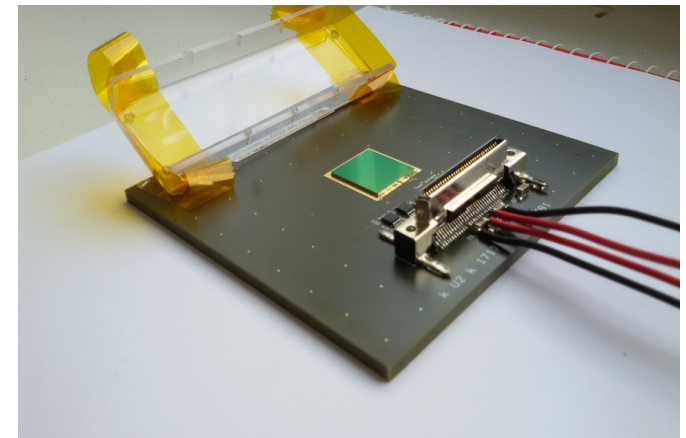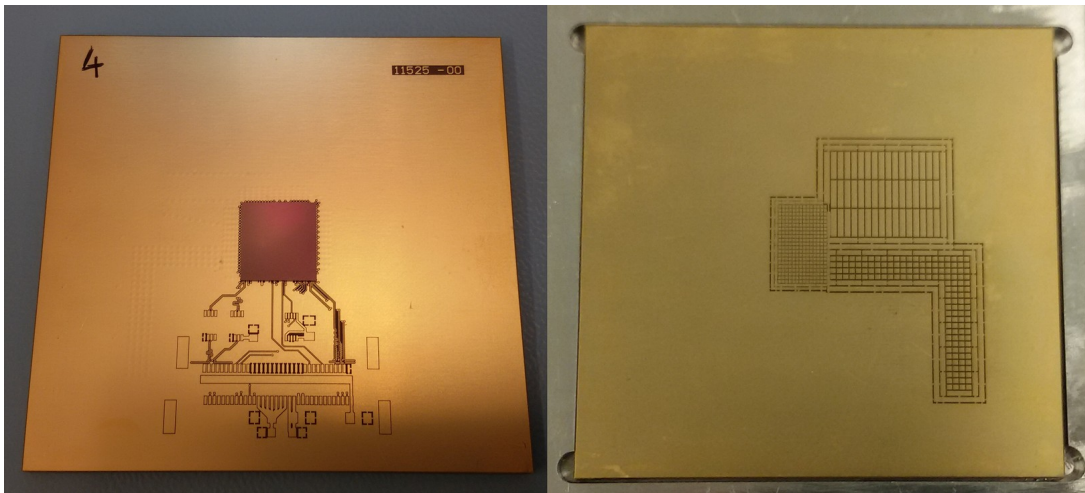
Bonding Strategy
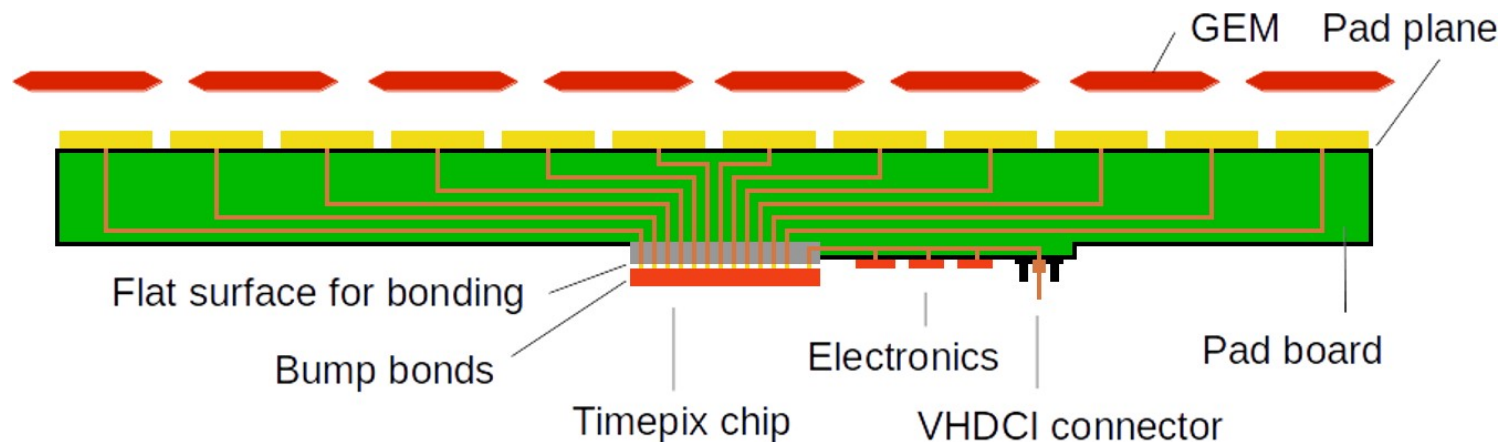
- 500 channels + 200 communications (3-fold redundant per pad) to be connected

- 1. Apply gold studs from 25 µm wire to PCB
  → rather feasible, but O(10) by-hand corrections to be done

- 2. Apply gold studs from 15 µm wire to Timepix
  → difficult to find correct parameters, optimise for bonding strength

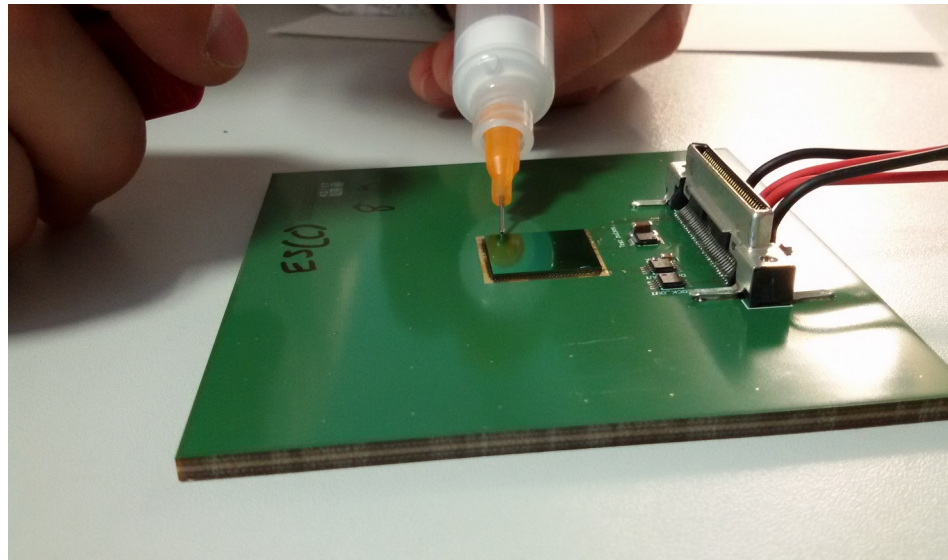- 3. Flip-chip in bonding maschine

# Bumping Maschine
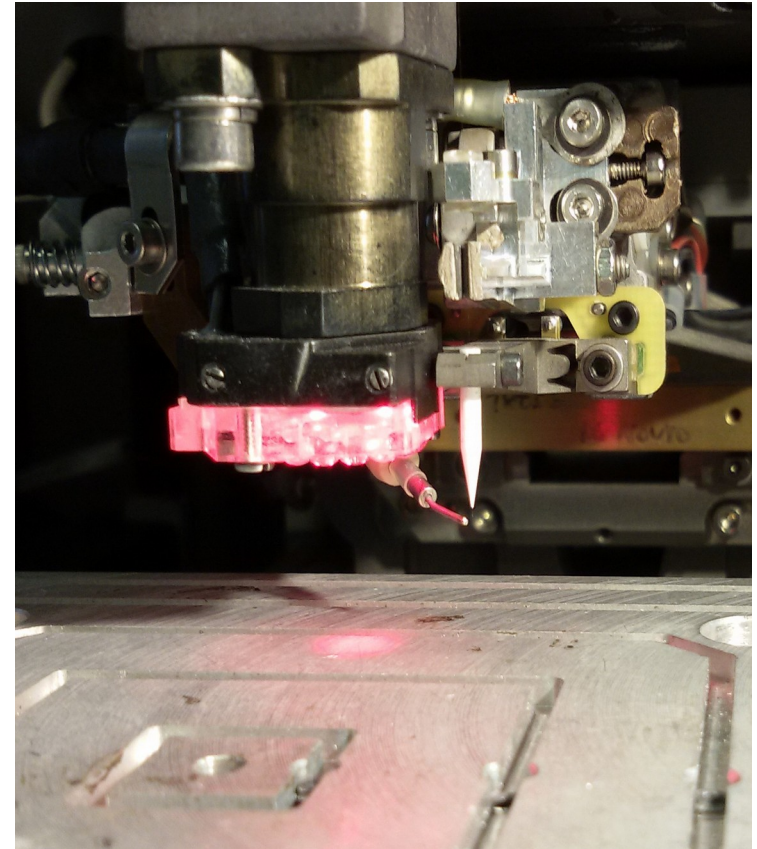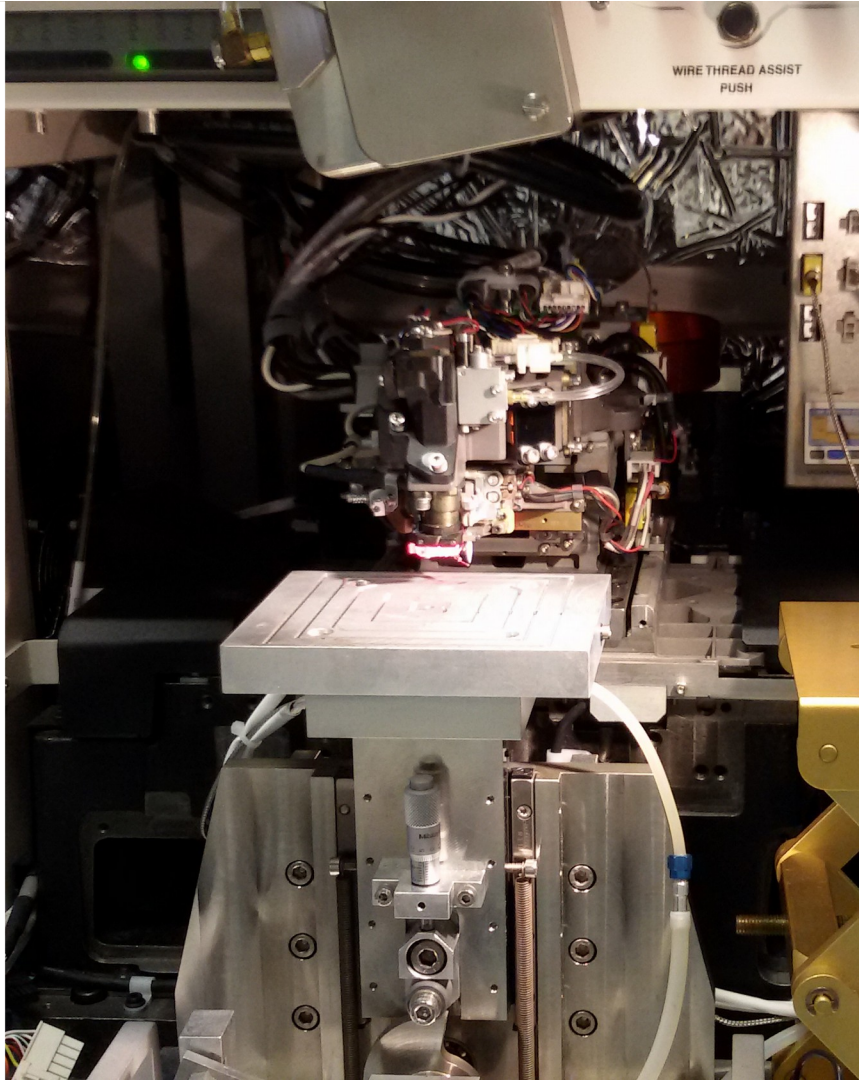
Bonding Maschine
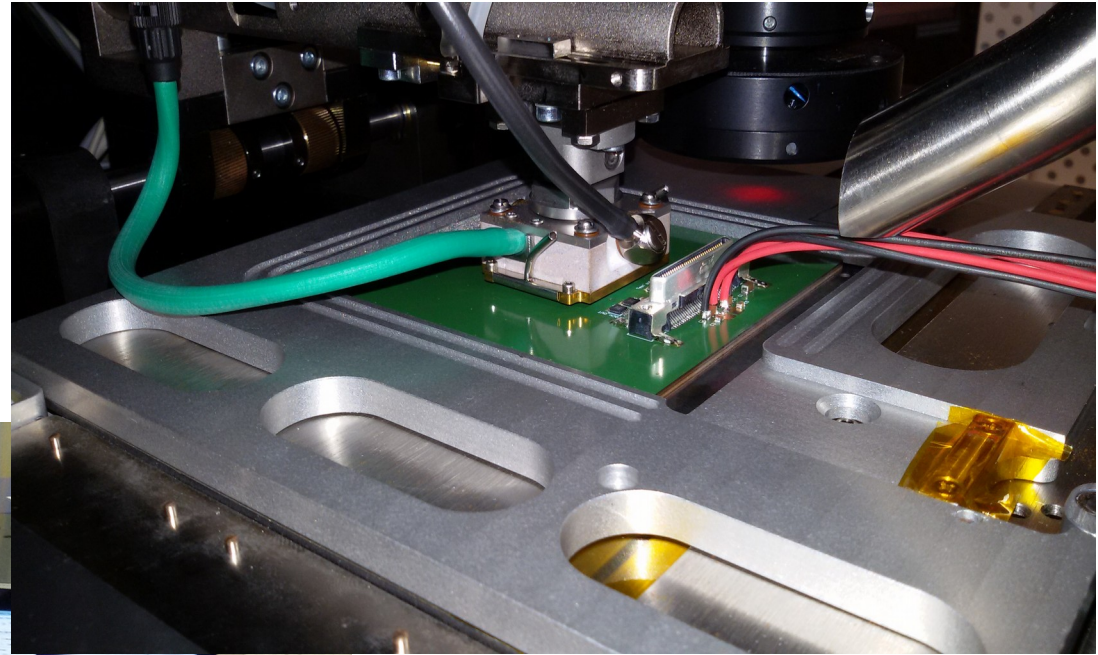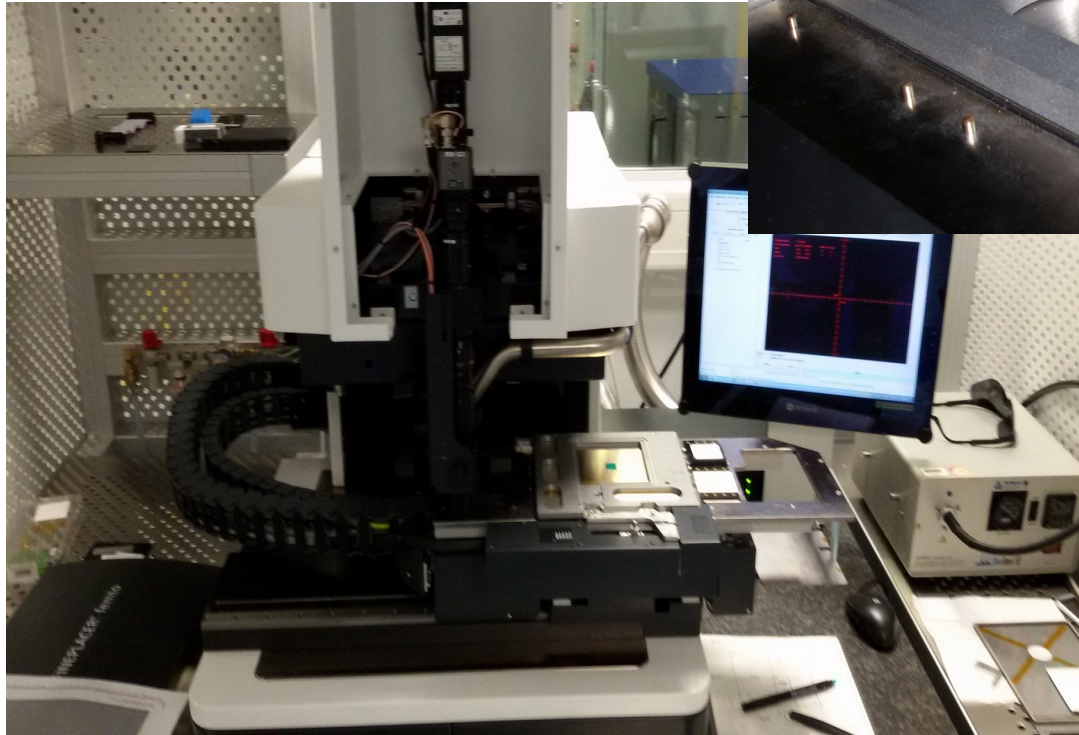
Results (so far)

- 7 boards bonded, 6 worked for at least some time, 3 worked in the end

- Data taken: 'threshold campaigns'
  → for different thresholds, runs with 100-200 frames

- Clear signs of temperature issue breaking connections

- Underfill applied to 3 boards for mechanical stability, now at DESY

To Do

- Want to take more data and test pulse data to estimate better the signal/noise

- Only use boards with active cooling: ASIC cooling blocks + fans to be placed on the Timepix backside
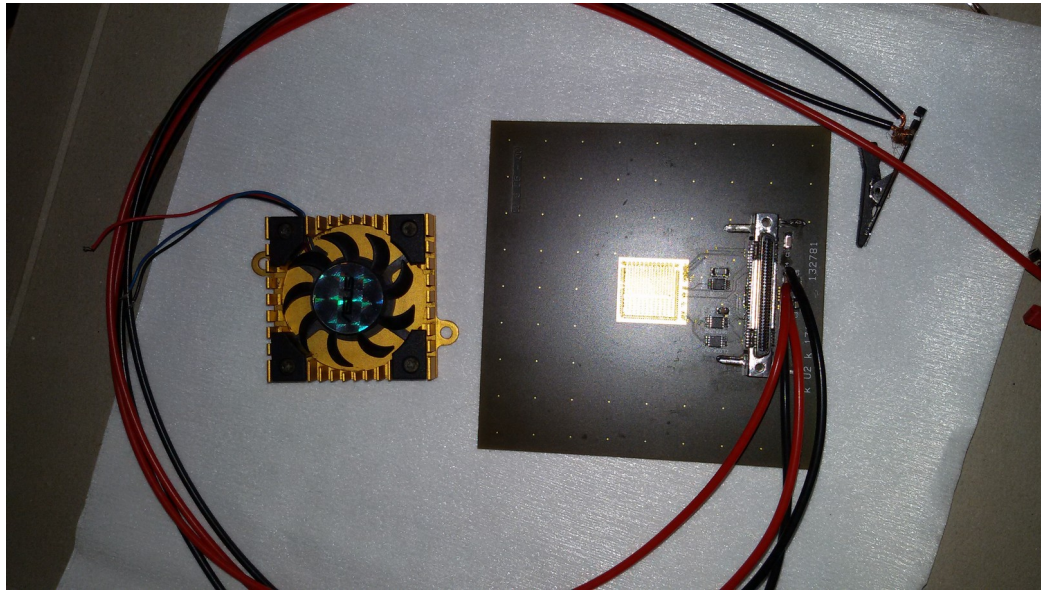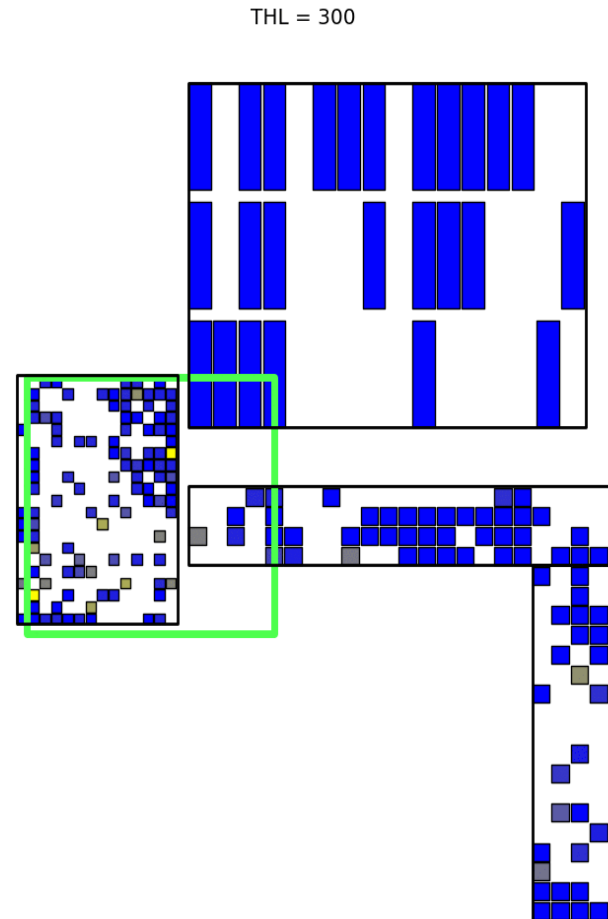
First look into the data

- Active pads in noise at different threshold levels

- Green: Timepix position

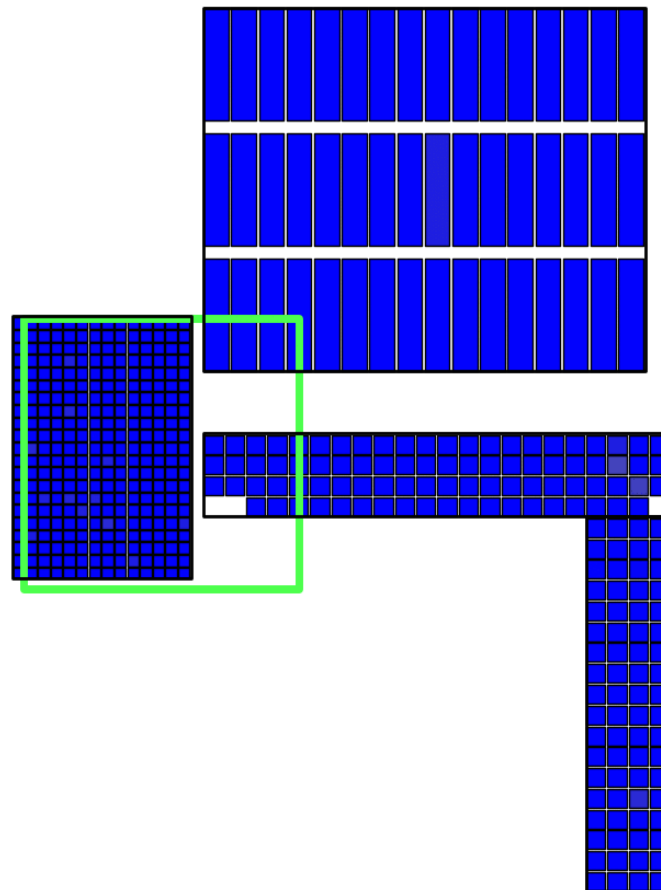- Noise should depend on pad size and line length

THL = 380
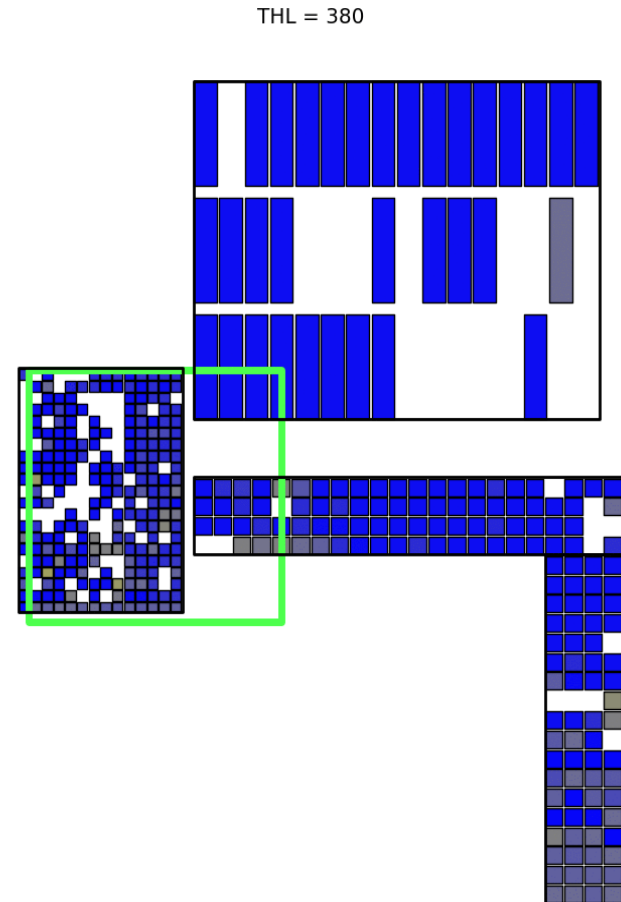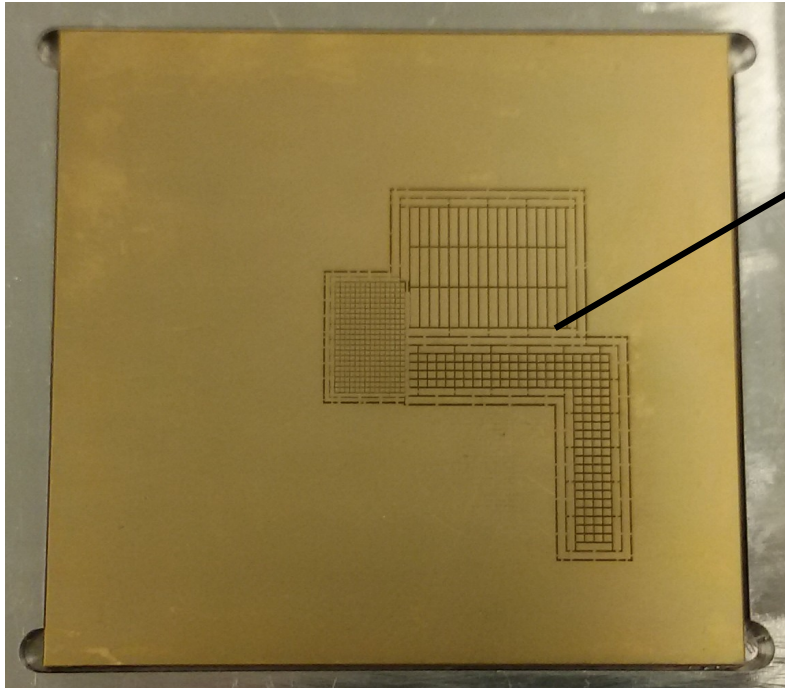
- Done for 3 different boards, not at the same thresholds

THL = 300

THL = 300

Many thanks to:

Michele Caselle
Markus Gruber
Patrick Pfistner and
Sumera Kousar!