Report from CNM activities

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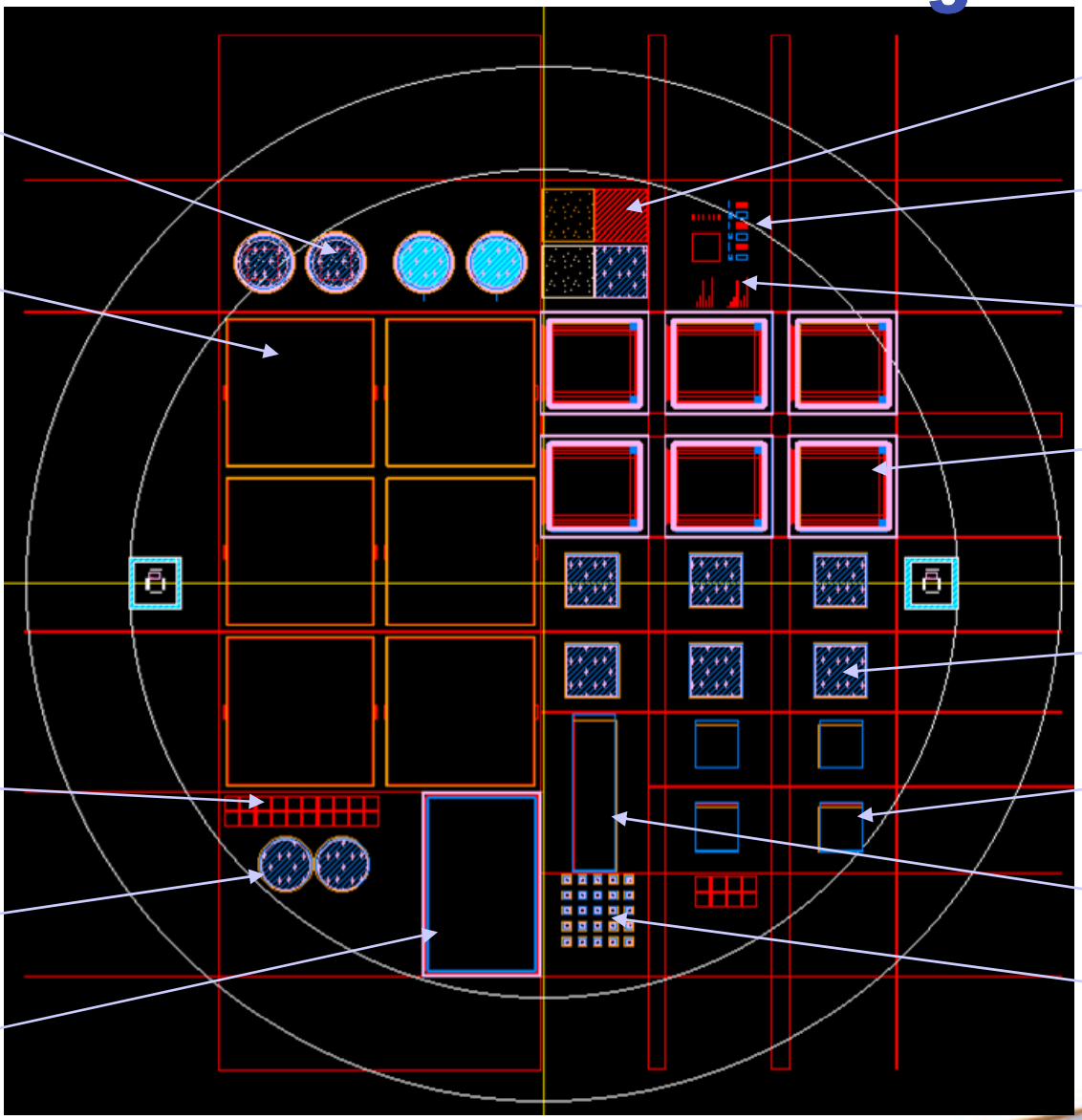
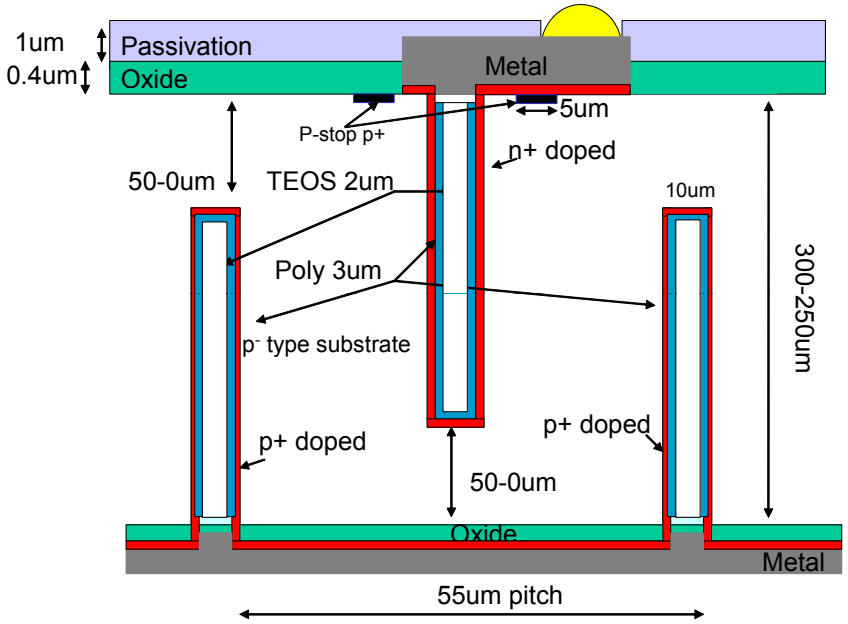
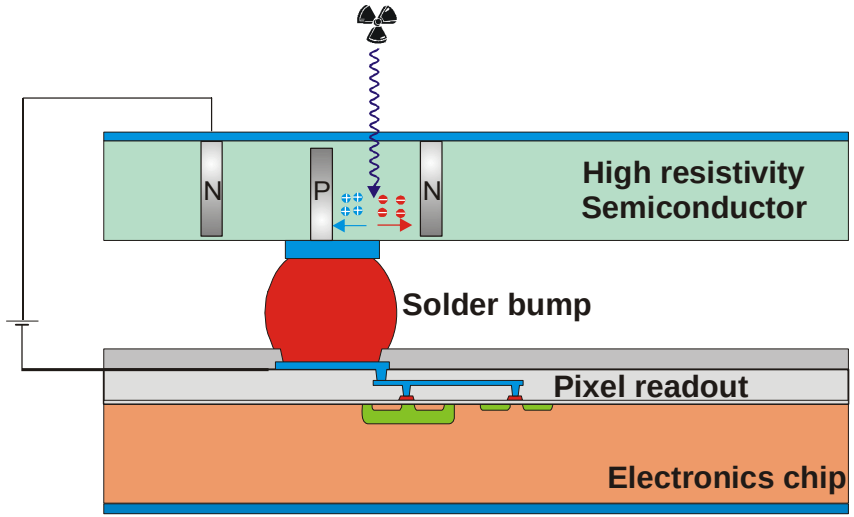
Mask design


Diodes 2D
Medipix2
Test for SEM
MOS
Pilatus
spreading
3x3 matrix
Test structures
Atlas pixel
3d pads
strips
Long strip
10x10 matrix

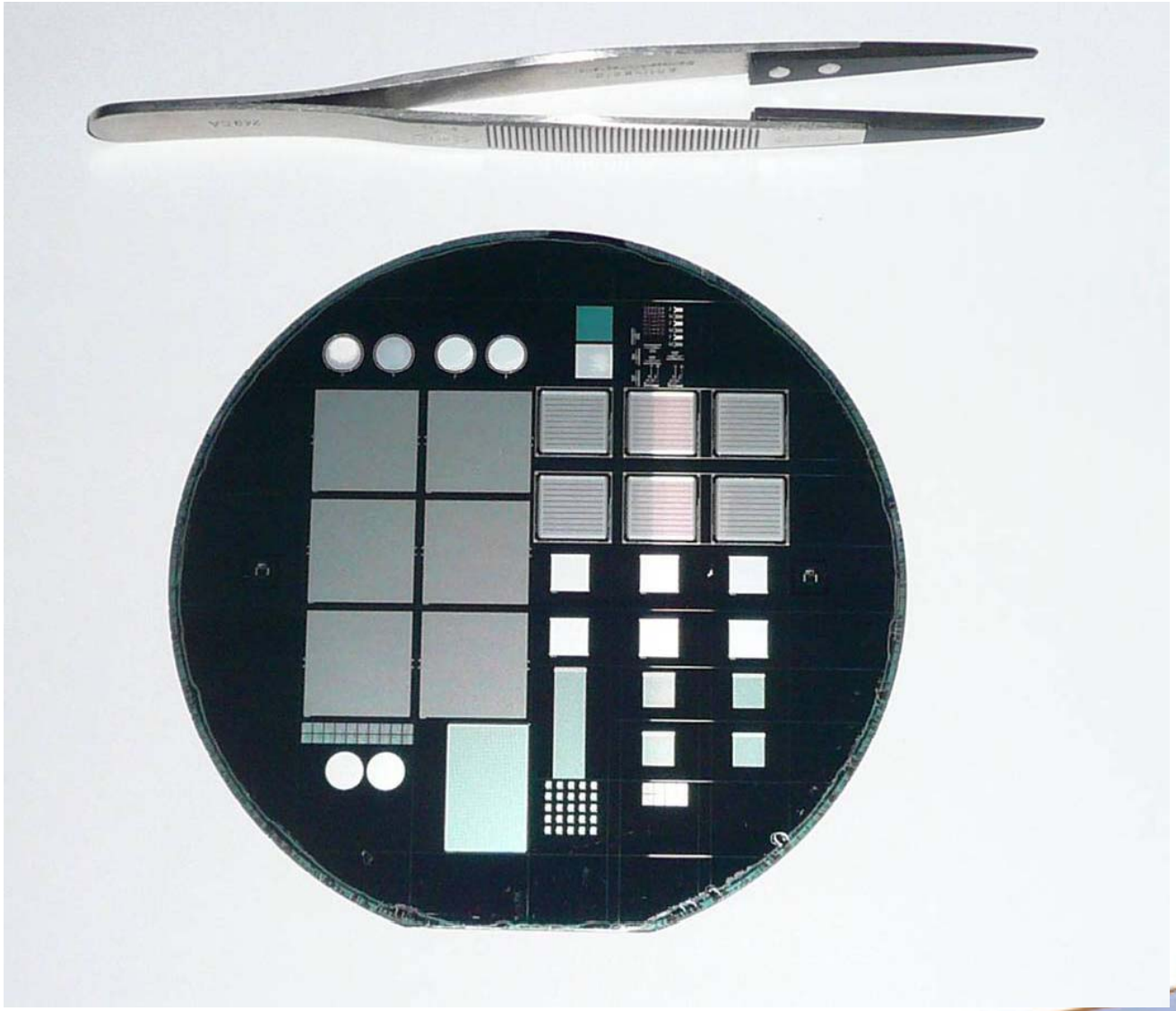
Layout





- 3 detectors have been bump bonded in VTT to a Medipix2 chip.
- 3 more to do.
- Strip detectors irradiated with neutrons: fluence 5E15 cm^{-2}

Fabricated detectors



Double sided 3D

First run is p-in-n:

- 250 μm p+ columns in 300 μm n-type substrate

Electrode fabrication:

1. **ICP etching of the holes: Bosch process, ALCATEL 601-E**
2. **Holes partially filled with 3 μm LPCVD poly**
3. **Doping with P or B**
4. **Holes passivated SiO_2**

(all fabrication done in-house)

-Deep RIE-ICP.

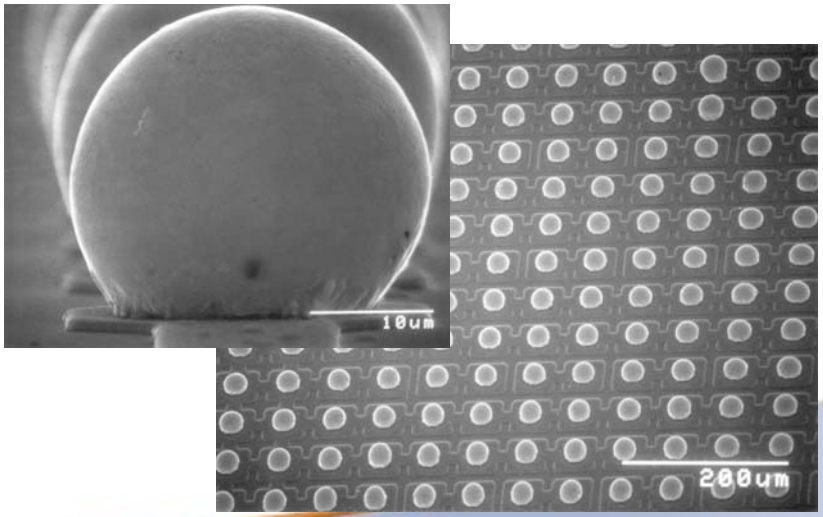
- Load-lock manual one 4" wafer
- SF_6 etching
- C_4F_8 passivation
- Cooled mechanical clamping :He-Ln2
- Possibility of Cryogenic etching.

Bump bonding at CNM

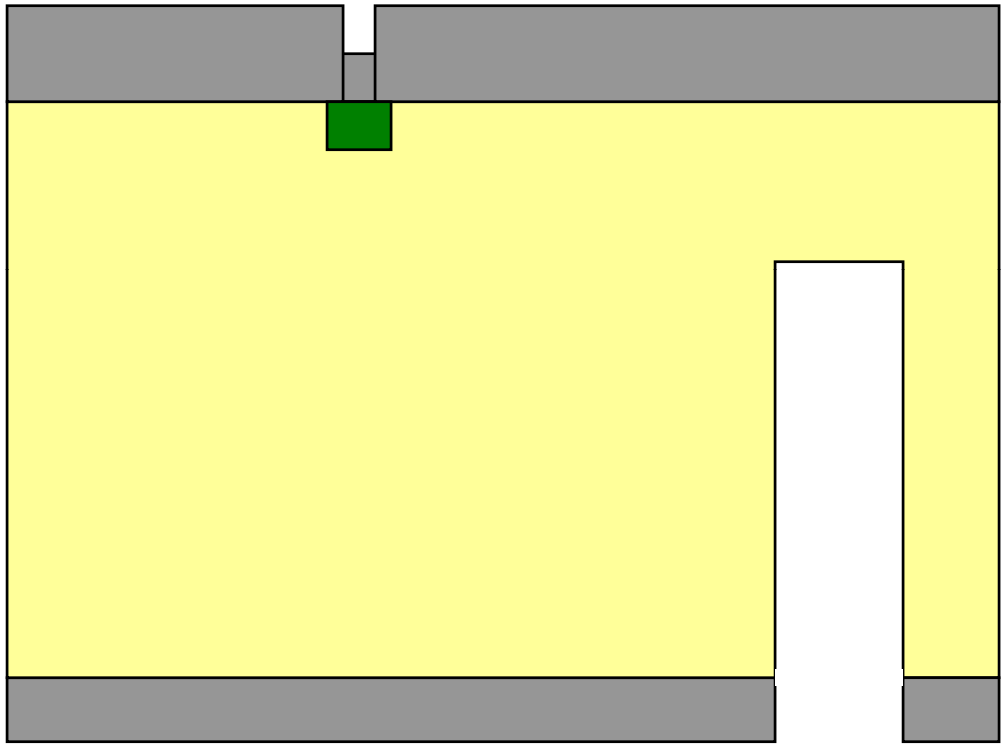
- Small clean room class 100 at CNM dedicated to packaging: Flip chip, Wire bonding, CMP
- Joint project with IFAE (High Energy Physics Institute)
- Bump bonding machine Süss Microtech FC150

Installation finished last month, in operation.

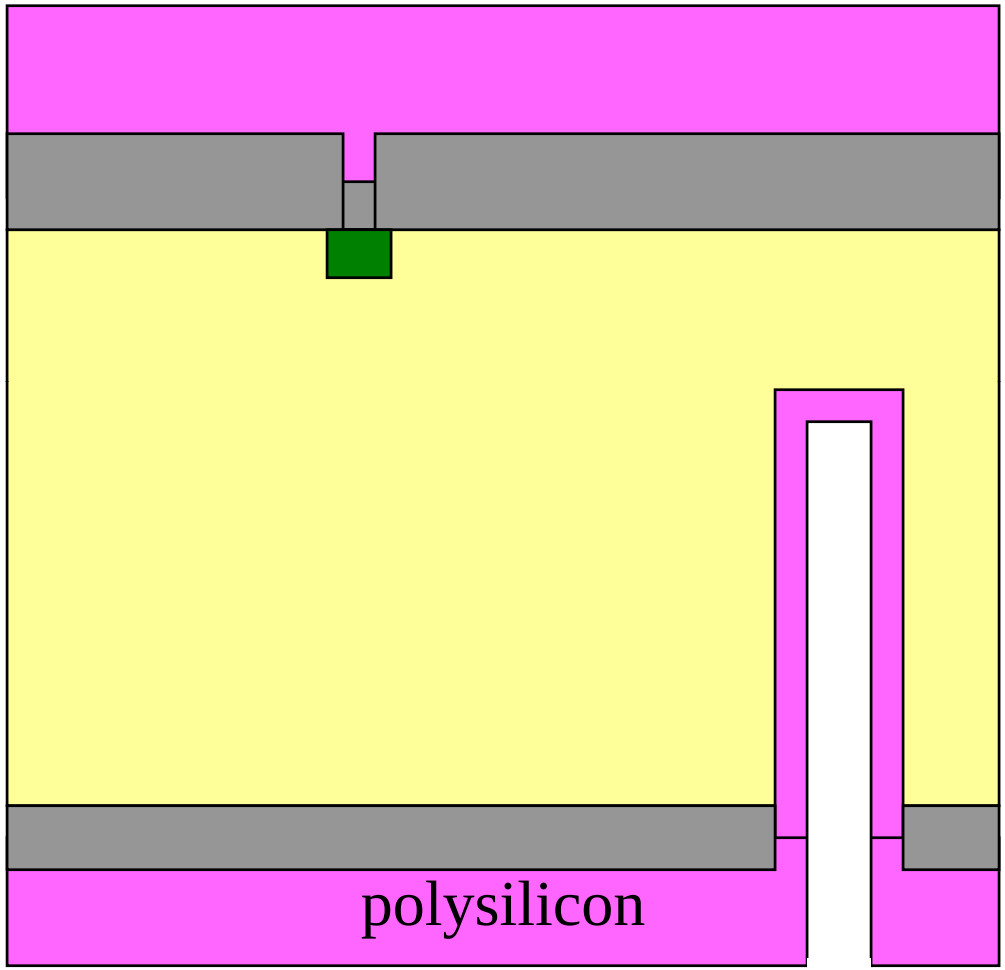
- Bumping process ready: electrodeposited SnPb and SnAg
- CMP G&P POLI-400L (Installation pending)



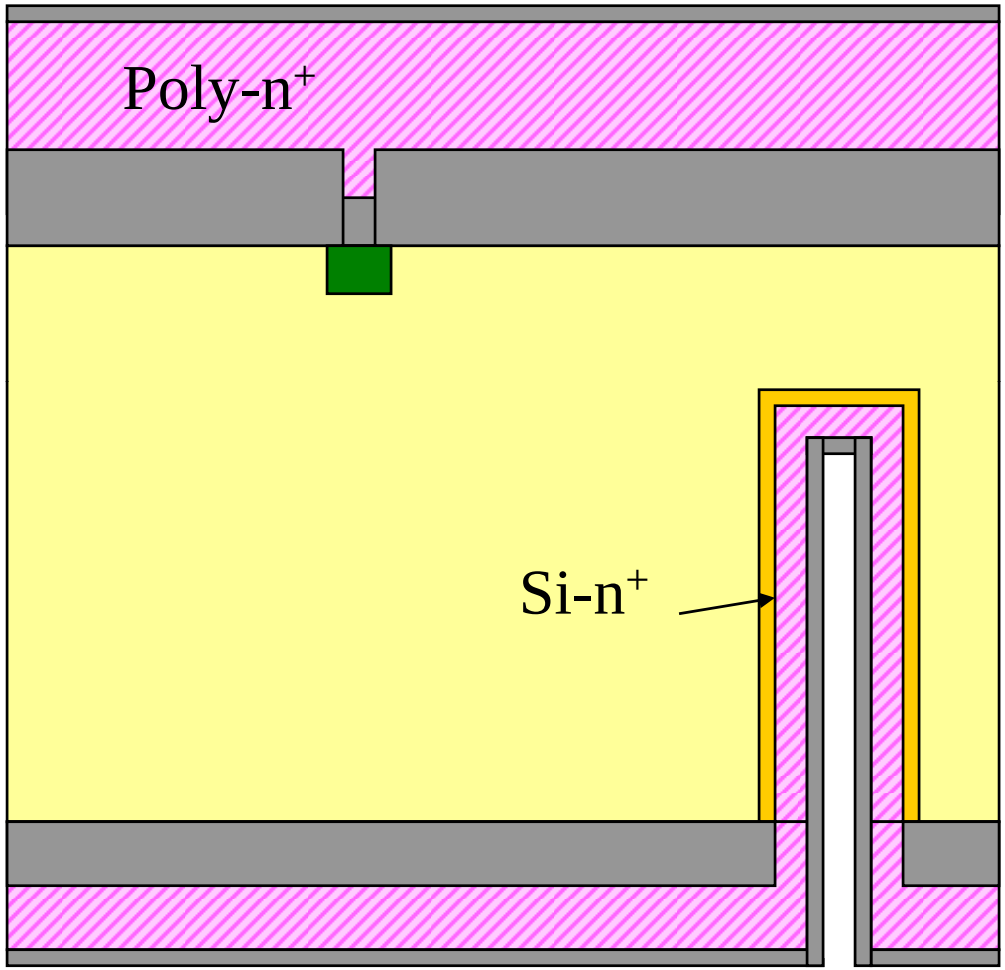
Holes etching



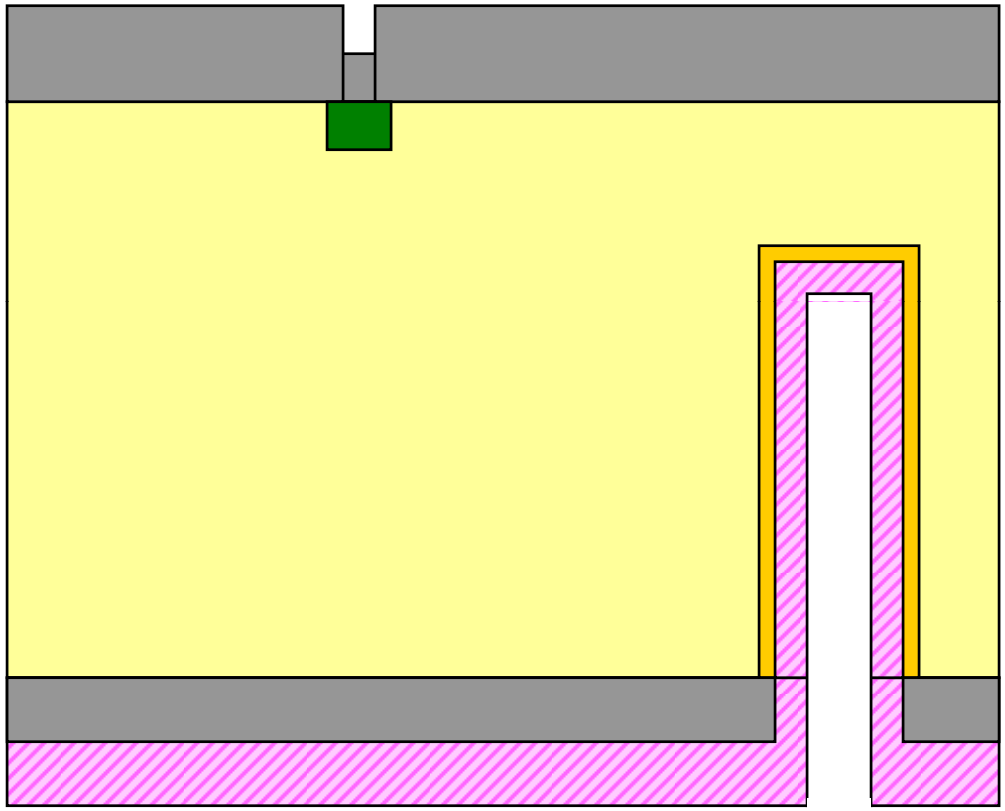
Poly filling



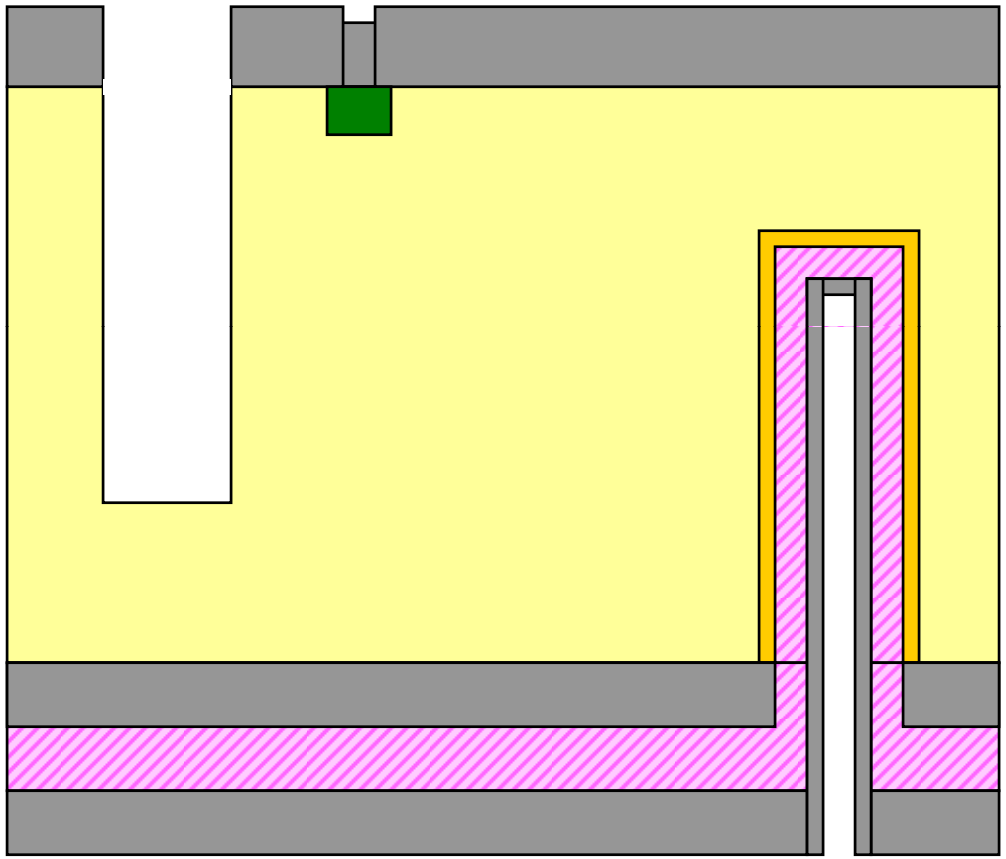
Doping of poly



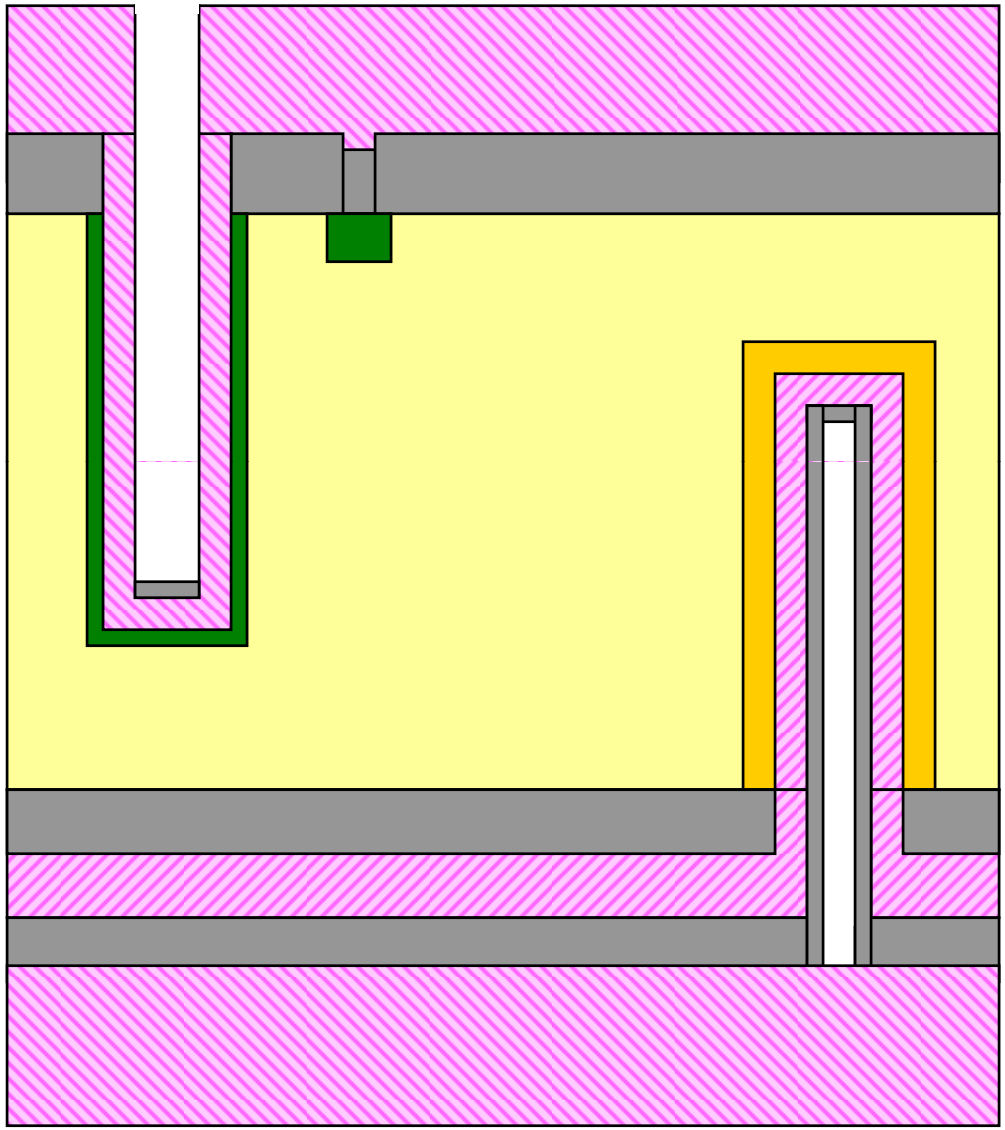
Poly etching



Second etching



Second poly filling



Final sample

Si-n^-

Si-p^+

Si-n^+

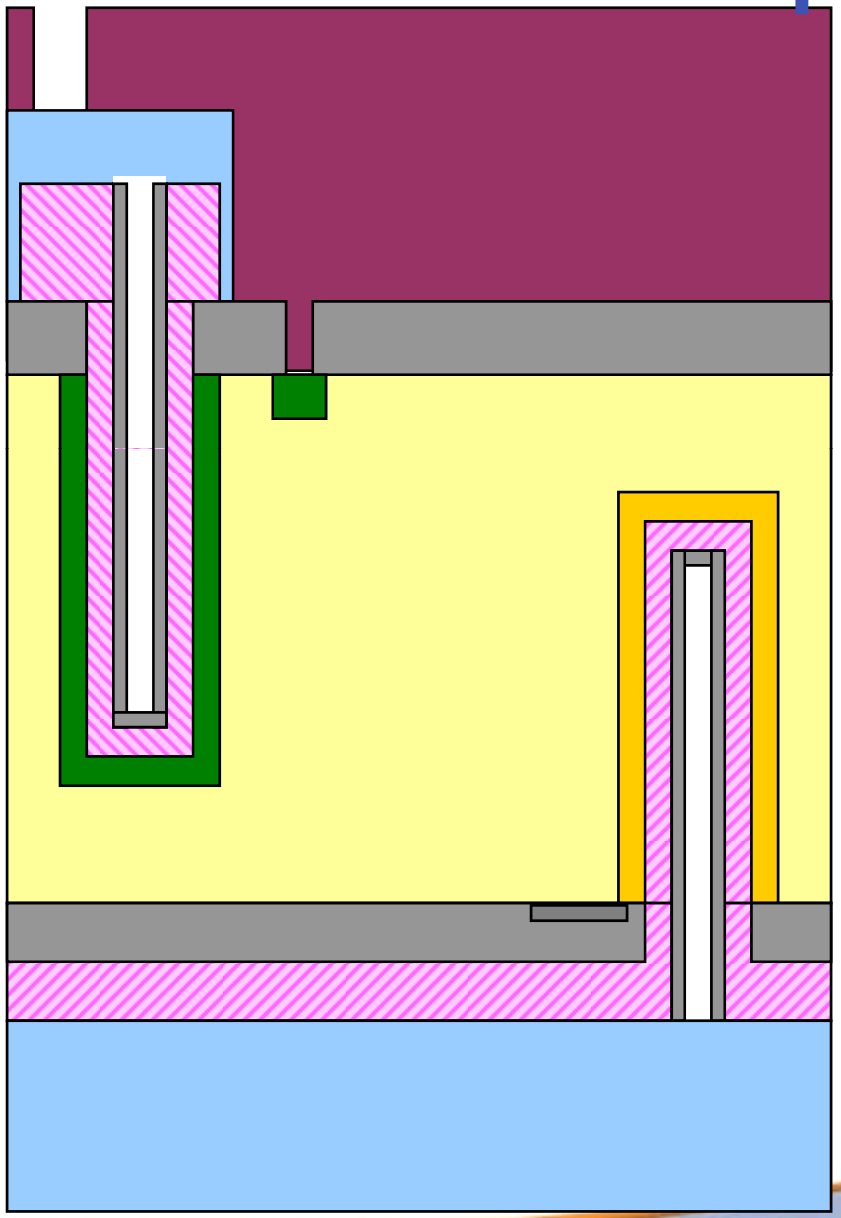
SiO2

Poly-p^+

Poly-n^+

Al/Cu

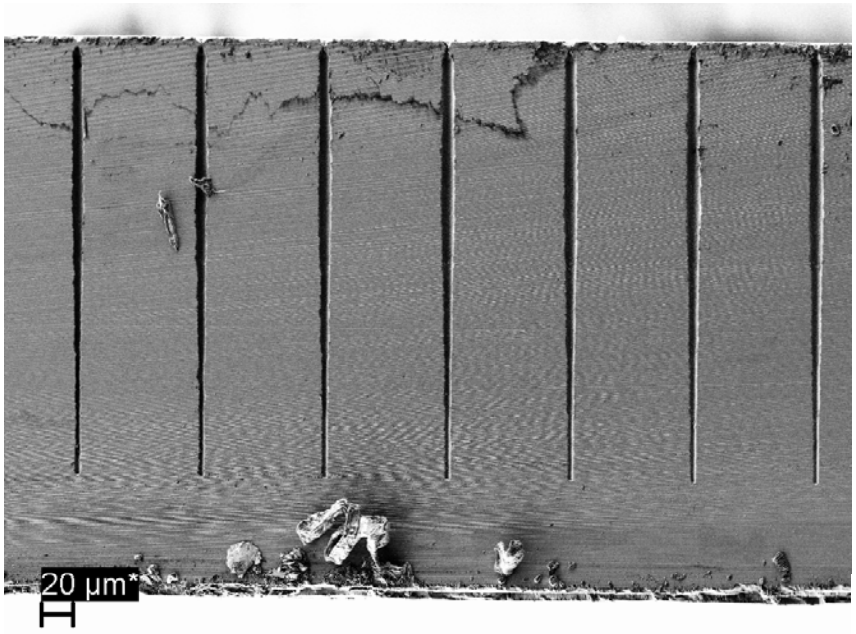
Passiv

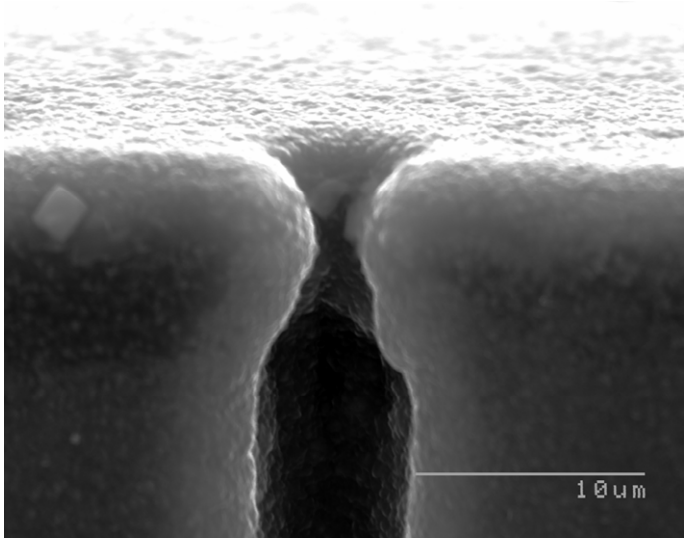


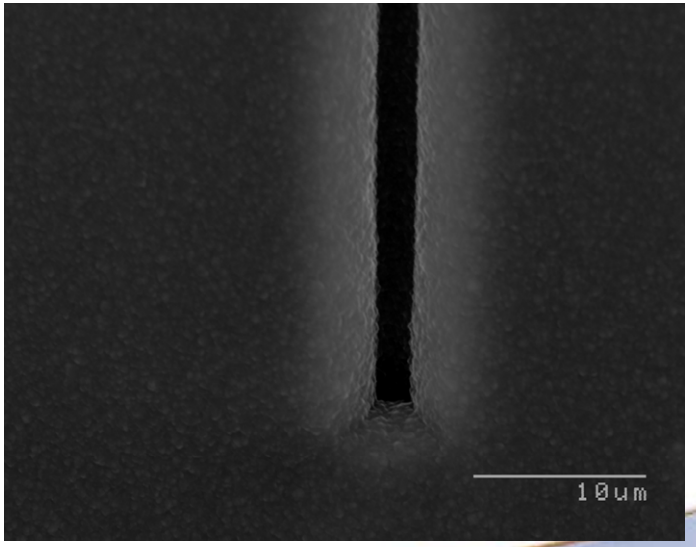
Mask Levels

- Back-window
- N-DIFF
- N-HOLES
- P-HOLES
- POLY
- WINDOW
- METAL
- PASSIV
- Bump bonding

3D technology

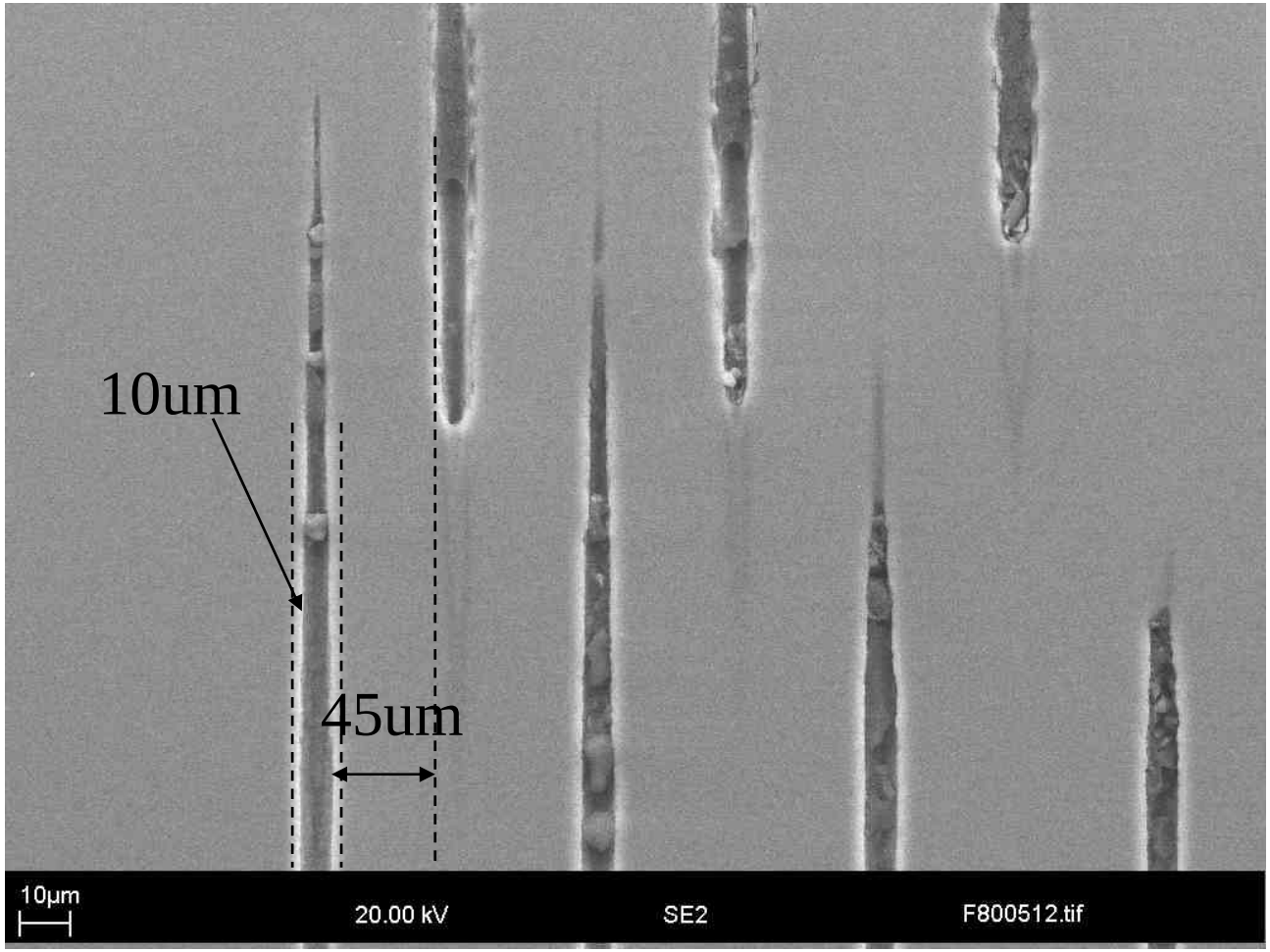






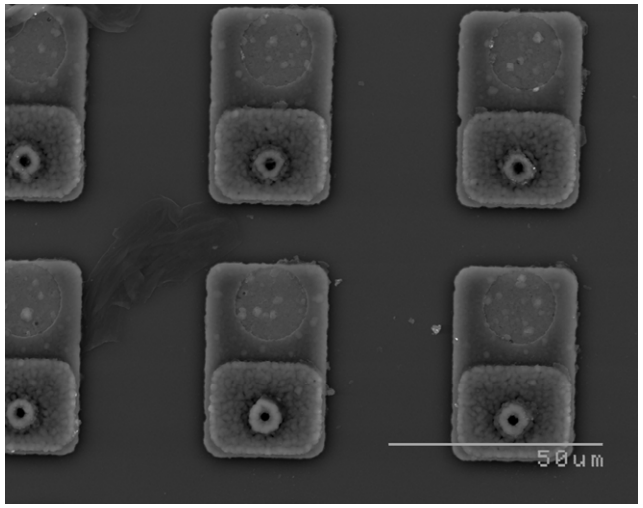
- 10 µm holes
- 55µm pitch
- 90 minutes etching
- 300 µm thick wafer
- Aspect ratio 24:1

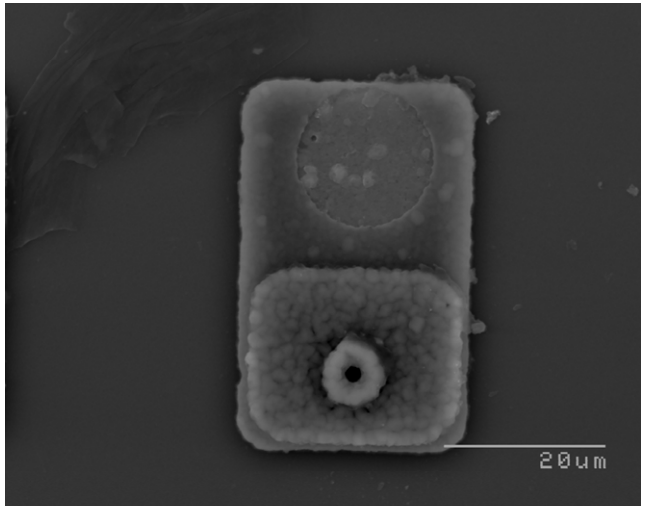
3D technology



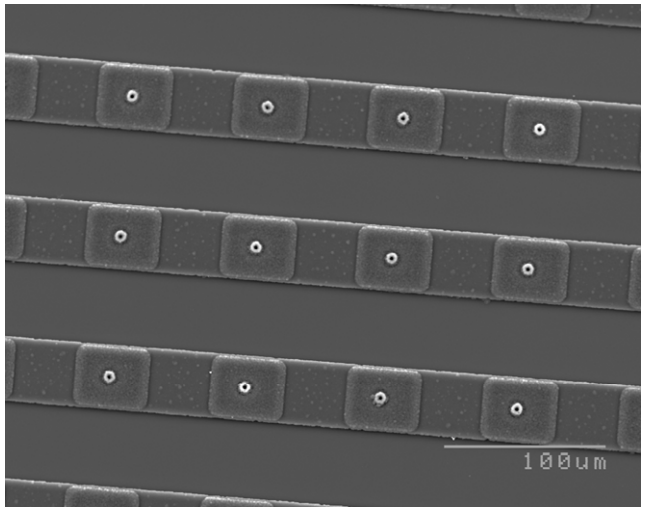
3D technology

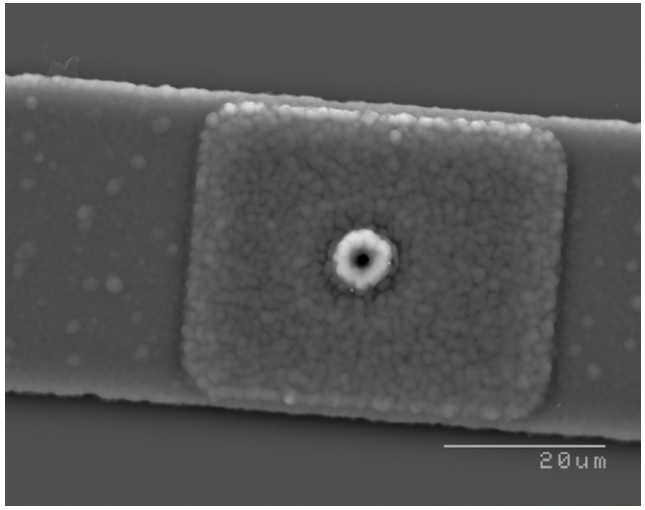
pixels



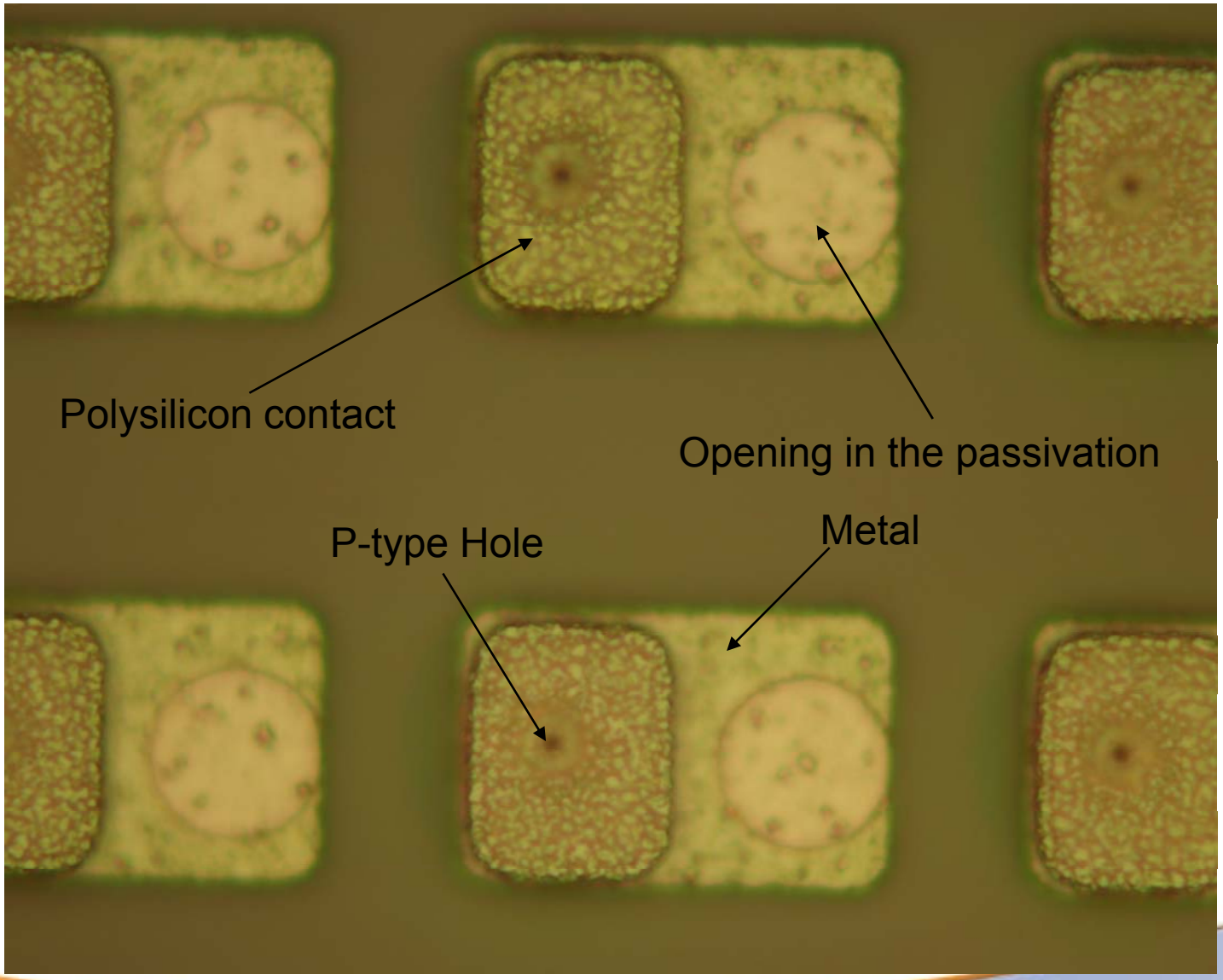


strips

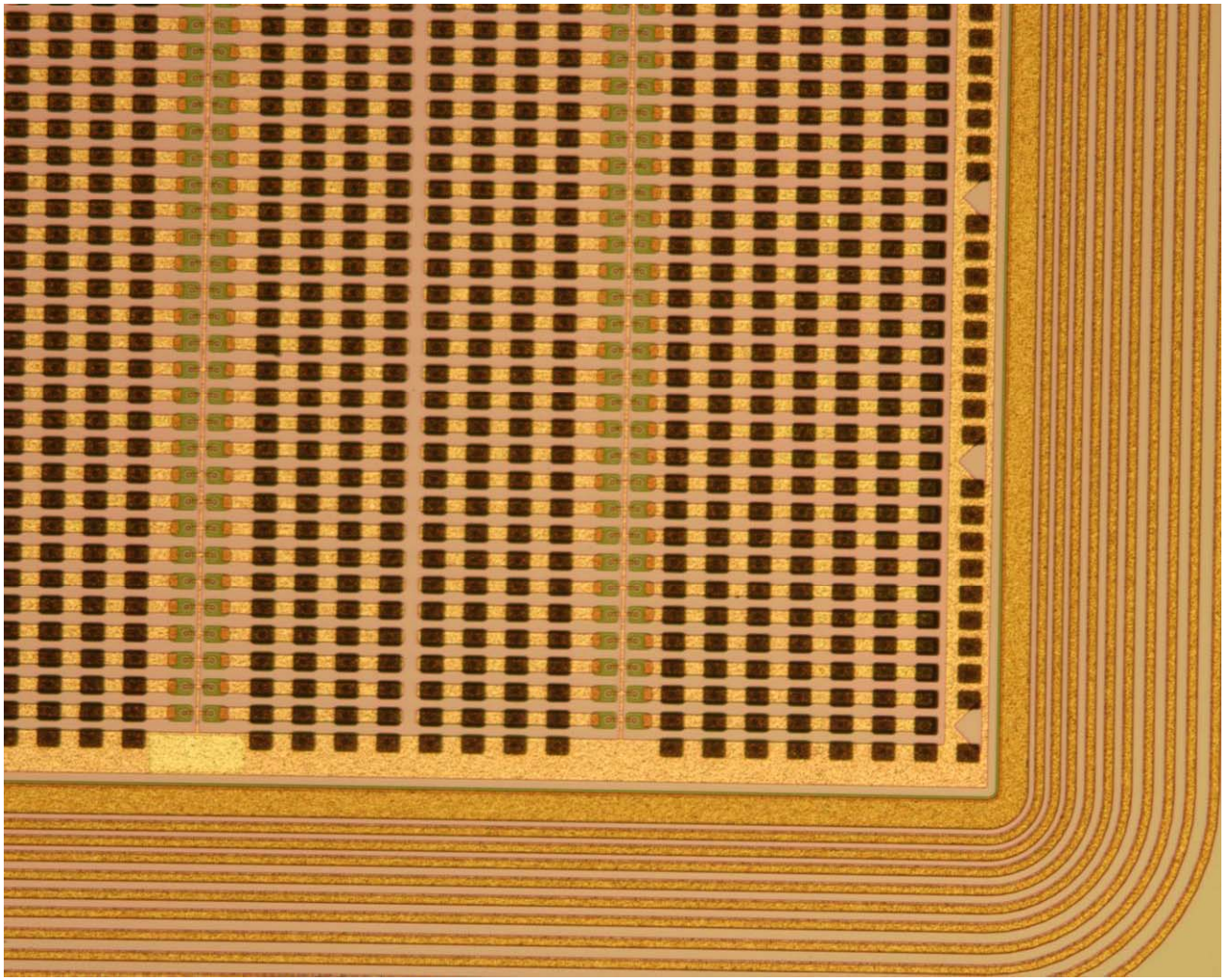




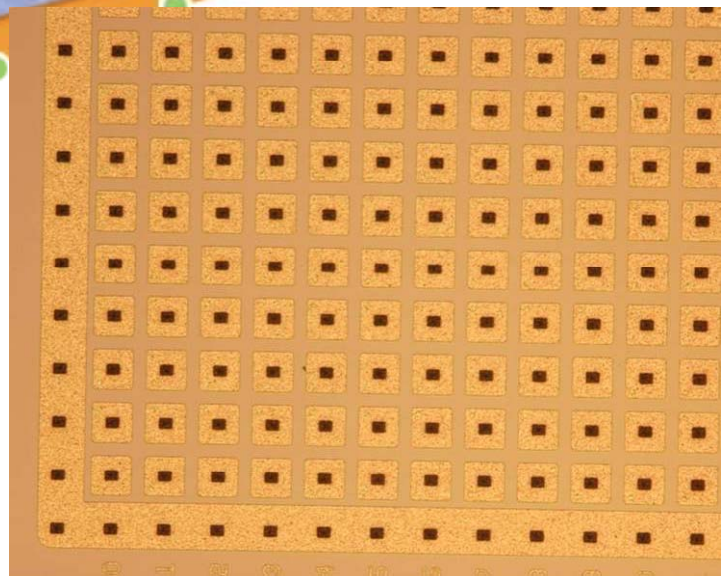
Pixel configuration



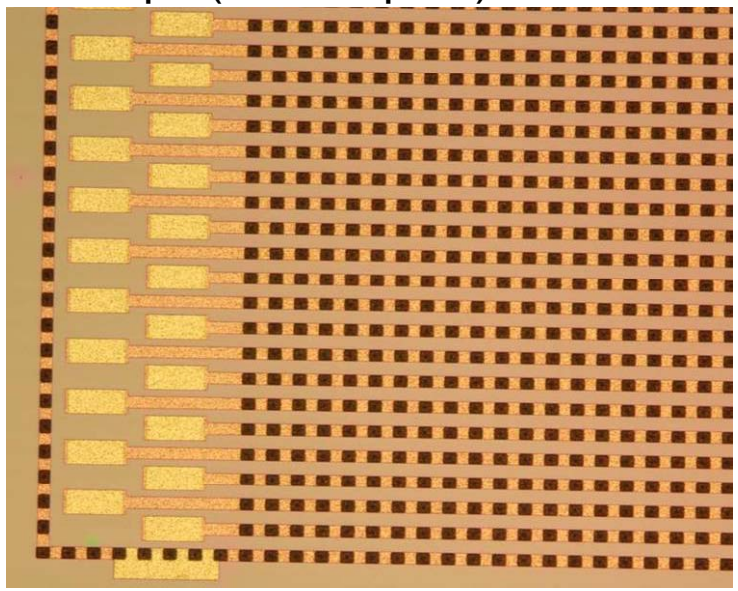
Atlas pixels



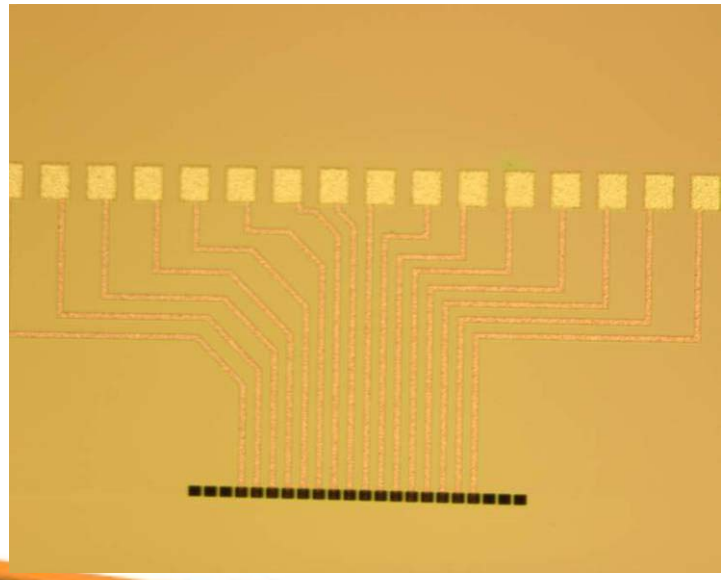
Pilatus

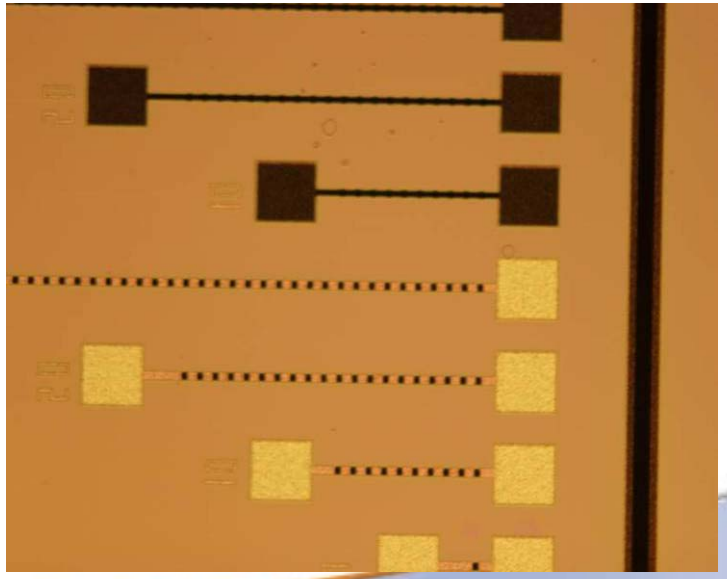


Strips (DC coupled)

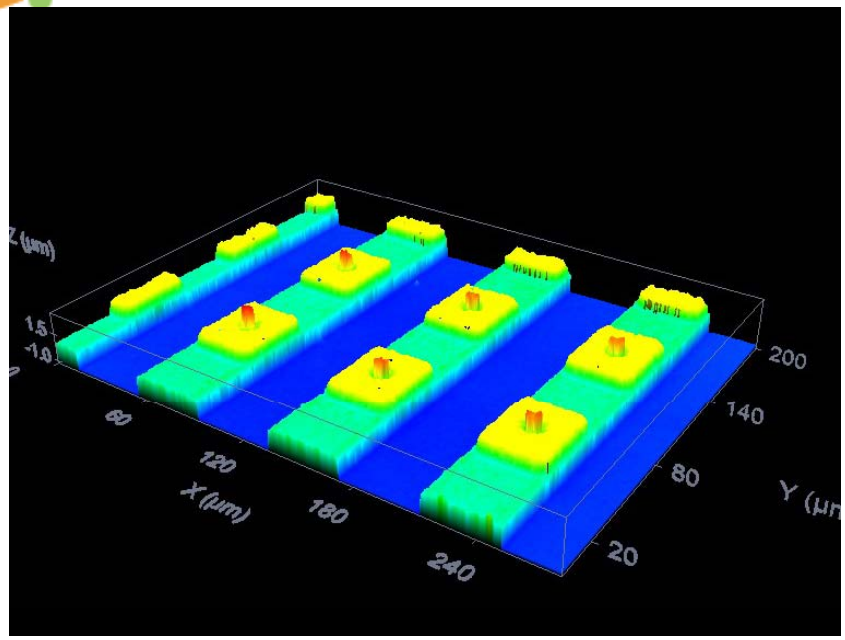


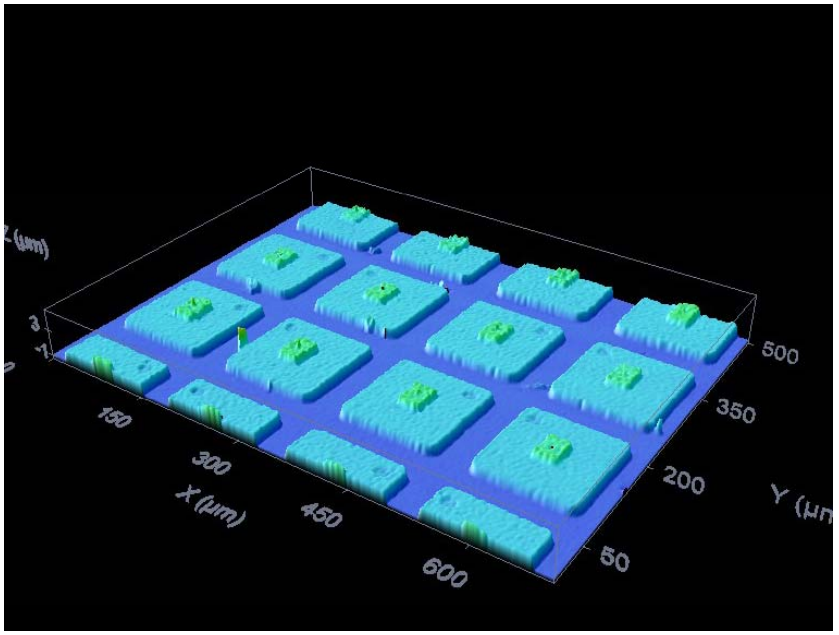
Test structures





Optical Profiler





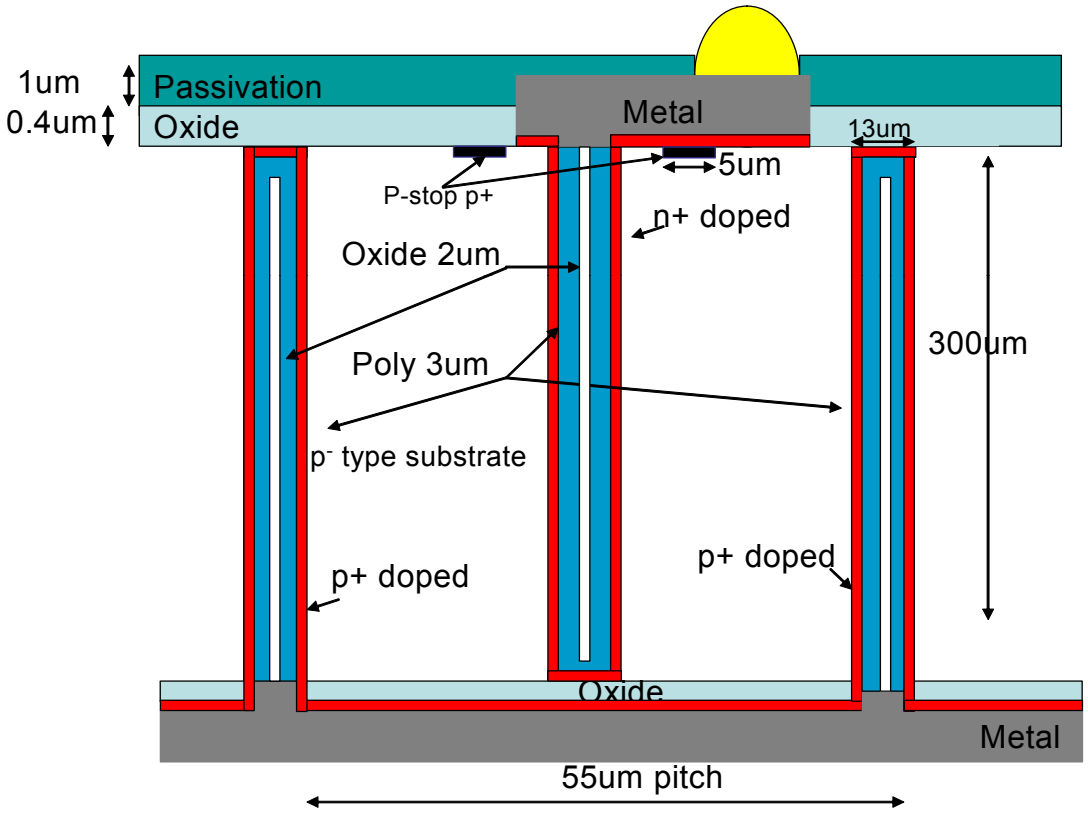
Total bending: in strip detector we measured a curvature of 0.6um
In Pixel detector VTT measured a bending of 3 um.

Testing

- Charge Collection Efficiency
- Electrical characterization
- Imaging with Medipix2 chip
- Irradiation with neutrons

please see Chris Parkes´ talk

New Fabrication Run



8 wafers p-type
8 wafers n-type

In Fabrication, due for the end of June 2008

Thank you