

RD50 funding request

Fabrication and testing of new AC coupled 3D stripixel detectors

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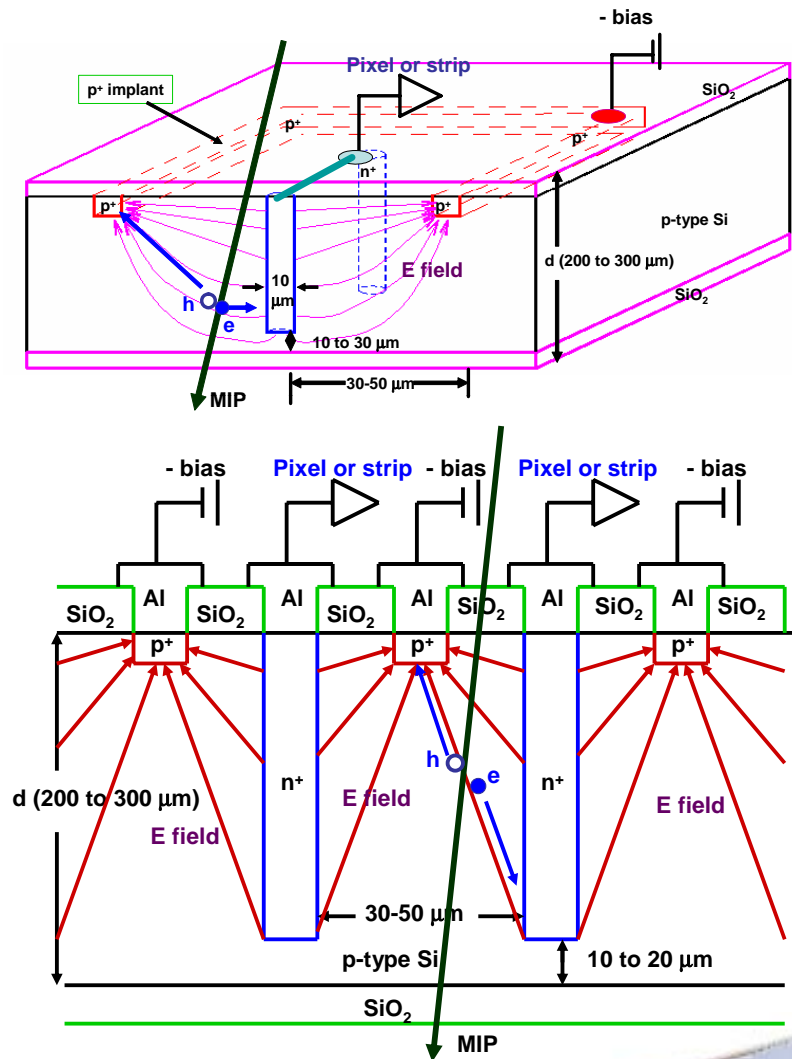


Layout

- Planar + 3d (we call it P+3d) processing technology
- 1-column etching and doping possible
- True single sided processing
- Pixel, strip, and 2d stripixel configurations possible depending on electrode connections
- No column filling
- No support wafer

Advantages:

- Edgeless technology
- Radiation hardness
- 2D read out from the same side



Workplan

- 4rt quarter2008 – Simulation and optimization of termination structures (BNL)
- 1st quarter2009 Mask structure design and fabrication (BNL, CNM, Glasgow)
- 2nd quarter 2009 – Device fabrication, etching and polysilicon filling (CNM)
- 3rd quarter 2009 – device fabrication at (BNL/CNM)
- 4rt quarter 2009 – first tests of simple devices (Glasgow and Valencia)
- 1st quarter 2010 – irradiation of devices (Glasgow/Valencia)
- 2nd Summer2010 –Test of simple devices after irradiation
- 3rd quarter 2010 - full strip detector tests with Alibava system (Glasgow,) Valencia

2 years project

Cost of the project

The total project costs are 32000CHF as detailed:

- Wafers : 2000 CHF
- 20 wafers at a unit price of 100 CHF
- Mask Production : 10000CHF
- Fabrication of 10 p-type wafers: 10000CHF
- Fabrication of 10 n-type wafers: 10000CHF

Request to RD50: *20000CHF*

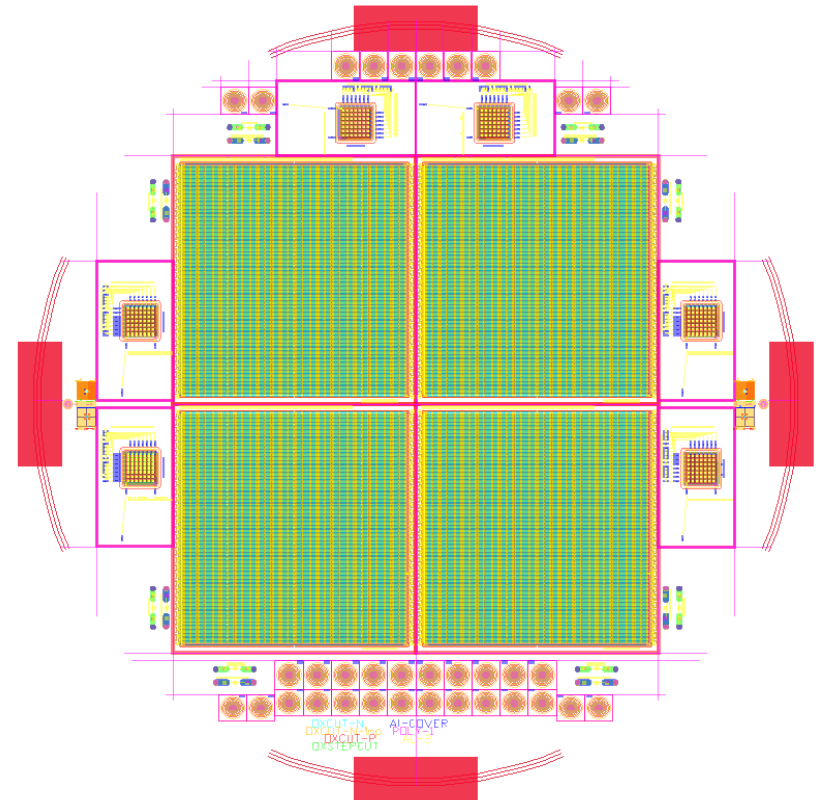
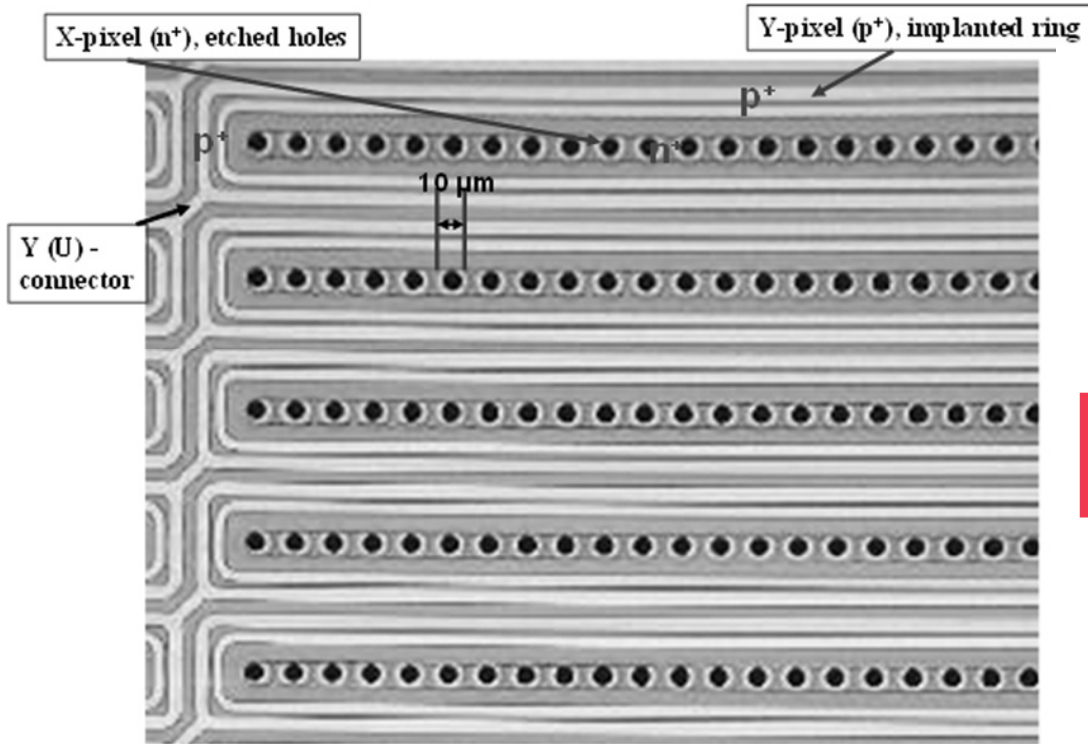
Total project cost: *32000CHF*

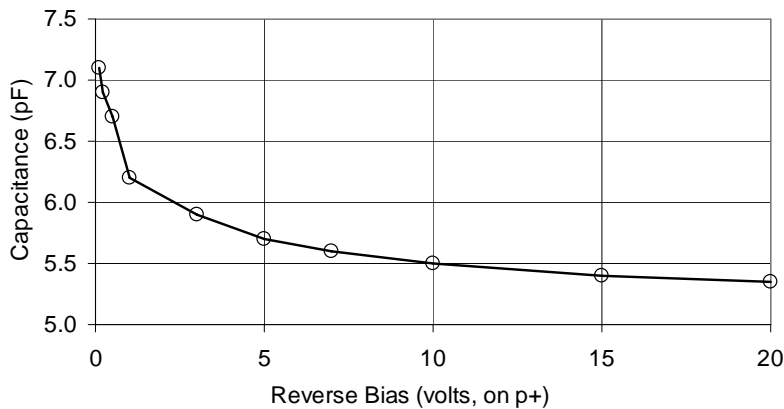
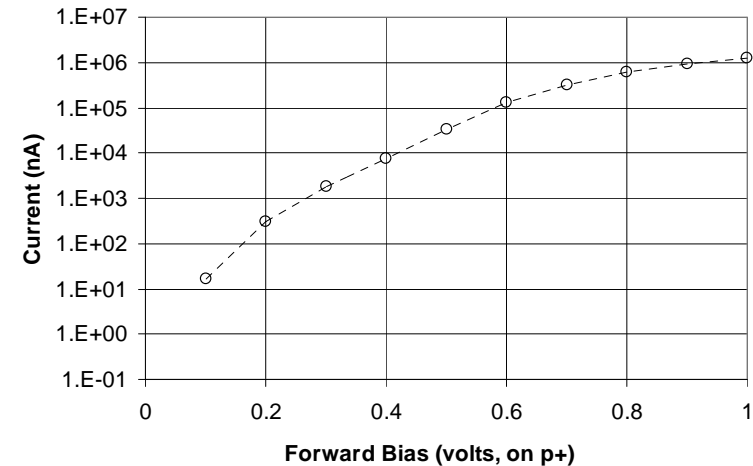
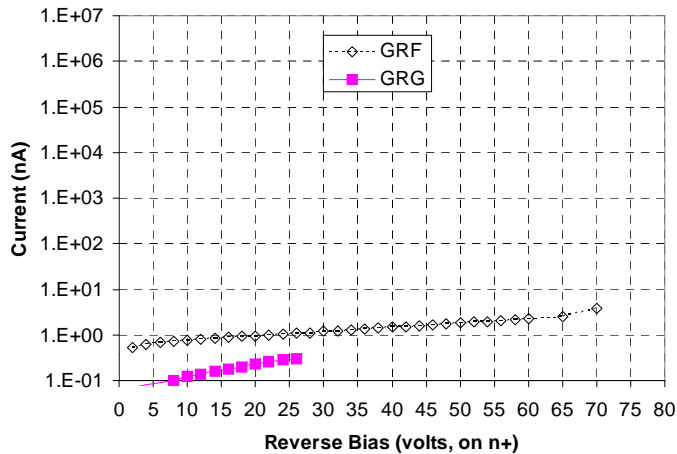
Mask layers

1. P-Diff: p+ stops
2. N-Diff :used to cut oxide for n+ implant
3. Holes-p: used to cut oxide for n+ hole etching
4. Poly : to define the poly layer
5. Window: cut vias for Al contacts
6. Metal: 1st Al layer for contacts
7. Via: polyimide layer for insulation between 1st and 2nd Al
8. Metal2: 2nd Al layer for interconnects

First fabrication run

n^+ columns: 10 μm diameter, 240 μm deep (300 μm thickness)

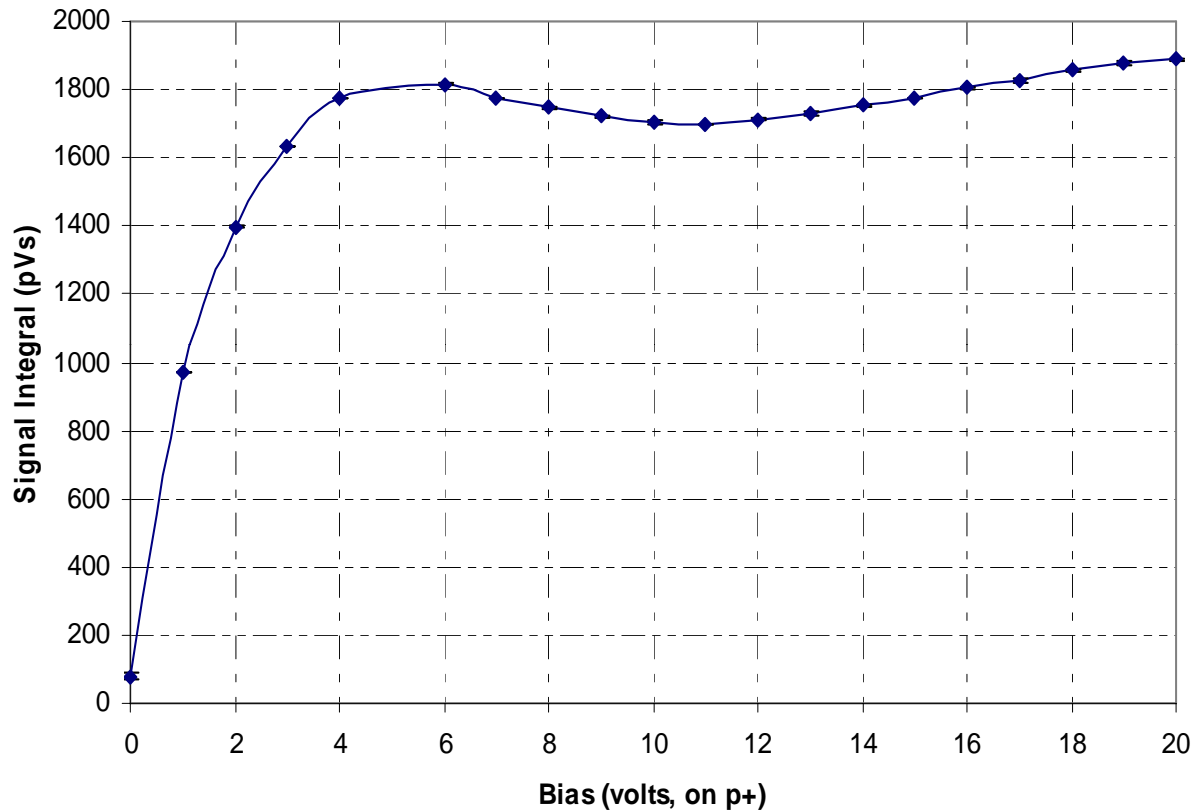




However: early breakdown may be due to p-stop no optimized, simulation needed

Fully depleted at about 10-15 volts

(Backside floating with SiO2 coverage)



- Biasing all Y p⁺ strips negative
- The signal corresponds to the X n⁺ holes

Laser properties:

- $\lambda = 1060$ nm (Near Infrared)
- Laser energy of photons = 1.170 eV