Plans for the GridPix Modules

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Bonn, Nikhef and Siegen

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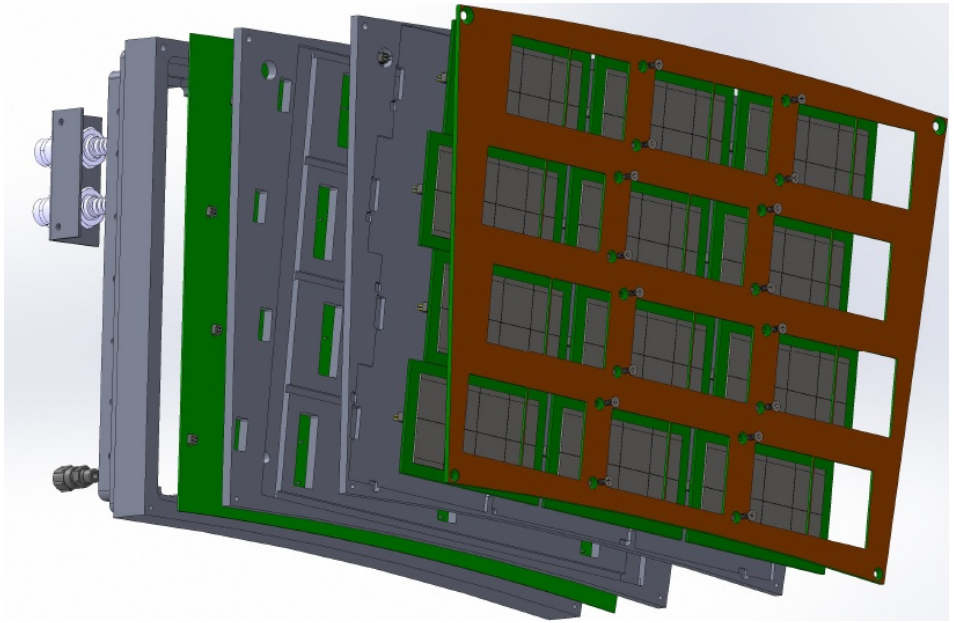
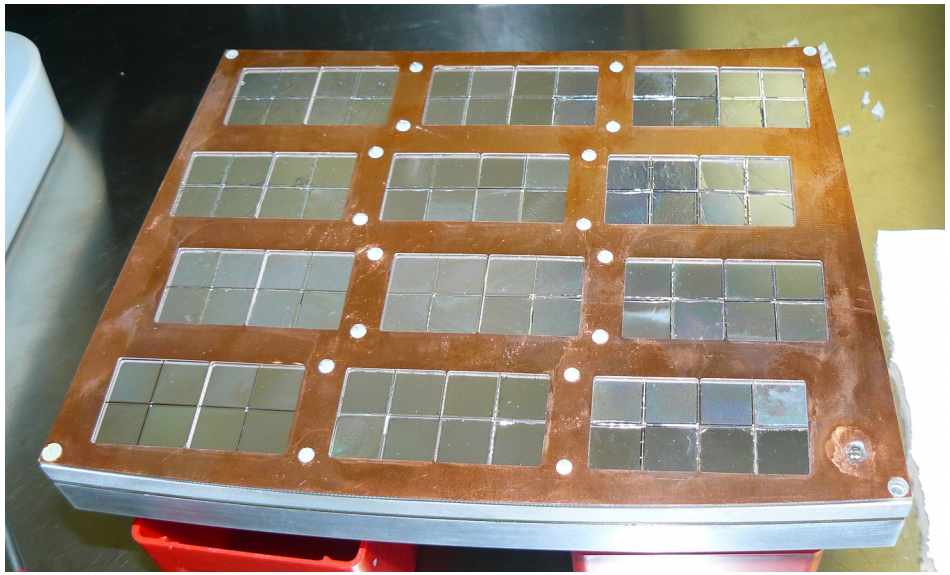
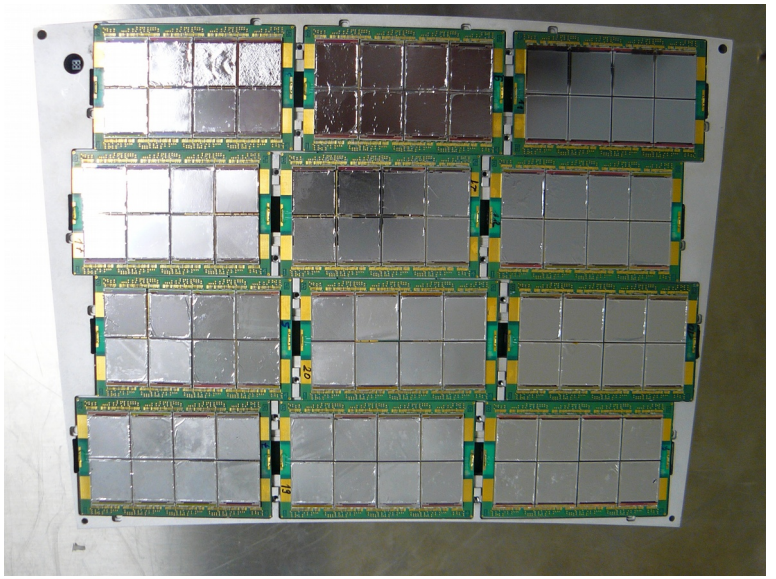
Module with 96 GridPixes



Current module has not foreseen a gating GEM:
- module height is 45 mm already
- no additional HV feed throughs
- no space at the boarders.

→ rather difficult. Several parts would have to be rebuilt.





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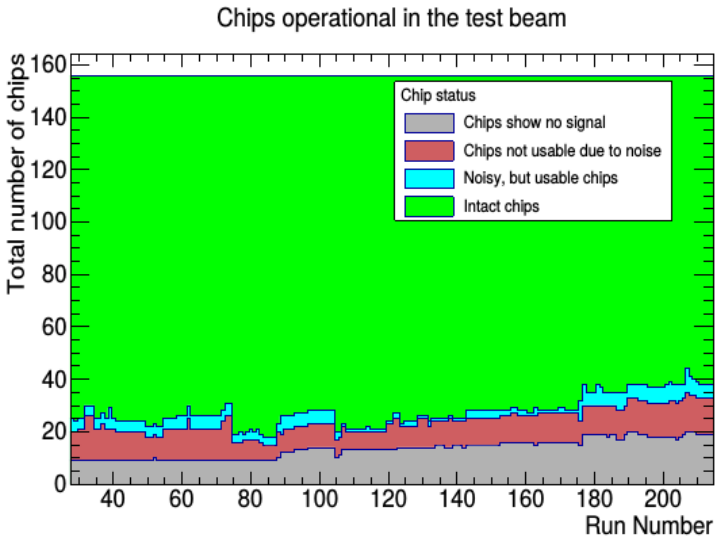
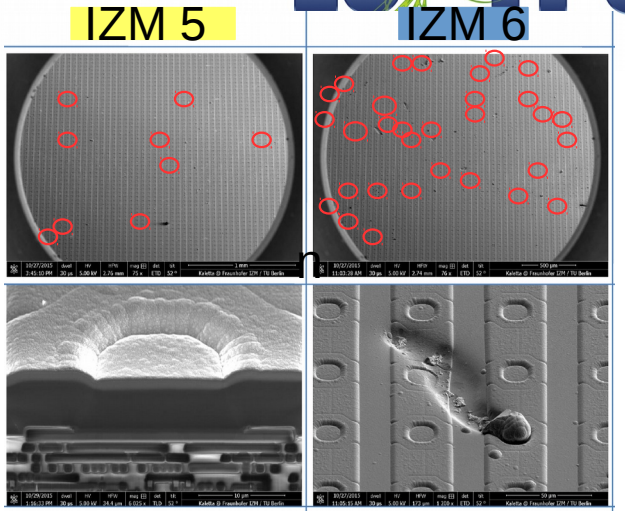
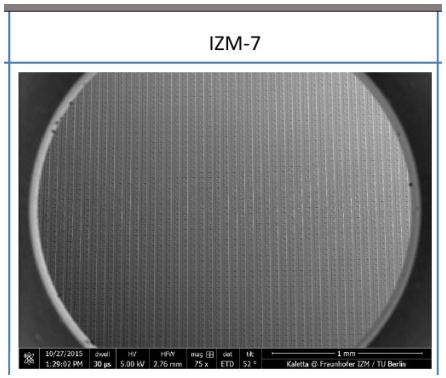
Remarks to last test beam



A number of GridPixes died during the test beam because of defects in the protection layer
→ problem identified and solved



New production batch (IZM-7) shows no defects and seems to be discharge proof.



4 GridPixes were tested in a constant discharge modes at U > 400 V. Example:

- W0065-F2: $t_{400} = 105$ min, $t_{450} = 65$ min & $t_{500} = 95$ min
  $\Rightarrow \sim 2.1 \times 10^6$ sparks in ≈ 265 min
- W0069-E2: $t_{400} = 115$ min, $t_{450} = 135$ min, $t_{500} = 145$ min & $t_{550} = 25$ min
  $\Rightarrow \sim 4.0 \times 10^6$ sparks in ≈ 420 min

Discharges did not degrade the performance of the GridPixes (energy resolution).

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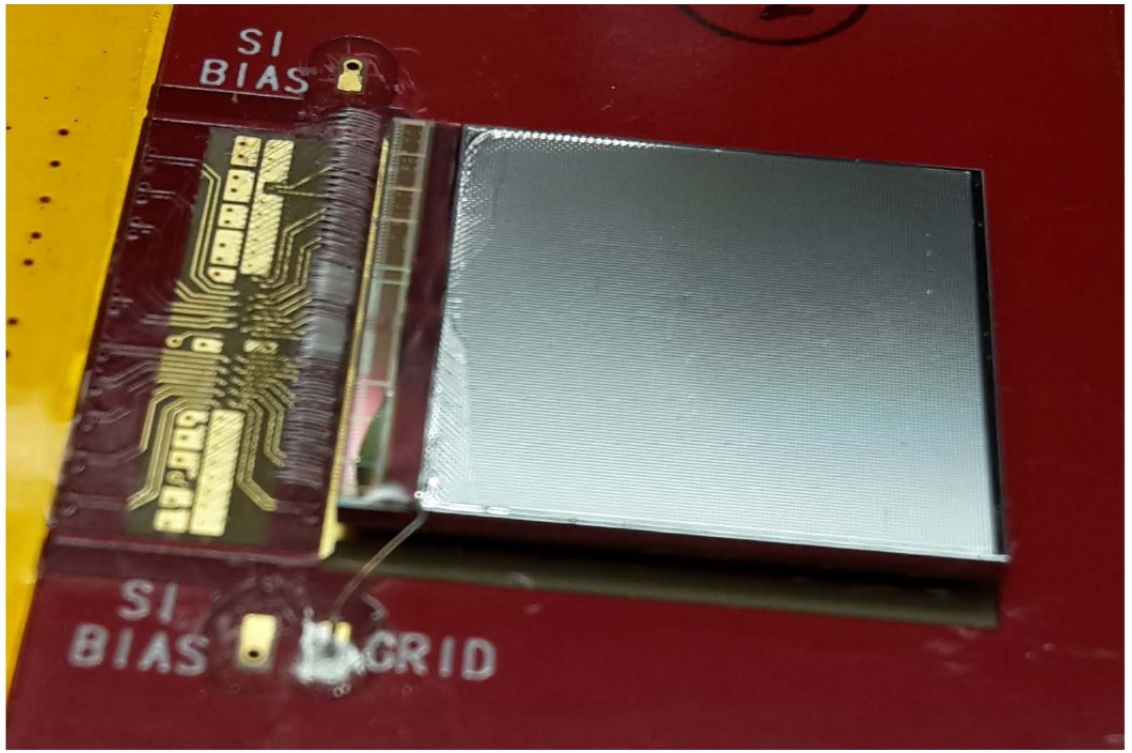
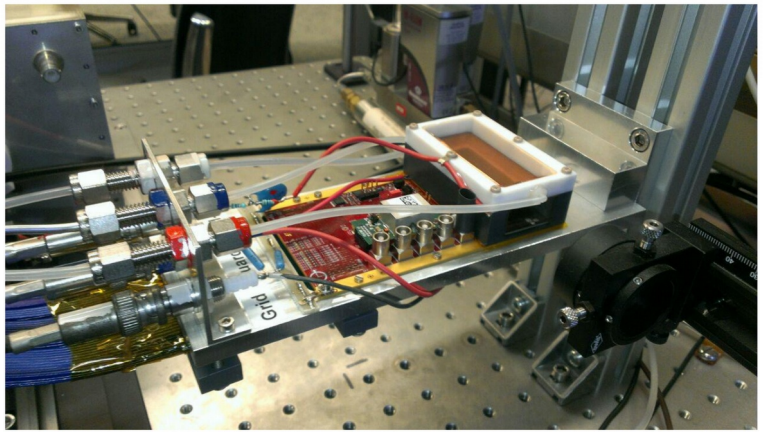
GridPix on Timepix-3

Timepix-3 has been produced. Most important improvements:
Charge and time are available for every pixel,
Multi-hit capable,
Very high output rate: 8×640 MHz (self triggering),
Better time resolution (~1.7 ns)



InGrids were built on top of Timepix-3.
Some improvements were done to the design:
The dykes at the borders were reduced and moved to the outside => the active area was increased.
Now 256x250 pixels are covered by grid.

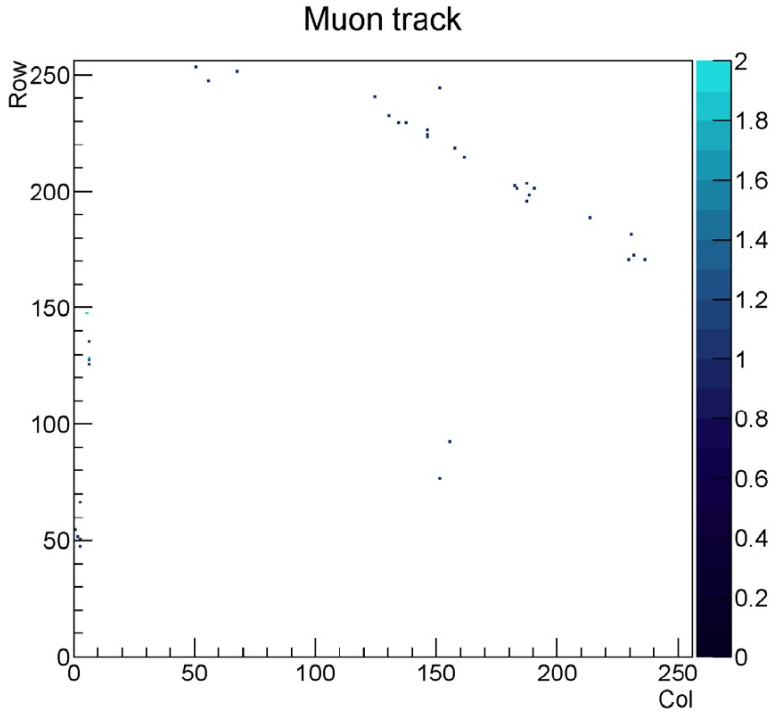
First Tracks and Laser Spots!!!

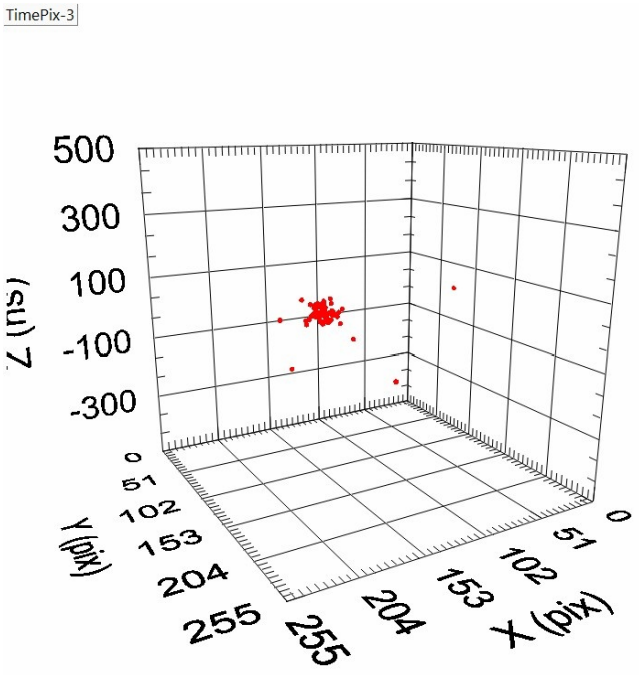


Small detector with a few mm drift distance was built at Nikhef

→ First muon tracks were observed

→ A laser is used to scan the active area and check the performance over the complete area





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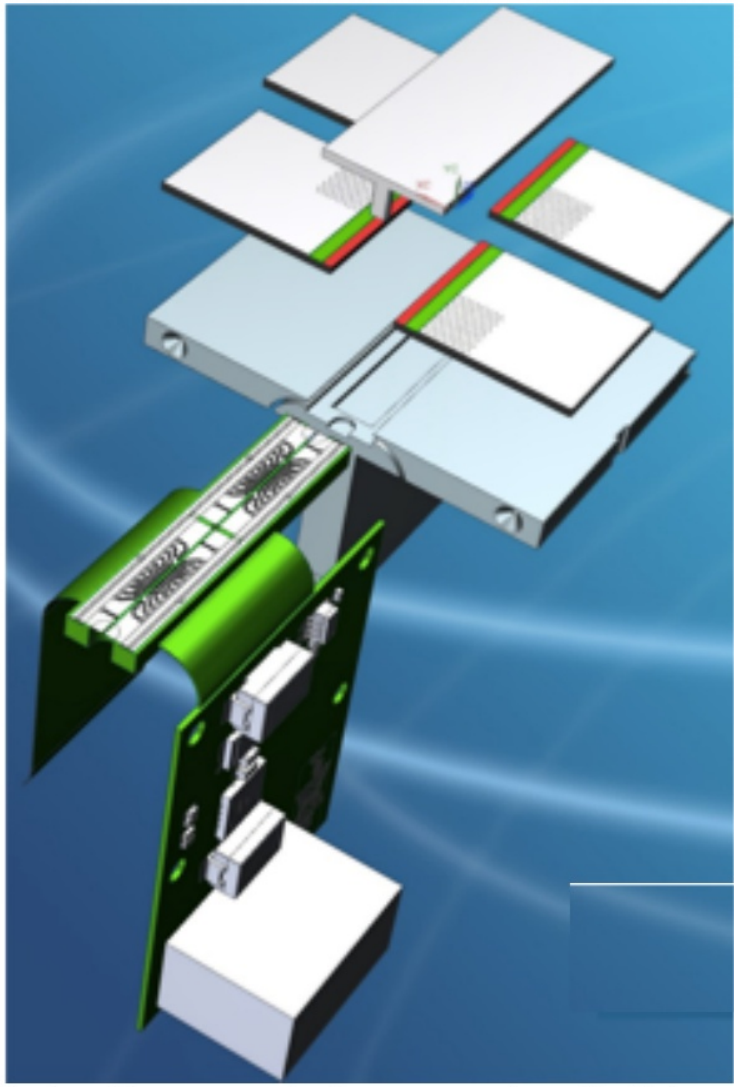
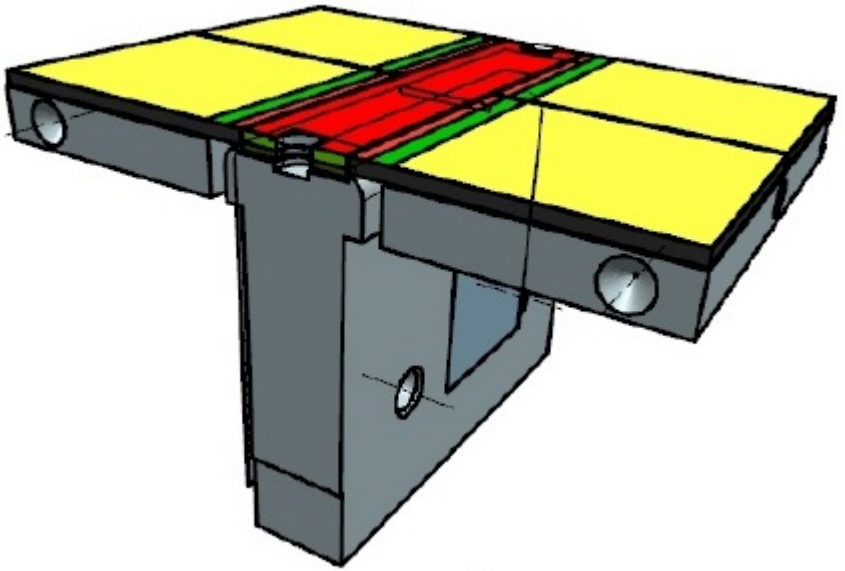
New Quad Design



Auke Korporaal, Bas van der Heijden
Charles Ietswaard

Design optimized to have the best space coverage possible (> 80%)
Readout is done by SPIDR of Nikhef.



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Next Modules

Current plans for ext modules:

- A first quad module should be ready at the end of 2016
- This will be first tested in smaller detectors
- Then a module with 1 or 2 quads will be built next year.
  → Test beam mid to end of 2017
- Then a complete module O(100 GridPixes) is planned
  This module should be as close to the final design as possible to make final measurements for the technology decision.
  → Gating GEM should be included