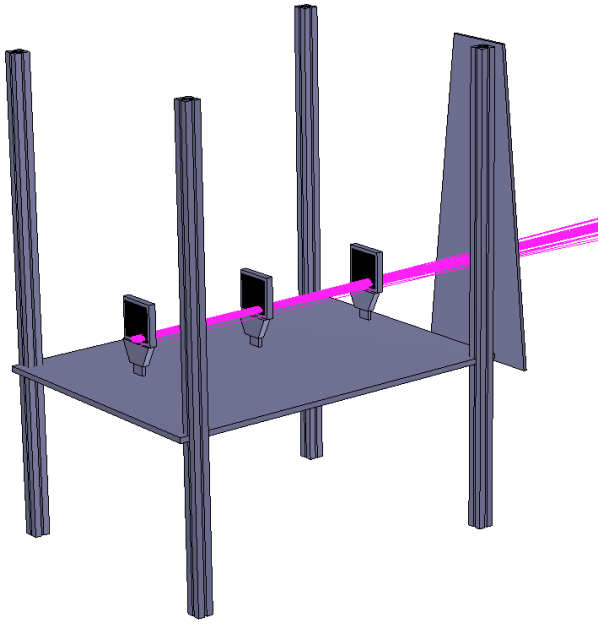
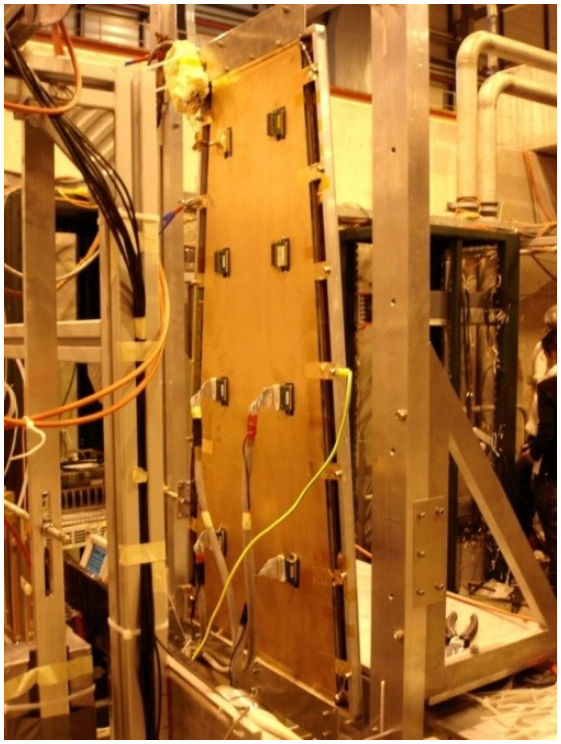
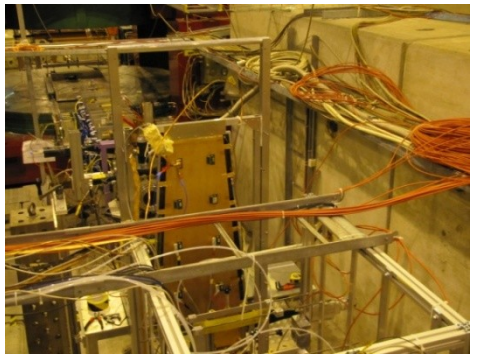
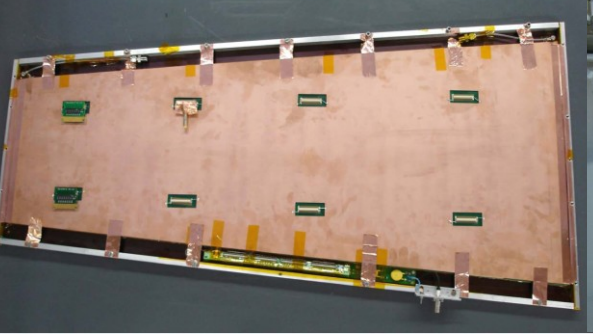
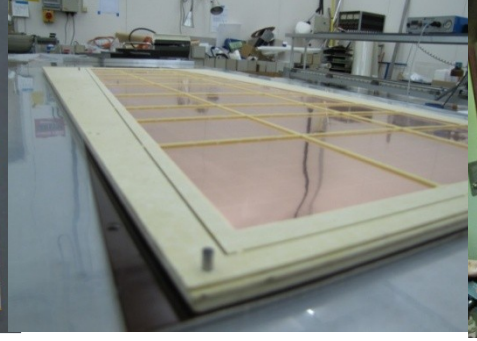
CMS upgrade – Large area GEMs
Stefano Colafrancheschi

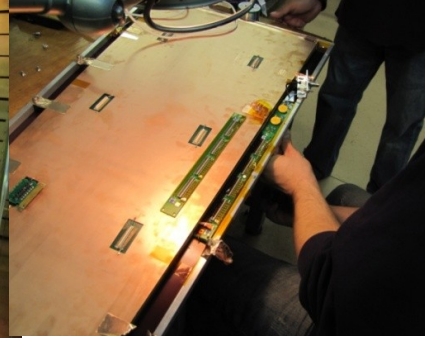
- Forward region of CMS, where RPCs cannot cope with rate
- Both tracking and triggering
- Dimensions and connection to services constrained by existing infrastructure
- Rapid development: from first concept to full0size prototype in 1 year
- 3 beam tests last year, the last one with large prototype

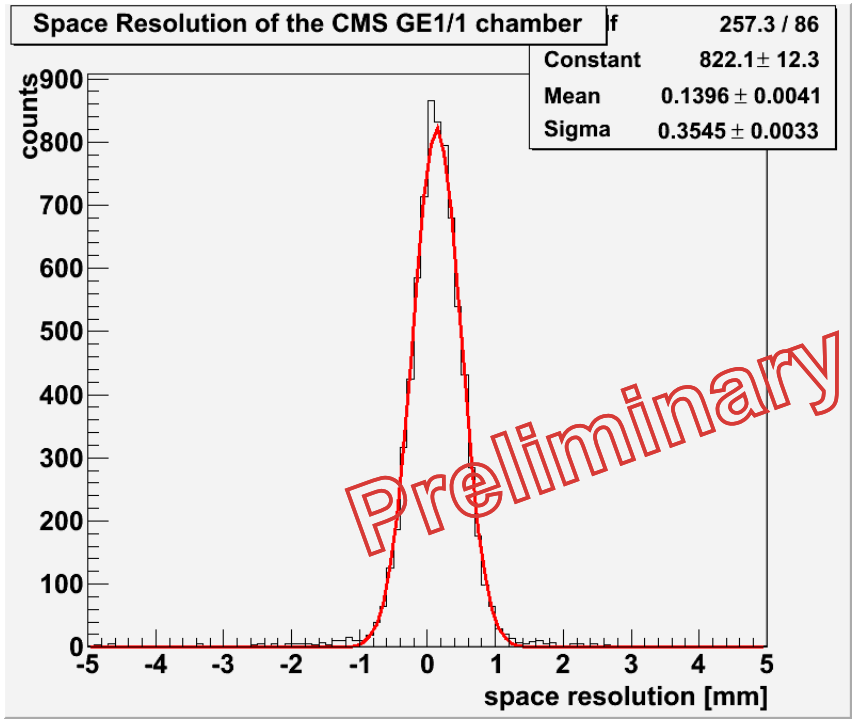


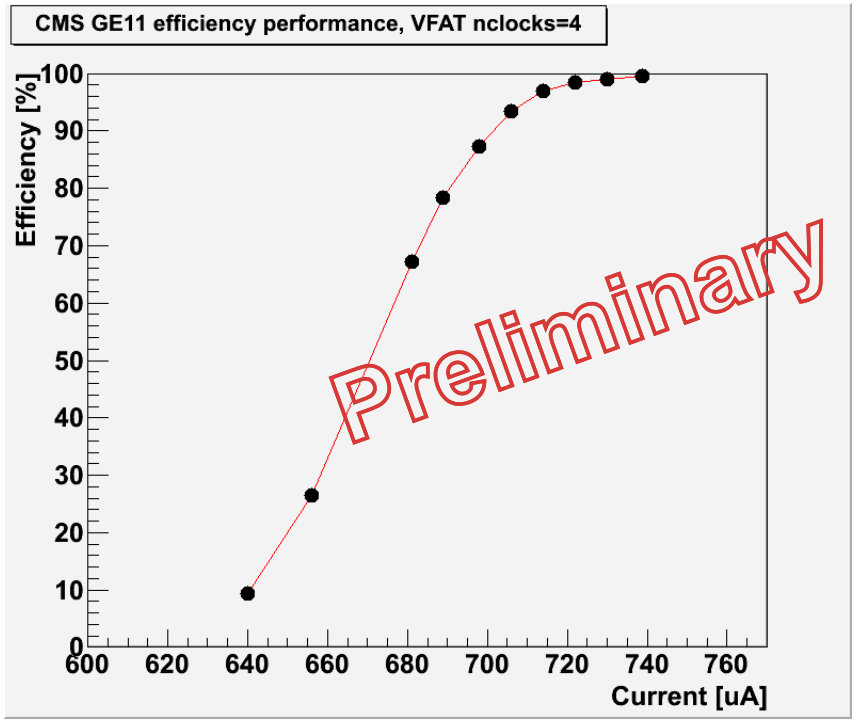






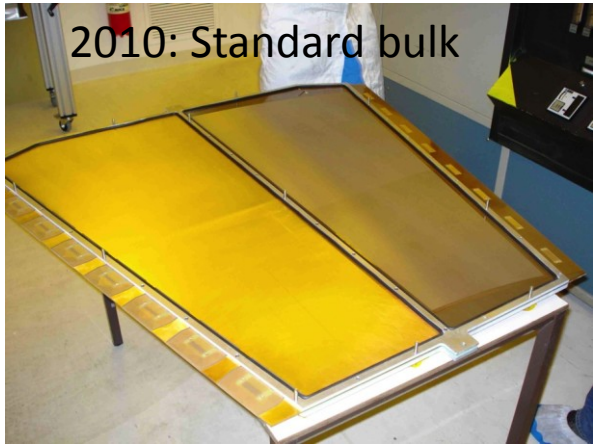


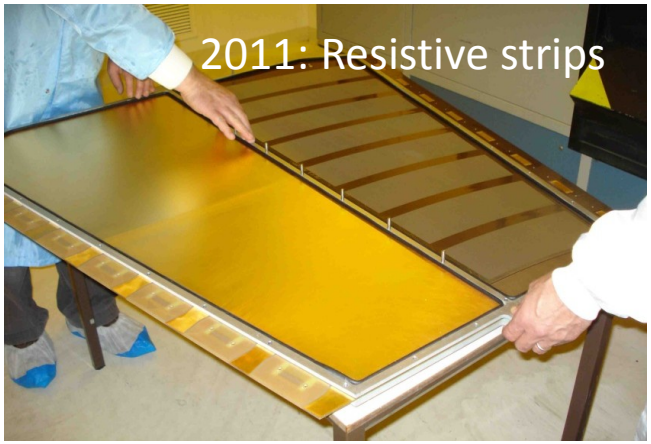


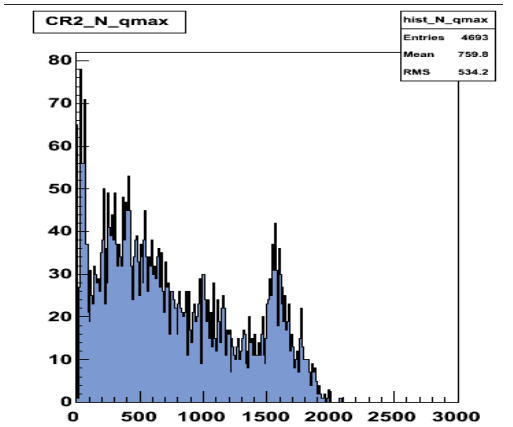
- Another prototype in preparation with reduced gap structure
- Higher granularity to improve trigger performance
- Beam test and simulations in magnetic field

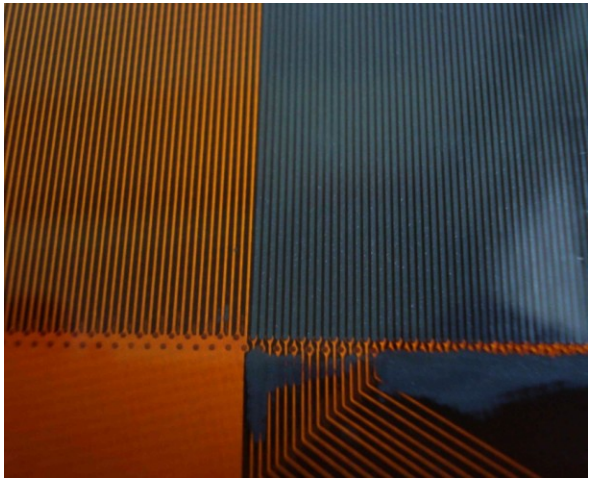
MAMMA
Joerg Wotschack

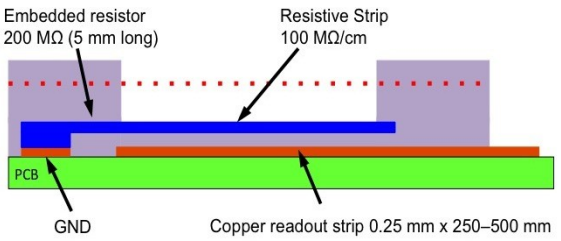
- Large prototype with unidirectional resistive strips
- Half the size of envisaged detector
- Low leakage current, stable operation
- First cosmic event recorded



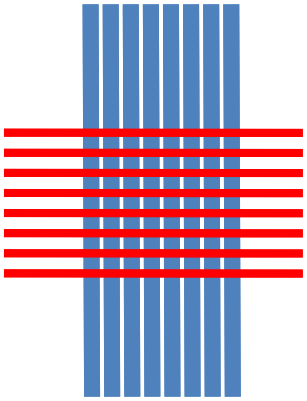




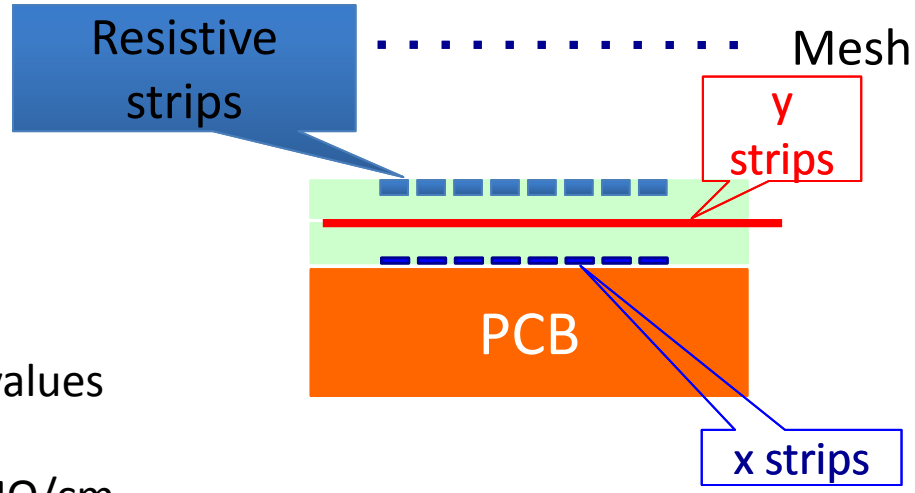




- Bidirectional strips
- Both directions capacitively coupled
- Sharing depends on width top strips

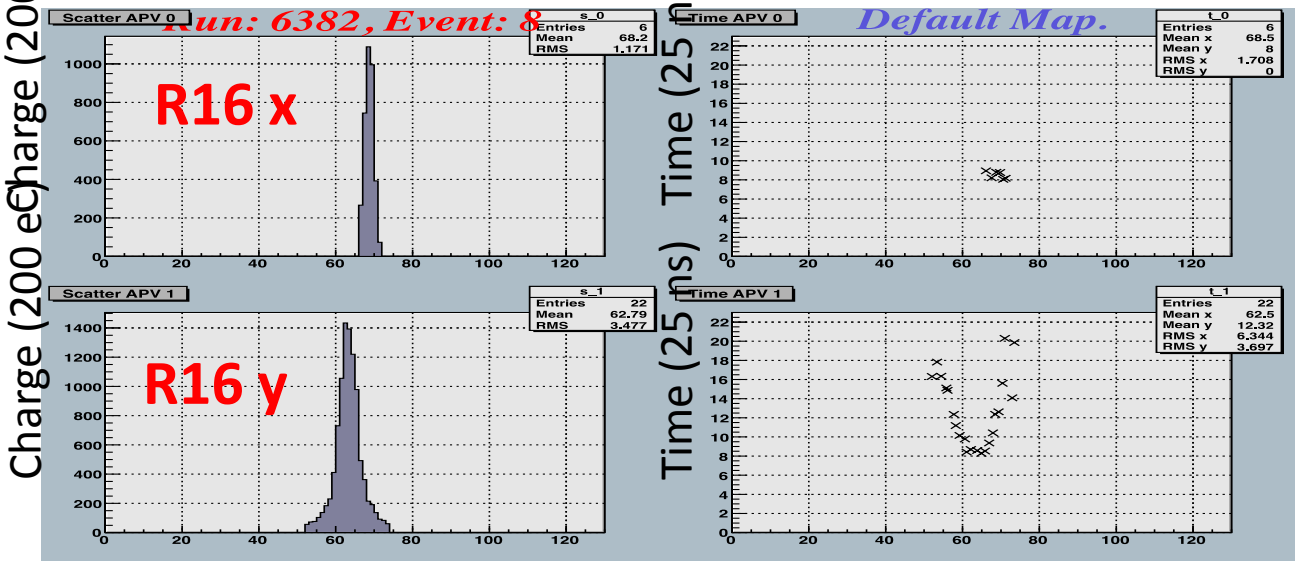


y: 250/80 µm
only r/o strips

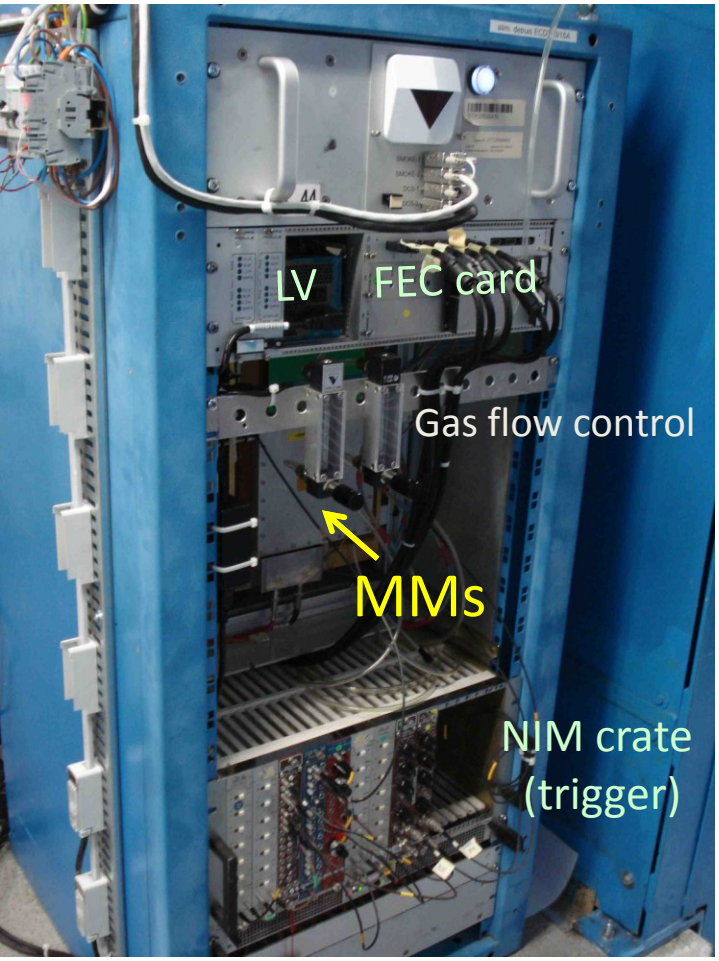


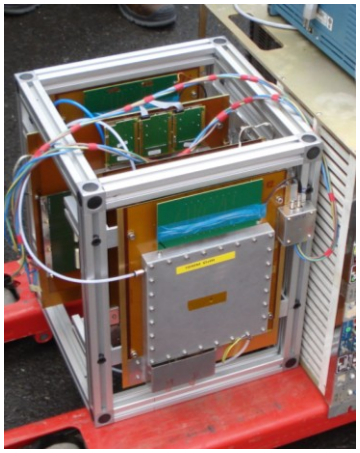
x strips: 250/150 µm
r/o and resistive strips

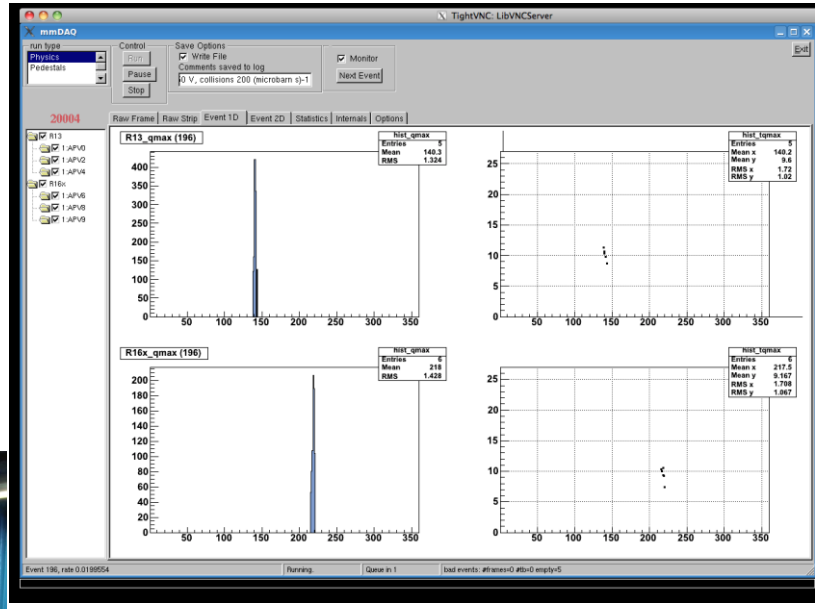
Resistivity values
$R_G \approx 55$ MΩ
$R_{strip} \approx 35$ MΩ/cm



Feb/Mar 2011: Test installation in ATLAS cavern!



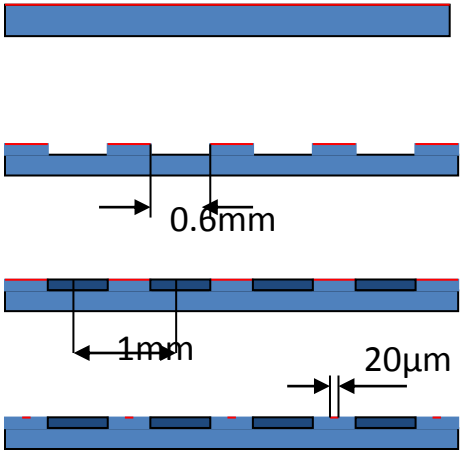




To come:

- 2011: Full-size prototype with 2D readout
- 2011: Long term aging test
- 2012: Choice of technology by ATLAS …

Resistive MSGCs
Vladimir Peskov

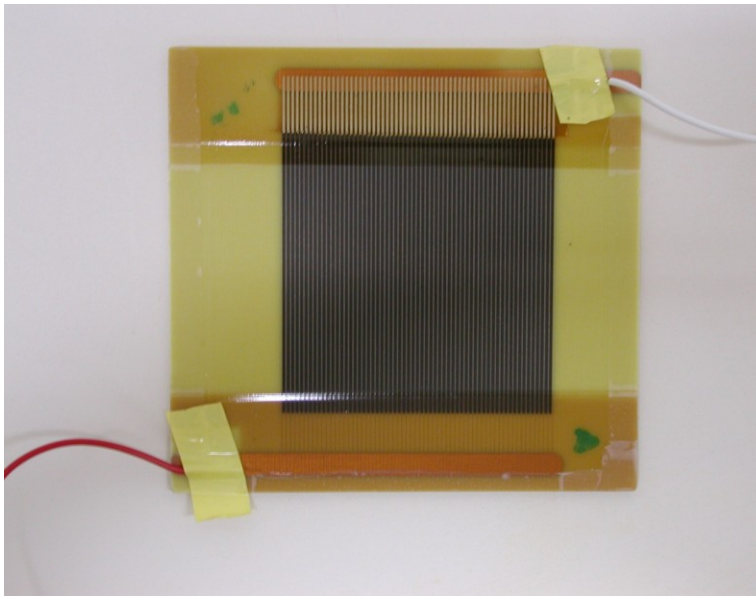


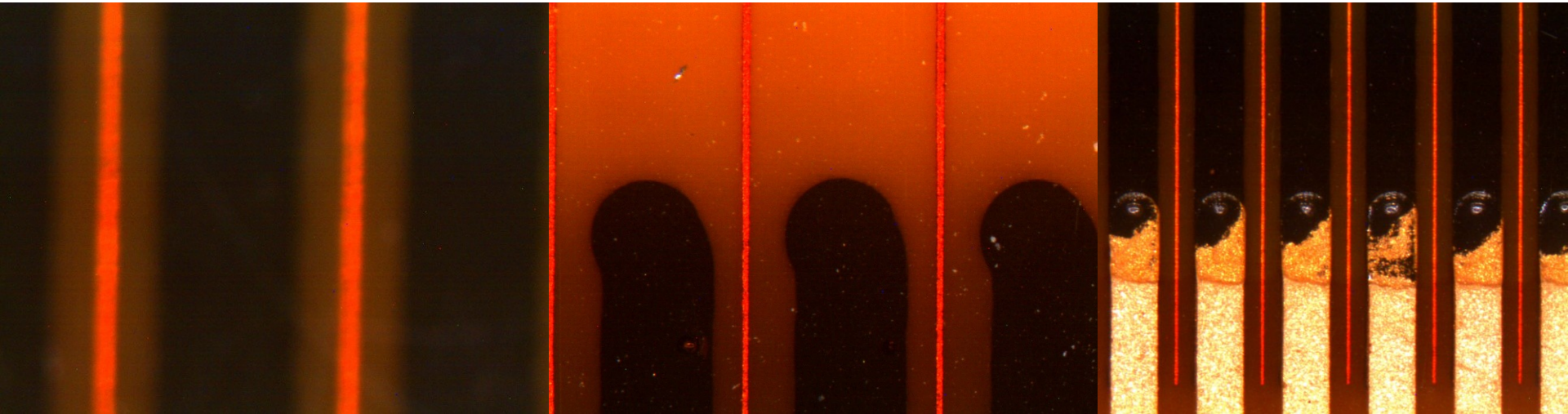
PCB with 5µm thick Cu layer

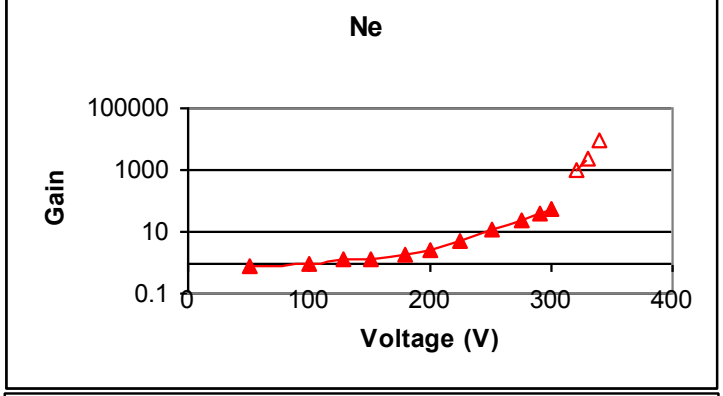
Milled grooved 100 µm deep and 0.6 µm wide, pitch 1mm.

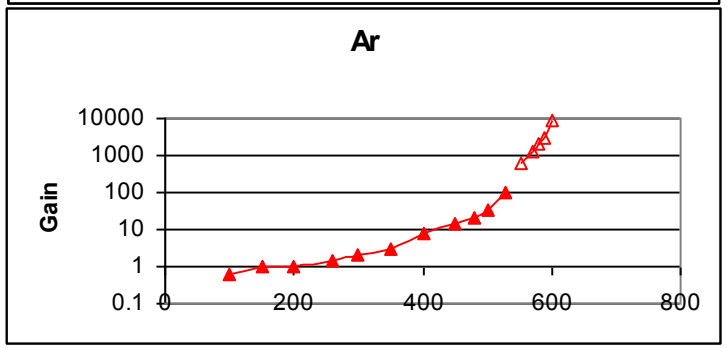
The grooves were then filled with resistive paste

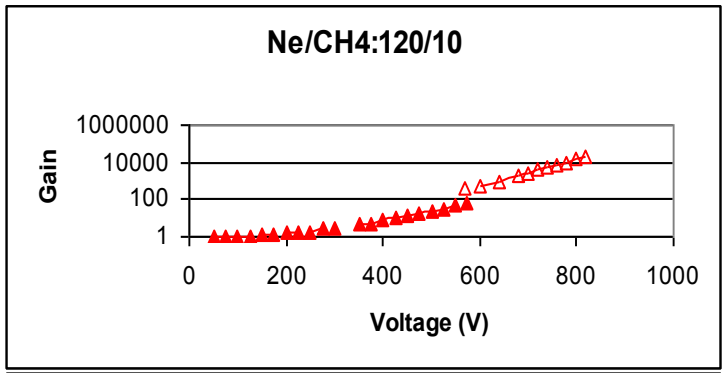
By a photolithographic technology Cu 20 µm wide strips were created between the grooves

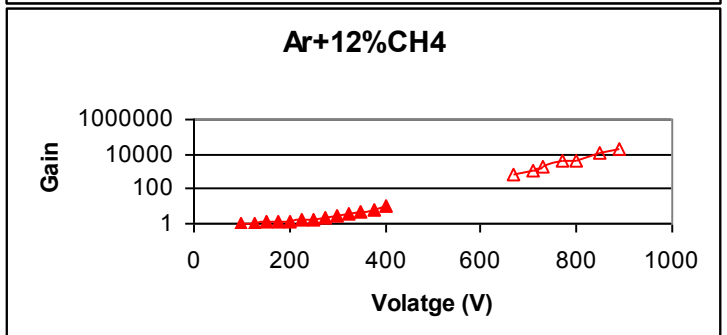




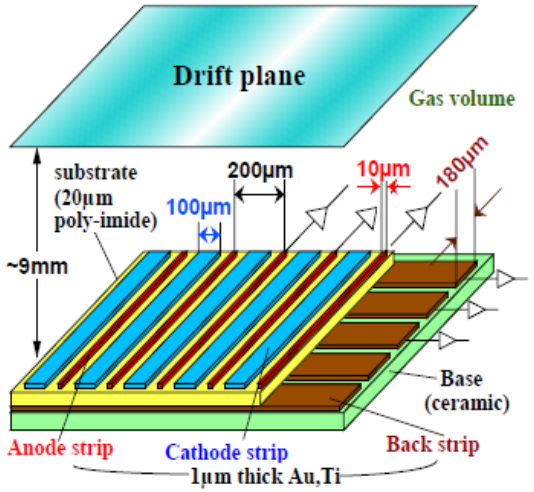


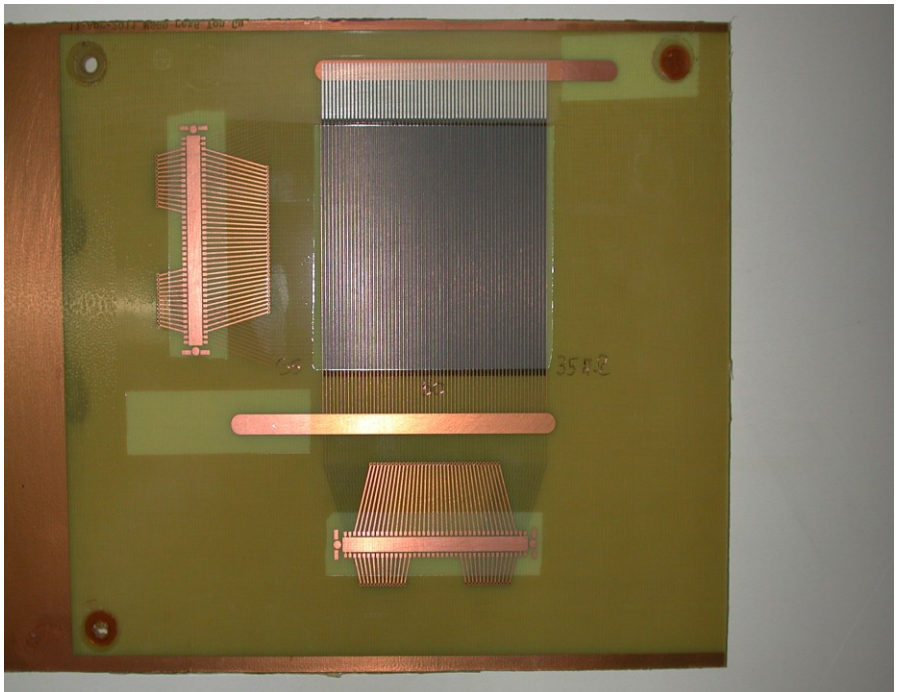






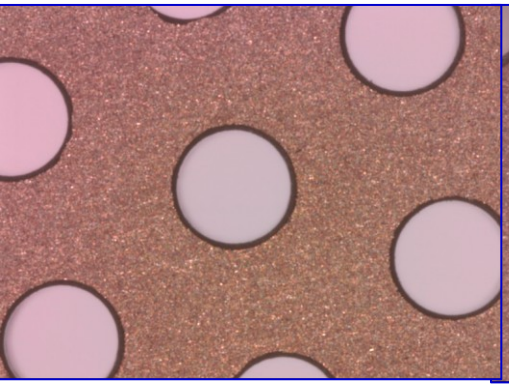
- Achieves high gain
- The resistive cathodes allow readout of a second coordinate.

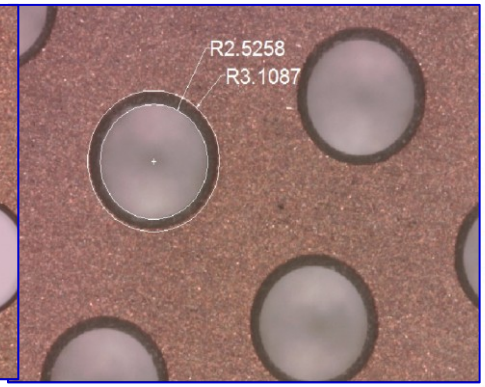




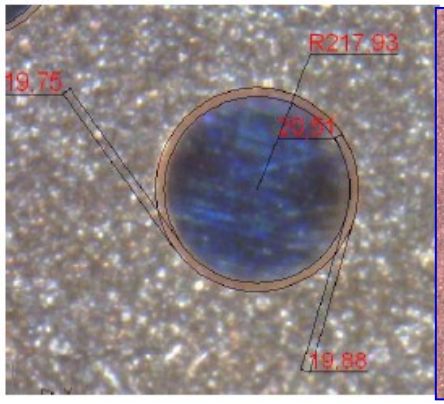
Thick GEMs for photon detectors
Silvia Dalla Torre

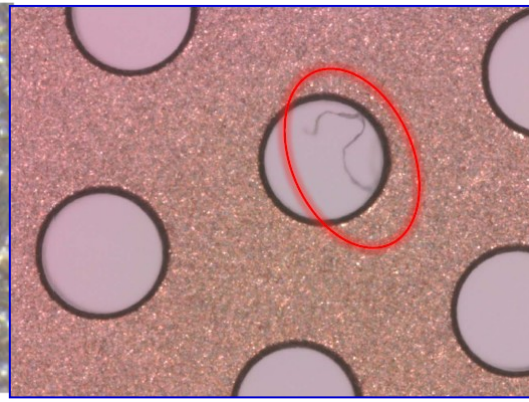
Problems controlling rim size

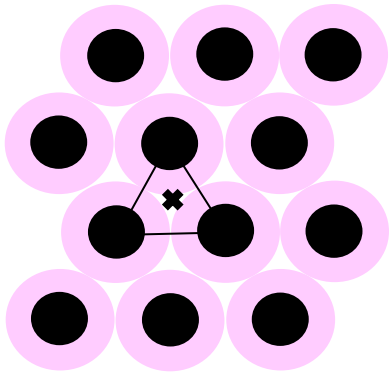


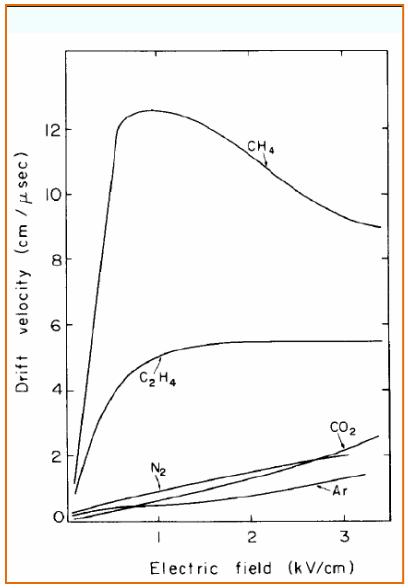


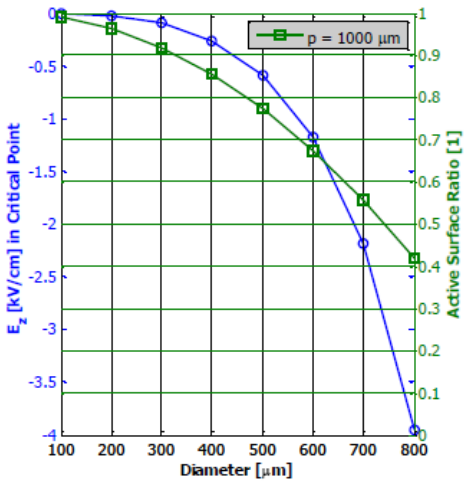
Cleaning the interior of holes

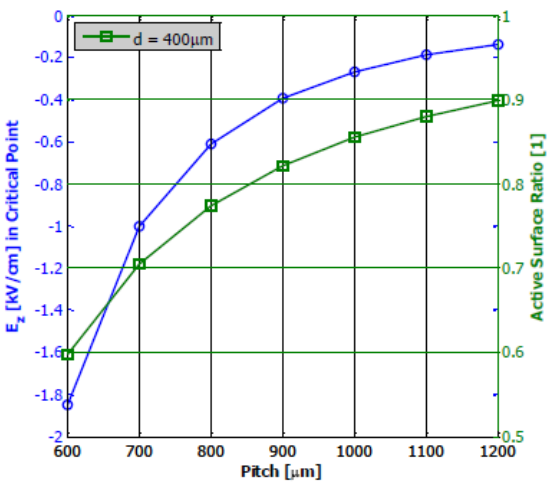




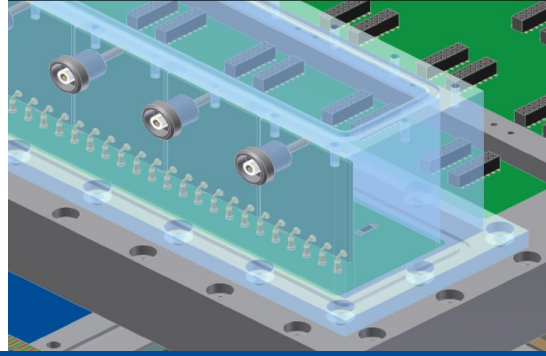


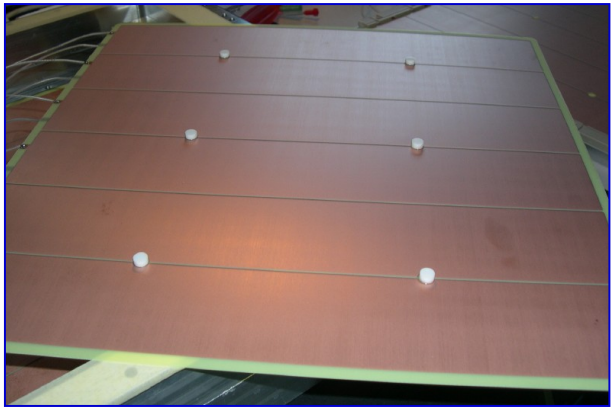


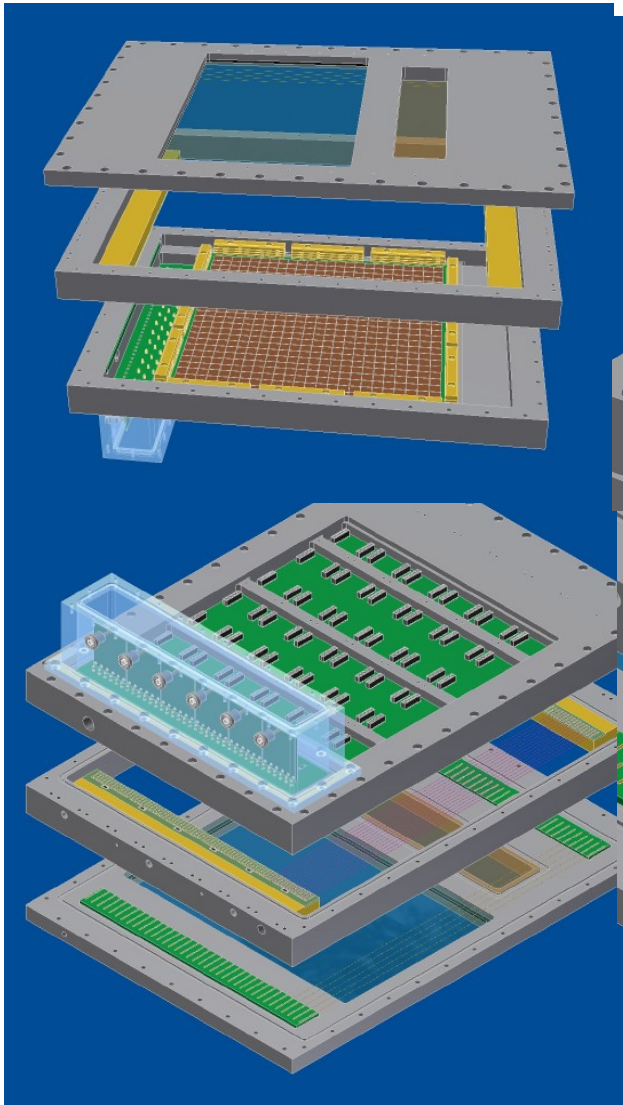


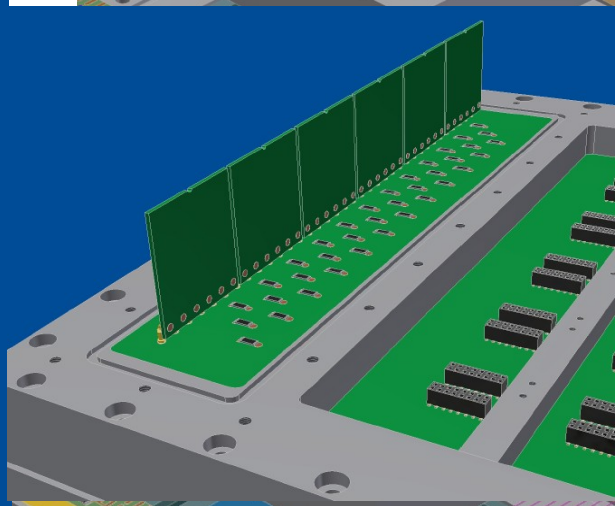


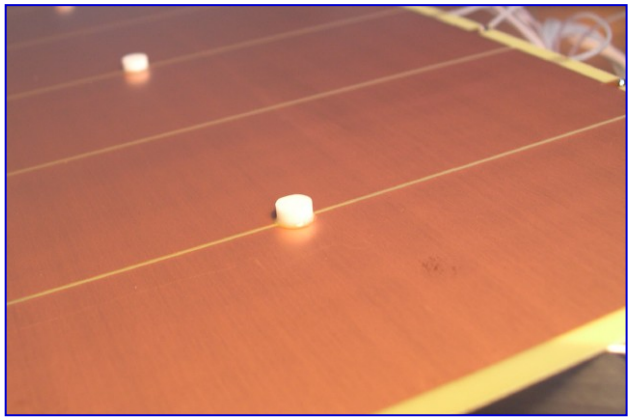
30x30 cm^2 prototype design

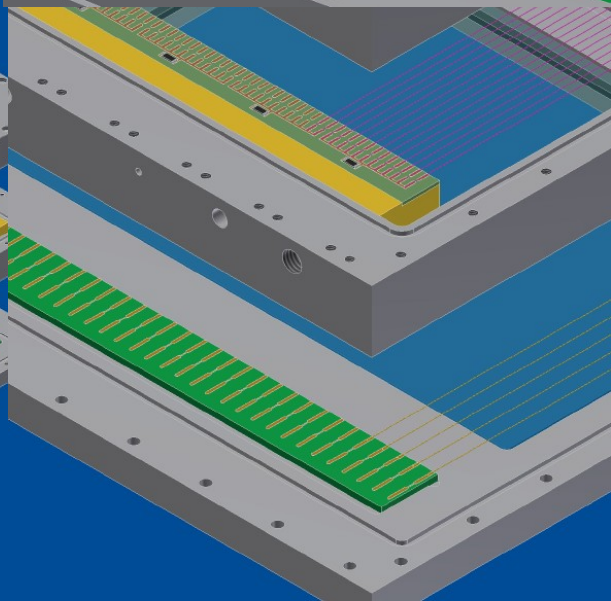




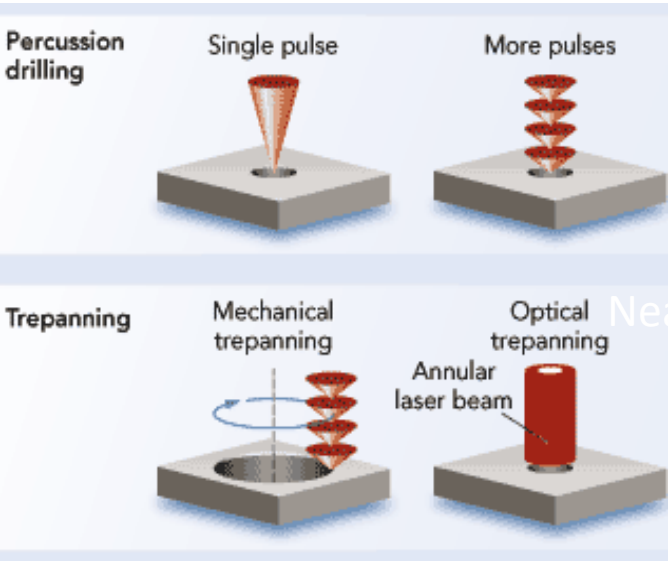


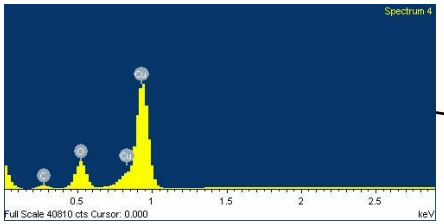


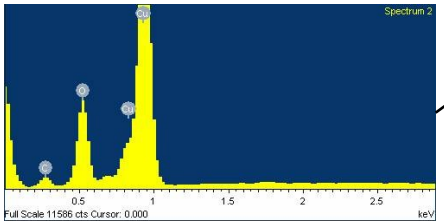


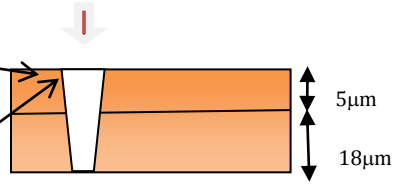


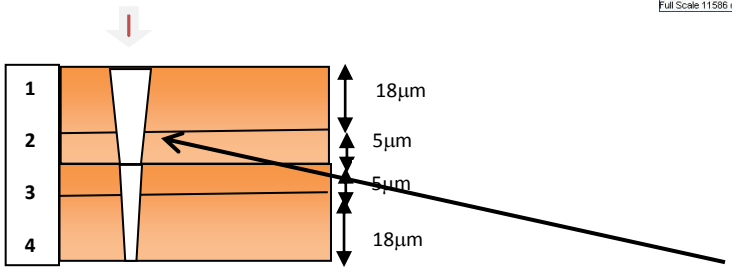
Laser drilling fine-pitch meshes
Vincenzo Berardi

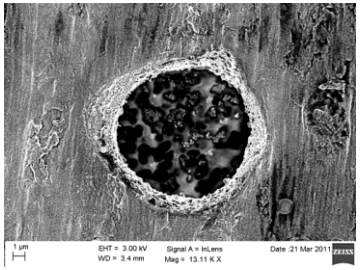




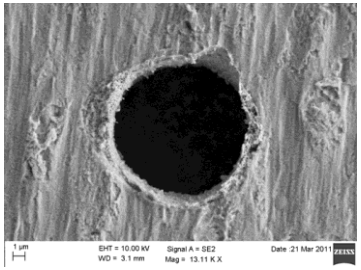




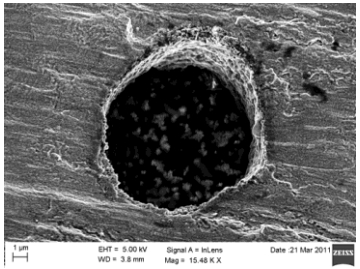




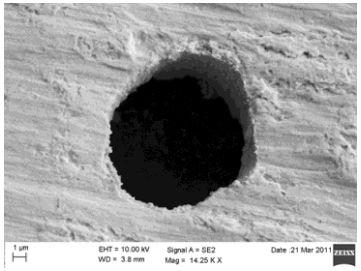
#9_02Mar_5down_laser_exit02



#9_02Mar_5down_laser_exit03

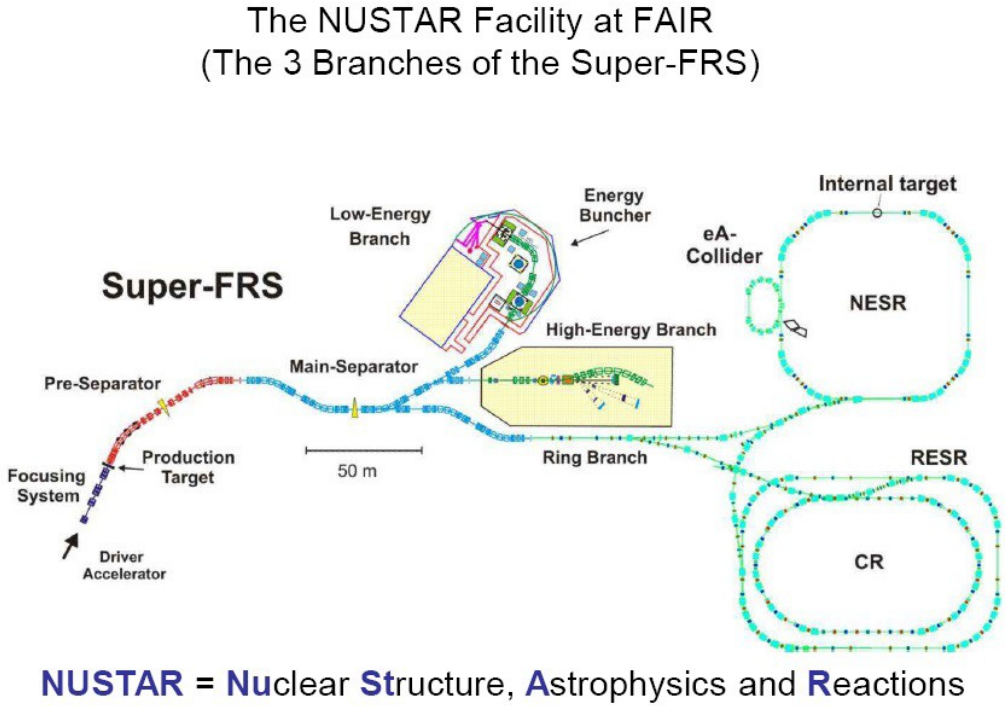


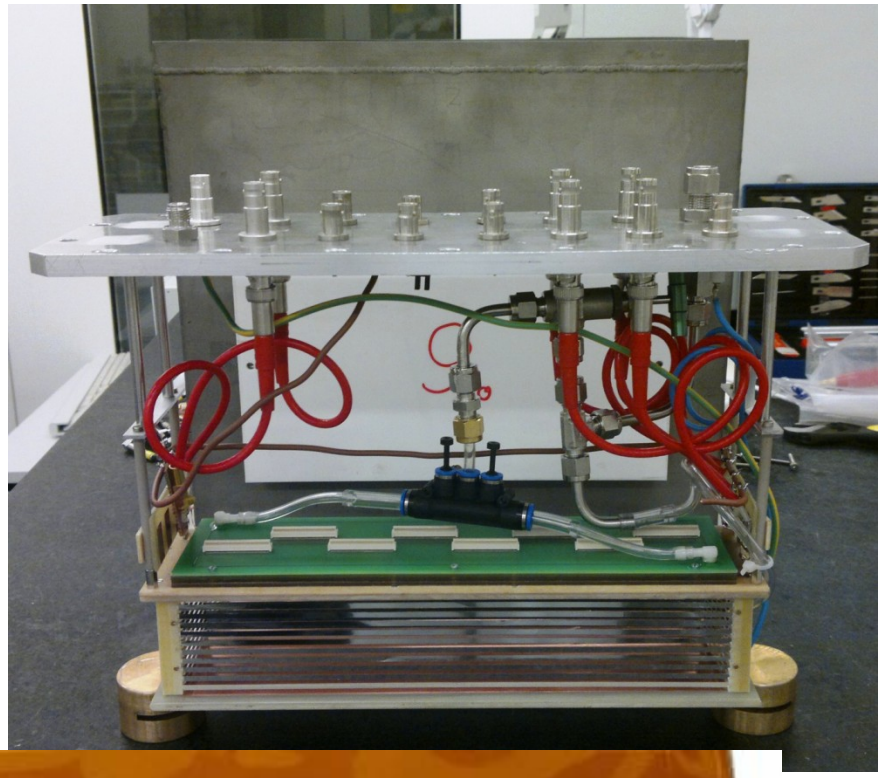
#9_02Mar_5down_laser_exit04

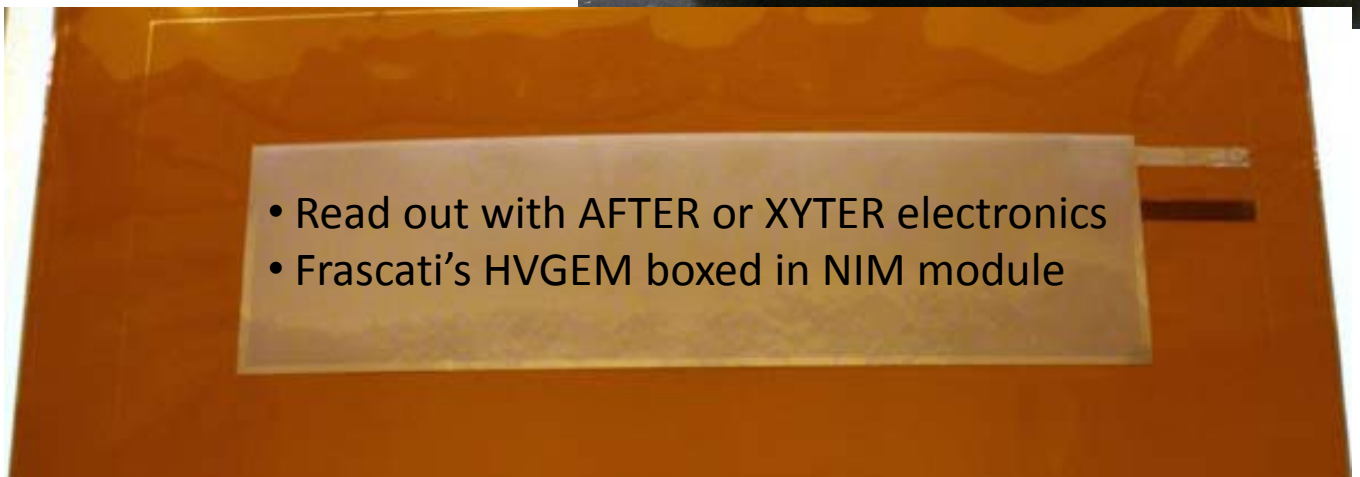


#9_02Mar_5down_laser_exit05

GEM-TPC for Super-FRS @ Fair
Francisco Garcia







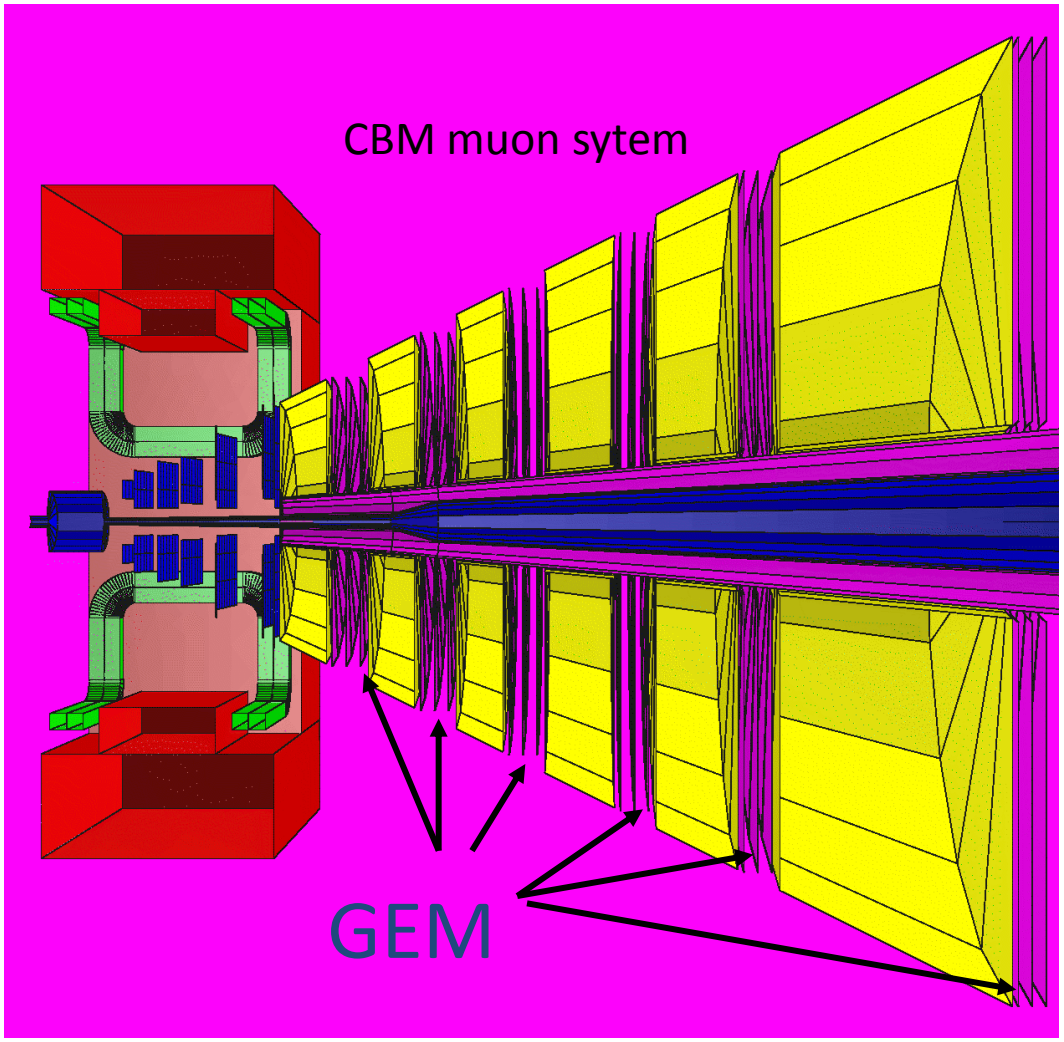
Technology Transfer Network – MPGD pilot offer

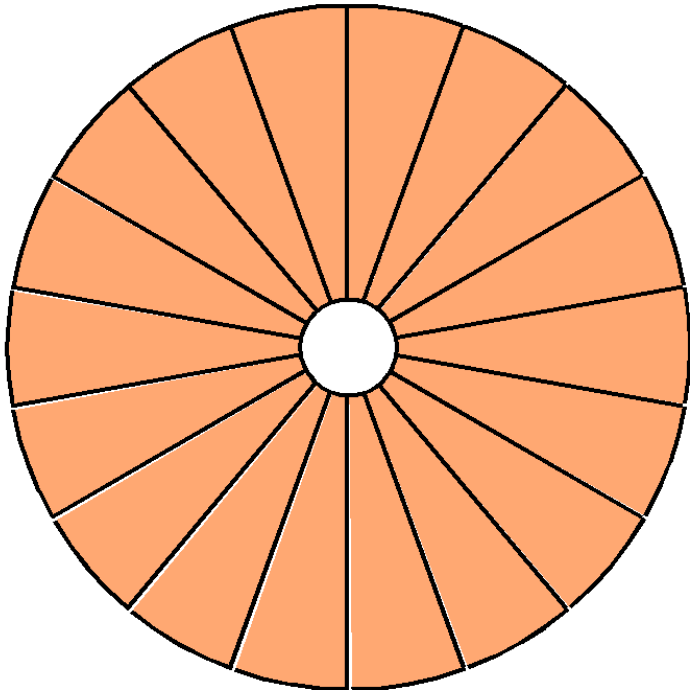
- Make MPGD technologies available for collaborative R&D
- Understanding market needs and opportunities

For example: a pilot offer to Homeland Security sector.
Combined neutron/gamma detector for cargo scanner

Large GEMs for CBM @ FAIR

Uli Frankenfeld





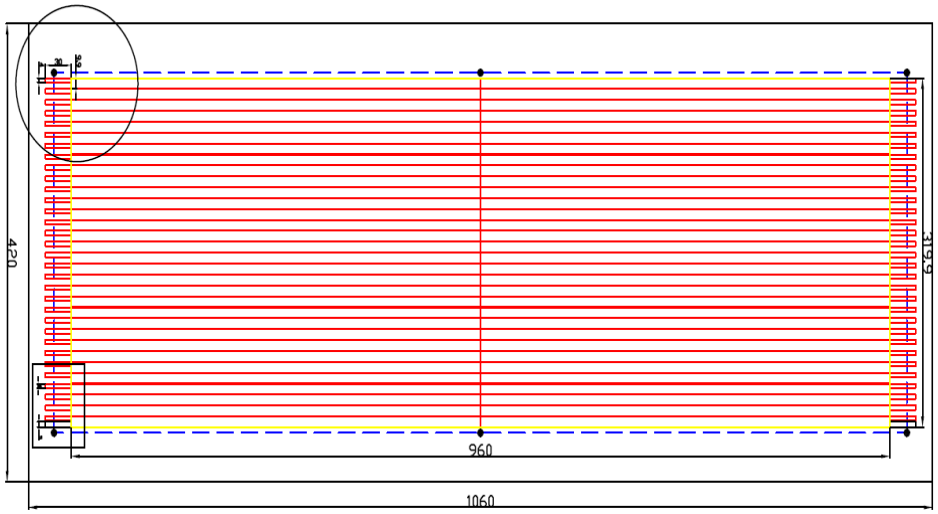
Proposed layout, based on single-mask GEMs. About 100 m^2 of such detectors in total. Rates up to 100

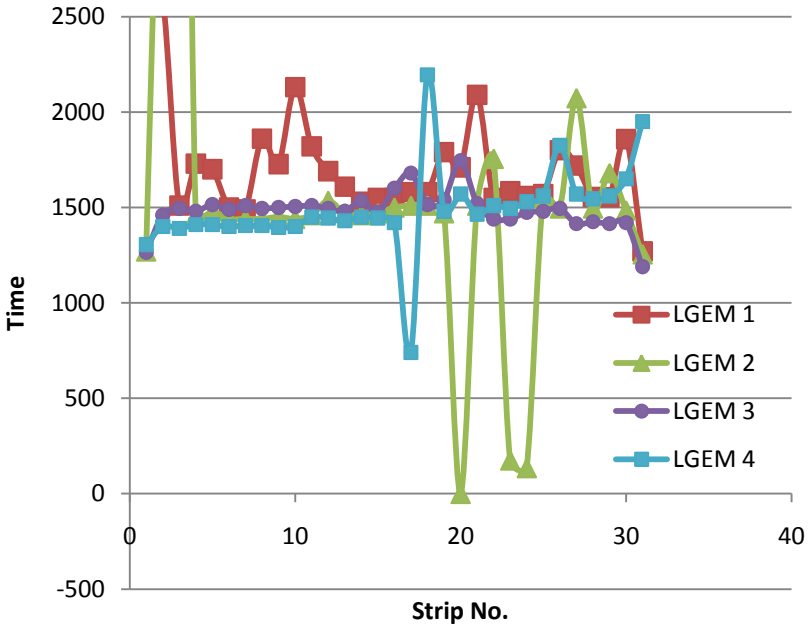
- About 100 m^2 of detectors in total
- Rates up to 100 kHz/mm^2 !
- RD51 beam test this year

33cmx100cm GEM qualification and DHCAL plans

Nam Tran

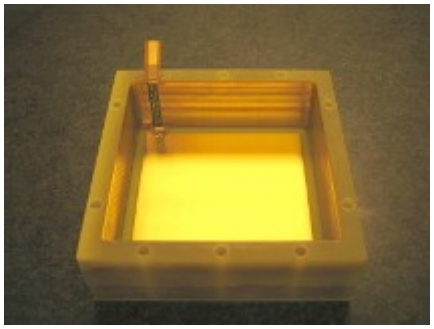
- Large double GEM detectors for a (semi-) digital HCAL
- GEM foils of 33cmx100cm, with long slim sectors, each of which must be tested

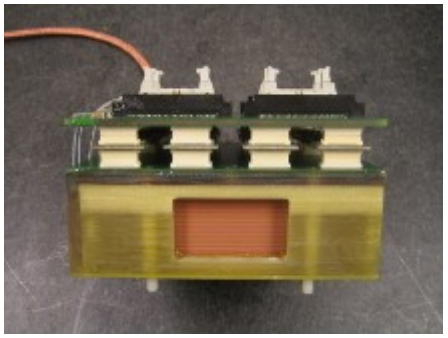


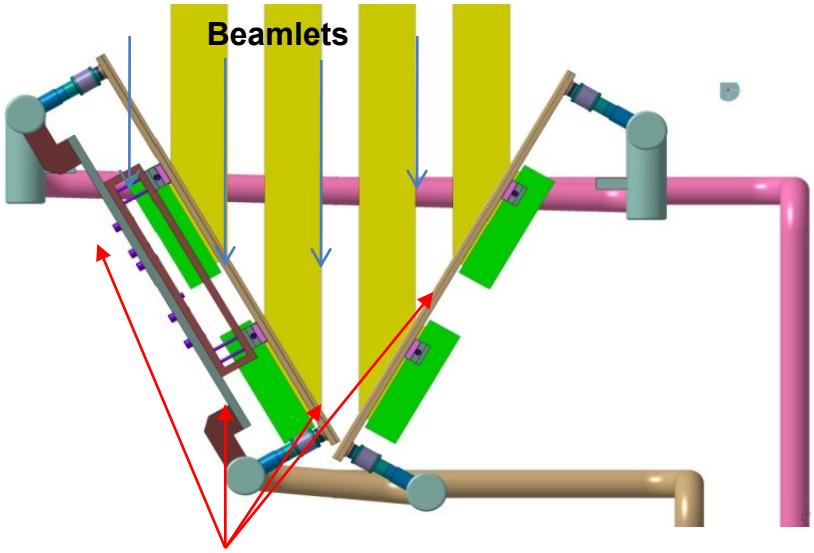


Time it takes for the leakage current to stabilize, against sector number. LGEM3 looks best.

GEM-based beam monitors
Gabriele Croci



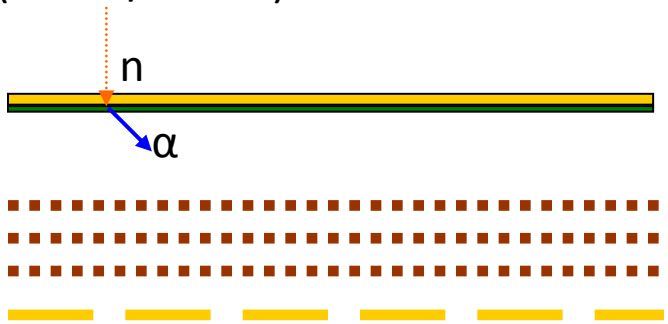


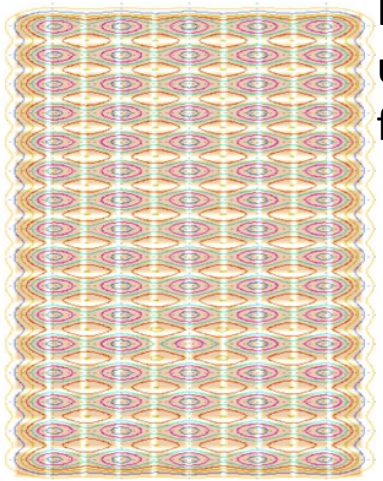


Small TPC (no B-field) for monitoring of profile and paralellism.

High flux fast neutron beam profiling, using a polyethylene converter in front of a triple GEM detector.

Triple GEM with boron carbide coated cathode. ~1% efficiency is sufficient, due to high rate (10kHz/mm^2).





Measured pattern of grid of beamlets.