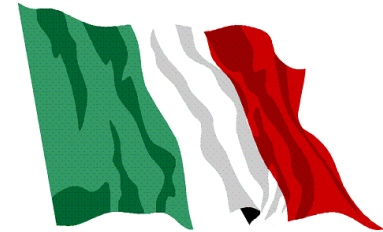# MC-PAD Midterm Review

Marco Villa

ESR @ CERN

28th September 2010

MC-PAD Midterm Review 28 September 2010

Myself: past & present

Past background

Dec 2007: defending my master thesis in Particle Physics at the University of Milano–Bicocca

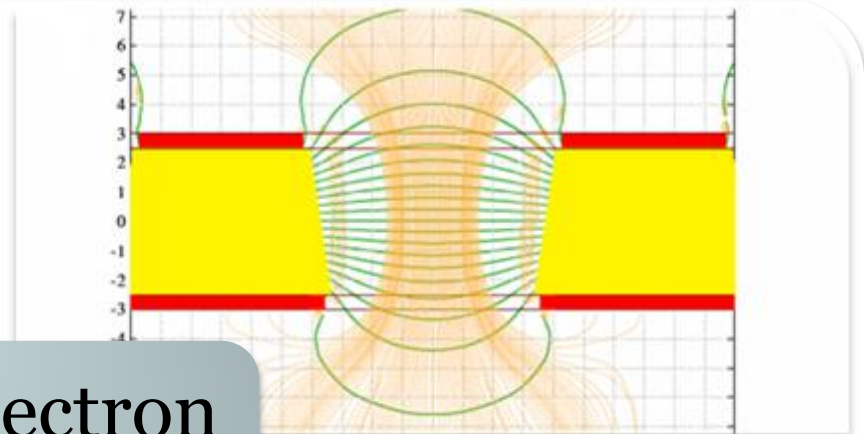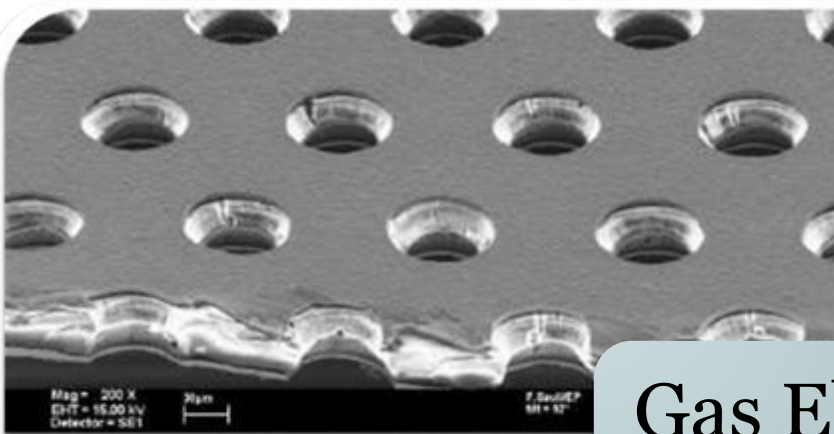2008: design of the LHCb muon automation system

Present status
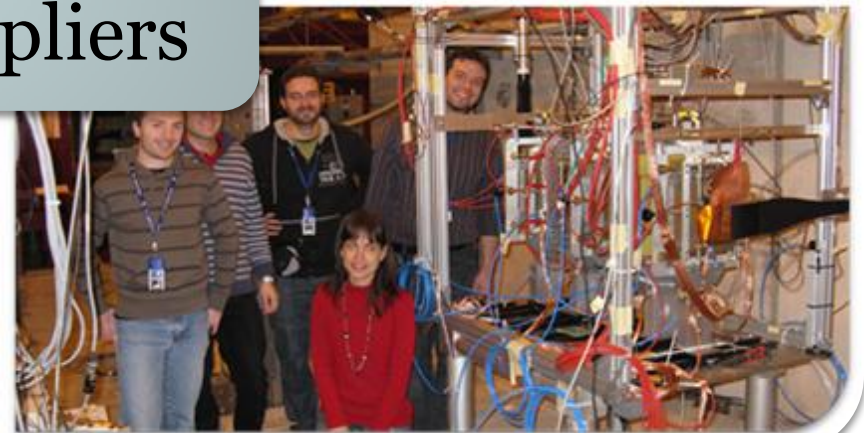
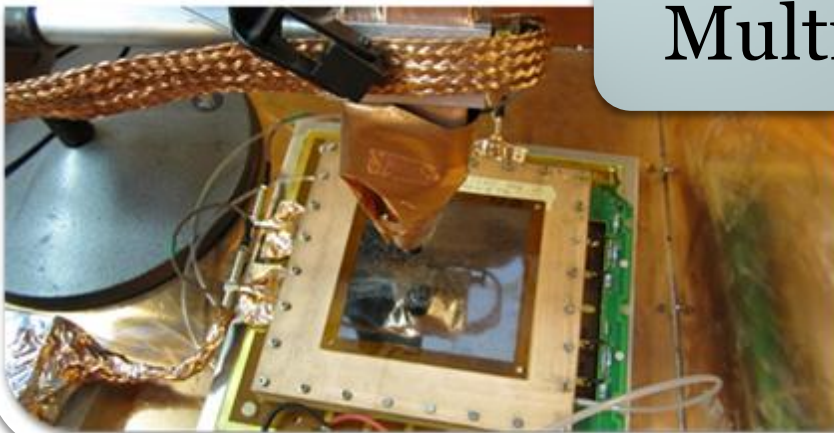Host institute: CERN

Project: Micro Pattern Gas Detectors

Supervisor: Leszek Ropelewski

PhD advisor: Ian Brock (Bonn University)

Playing with GEMs...[1]


Gas Electron Multipliers

Playing with GEMs...^{2}

Large area? Yes, we can!

- *Simulate* GEM properties with Garfield
- *Test* GEM samples
- Find ways to *improve* the technology
- ...and *iterate* the process...
- The latest single mask photolithographic technique with electrochemical active corrosion protection allows us to build new GEMs:
  - *large*: up to 50 x 200 cm
  - *performing*: compatible with std GEMs
  - suitable for *mass production*: in industry
  - *cheap*: price reduction by factor 100

...and having fun with Micromegas[1]
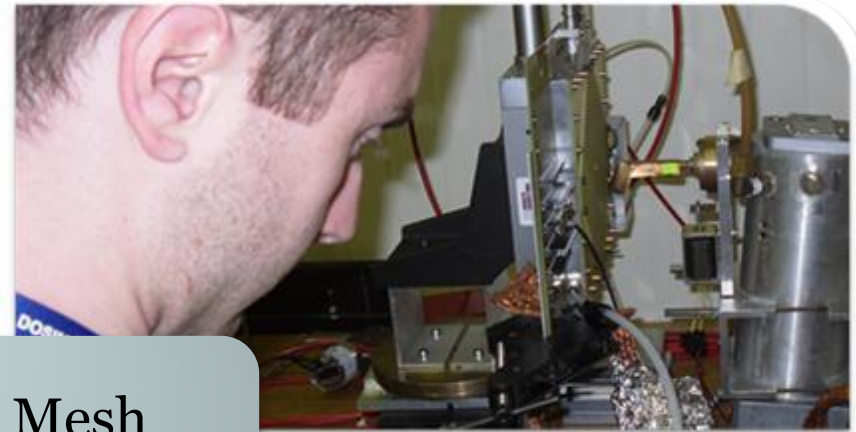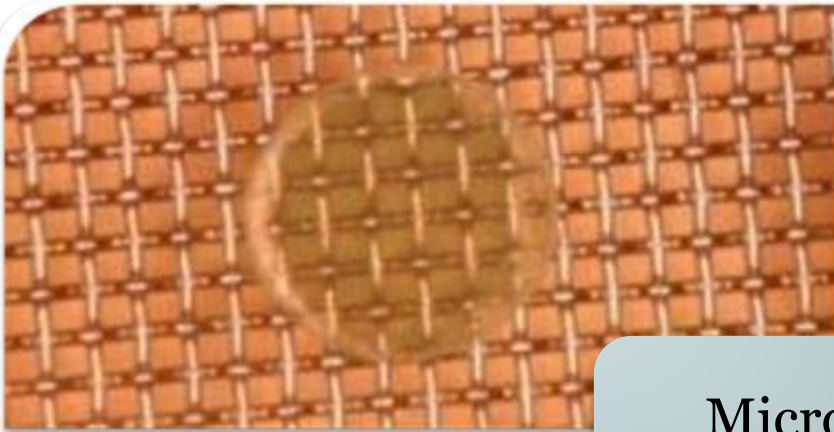
Micro Mesh
Gaseous Structure

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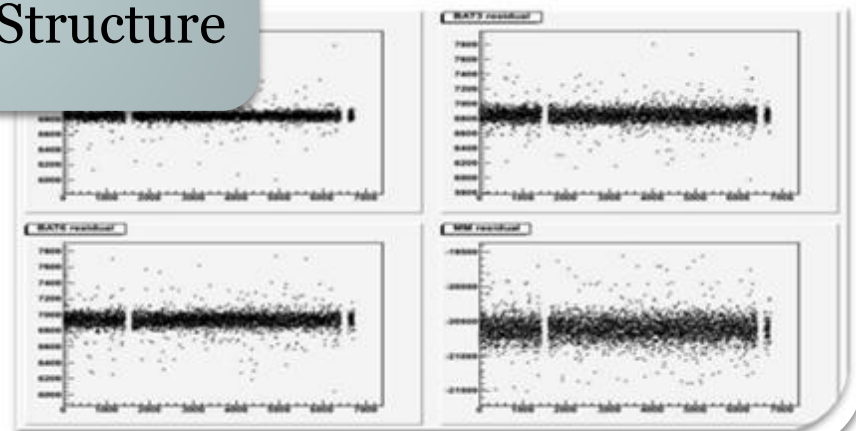
...and having fun with Micromegas^2

Upgrading ATLAS CSCs

- Study the *space resolution* as a function of the strip pitch
- Find ways to *reduce sparks* with high background
- Fully characterize a *GEM+μM* prototype
- *Test* new Micromegas technologies
- ...and *iterate* the process...
- The latest capacitively coupled resistive strip Micromegas have:
  - *no voltage drop* in case of sparks
  - *μ−TPC* capability
  - (*efficiency* study ongoing)

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Milestones & deliverables

Milestones

☺ Small prototype single mask GEM available (m3 – Feb 2009)

☺ Full scale prototype single mask GEM available (m15 – Feb 2010)

Deliverables

☺ Characterization of single mask GEM small prototype (m9 – Ago 2009)

☹ Technology assessment report on single mask GEMs (m33 – Ago 2011)

Me: a trainee...

Technical training...
1st EIROforum School on Instrumentation
MC-PAD network training on Readout Electronics
MC-PAD network training on Detector Simulation and Data Analysis
C++ programming courses
MC-PAD network training on Processing and Radiation Hardness

...and complementary training
general and professional French courses
communication courses on oral and poster presentations
EuroScience Open Forum Marie Curie Event

...and a trainer ☺

GEM and Micromegas detector design and assembly training (Feb 2009)

Supervision:
3 students in summer 2009
4 students in summer 2010
n students in summer 2011?

Last but not least…