WG1 summary

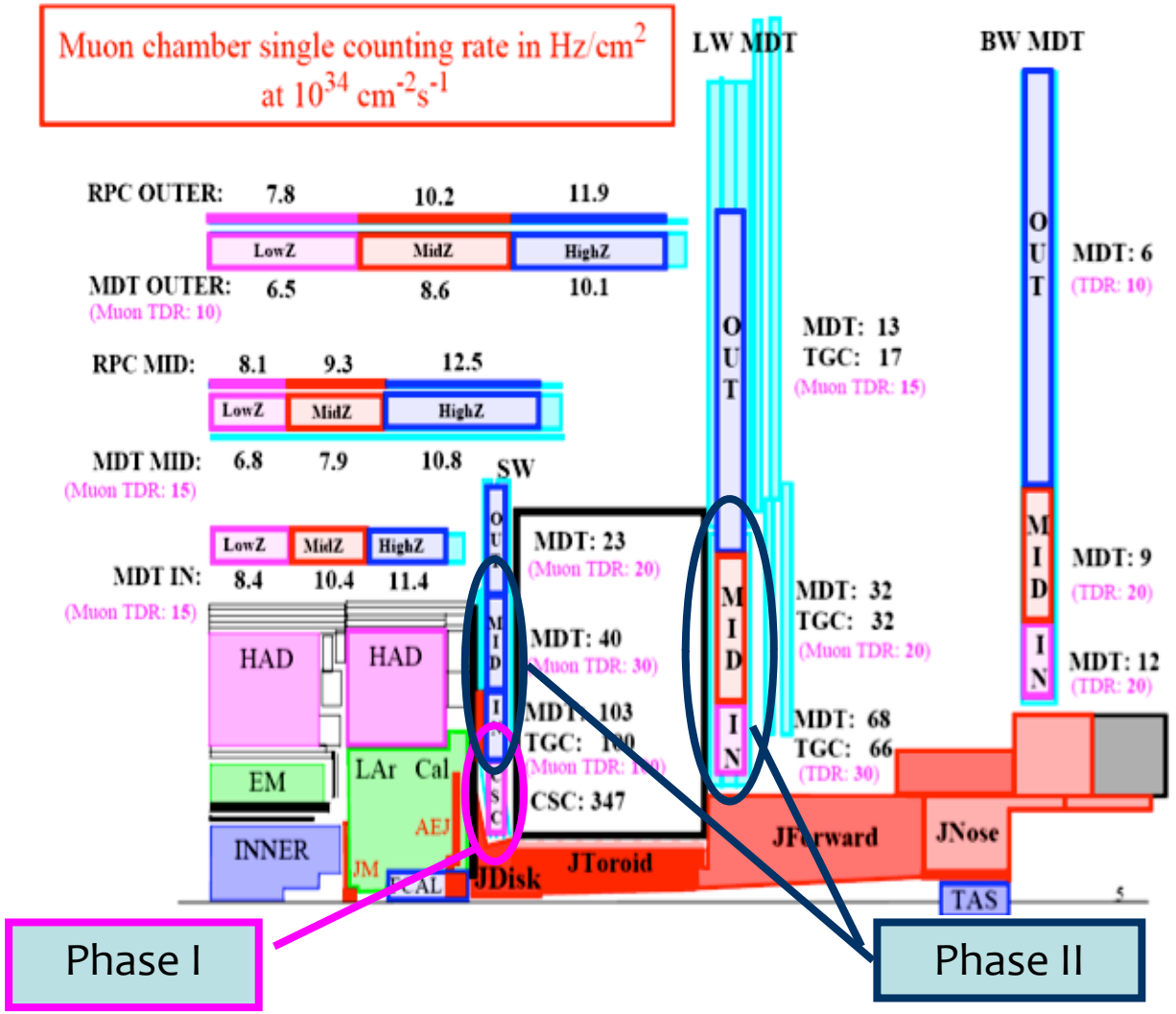
RD51 meeting, Kolympari, Greece
16-18 June 2009

Serge Duarte Pinto, Paul Colas

Task 1 – Large area detectors

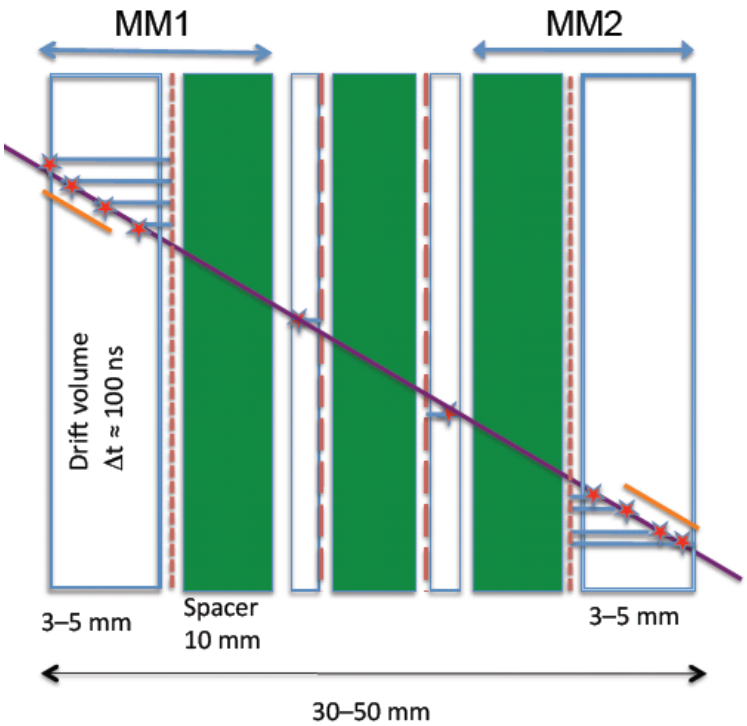
MAMMA, Joerg Wotschack

Plans for upgrading forward muon system of ATLAS



Phase I

- Thin chambers to be added to CSCs
- Number of ch./module for 500 μm pitch:
  - 2400 x 2 = 4.8 k (precision strips)
  - O(200) strips for 2nd coordinate
  - O(1000) pads for trigger
- Total/module: 6 k channels
- 32 chambers of 1 m2 with 4 active layers each (total MM area 100 m2)
- Total # of channels : 200 k



Phase II

- Three multigap chambers to replace all EI MDTs and CSCs
  - 288 chambers of Δr ≈ 1100 mm
  - Strip pitch: 500 (or 250) μm
  - Max strip length: 1 m
  - 5–10k channels/chamber
- Three multigap chambers to replace EM MDTs + TGCs for η > 2
  - 96 chambers of Δr ≈ 1700 mm
  - 7–15 k channels/chamber
- All chambers vertically installed
- Total MM area close to 2000 m^2
- Total # of channels : 2.25 M (4.5 M for 250 μm strip pitch)
- Trigger:
- Bunch ID from thin gaps (pads) from first time signals (<5 ns)
- Fast or for LV1 decision
- Track angle (LV1) from time measurement on precision strips

News

- 1.5 x .5 m^2 prototype

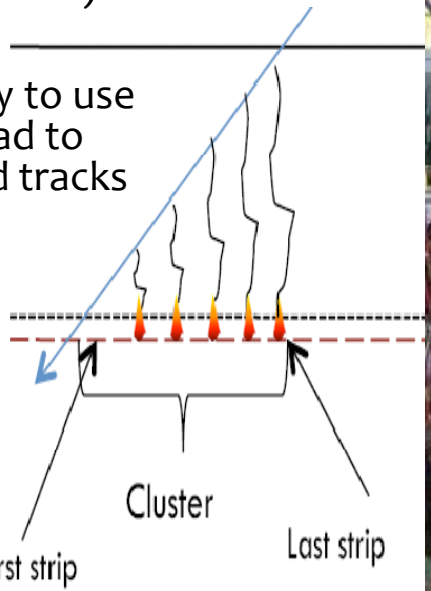
  Half the final size. Segmented mesh, 250 and 500 µm strip pitches, longer strips (350 & 850 mm)
- 10 x 10 cm^2 chambers

  250 µm strip pitch & better mesh (450 lpi, 18 µm wires, pre-stretched) compared to P1 prototype. T2K connectors, read out with T2K electronics or other.
- Test beam

  With new electronics, new mesh, and resistive anodes (2 types, see conference talk by K. Nikolopoulos)
- Micro-TPC

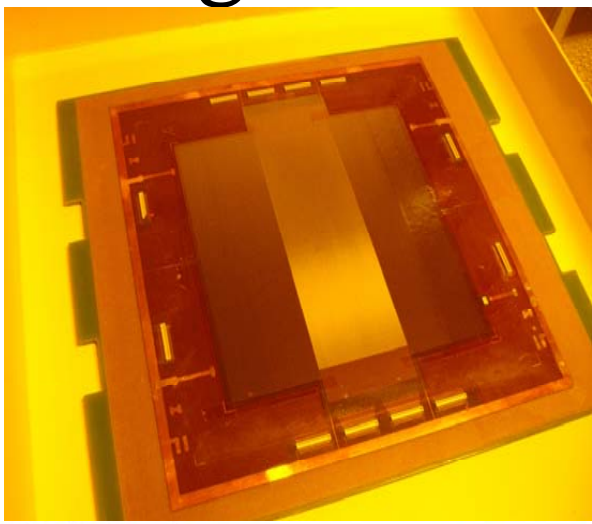
  Study to explore the possibility to use information on drift time spread to improve resolution for inclined tracks

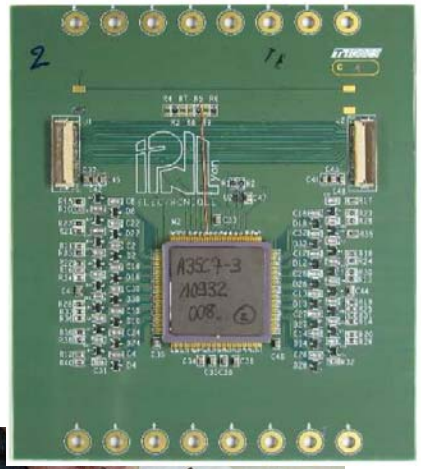
  - Track angles 10–20°
  - Drift gap 7 mm
  - 4-8 strips hit for 250 µm pitch
  - Time res. few ns needed
  - Coarse charge measurement

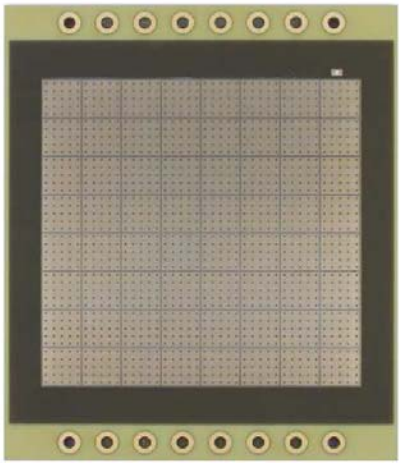


Other applications of large Micromegas

- COMPASS tracking, with pixellized central area. *Conference talk by D.P.F. Neyret*
- DHCal for ILC. *Conference talk by M. Chefdeville*
- TPC for ILC. *Conference talk by D. Attié*



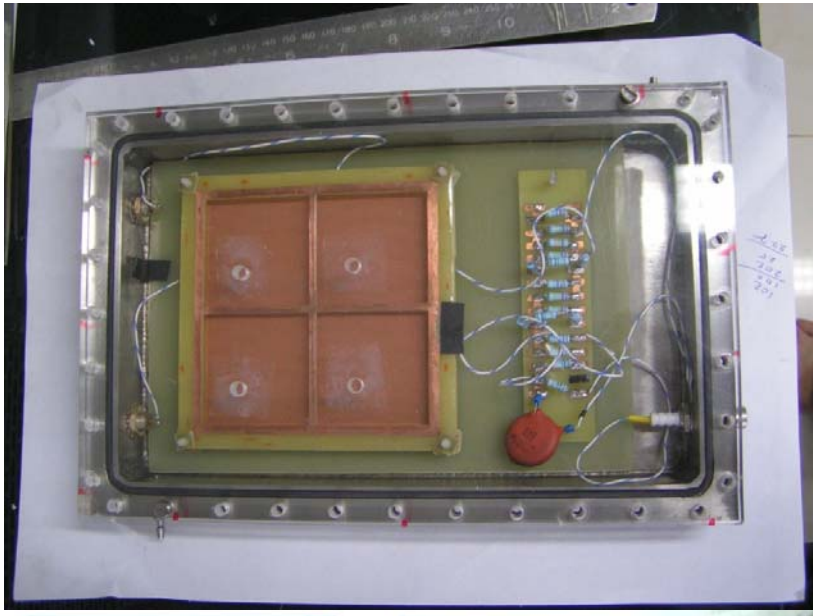


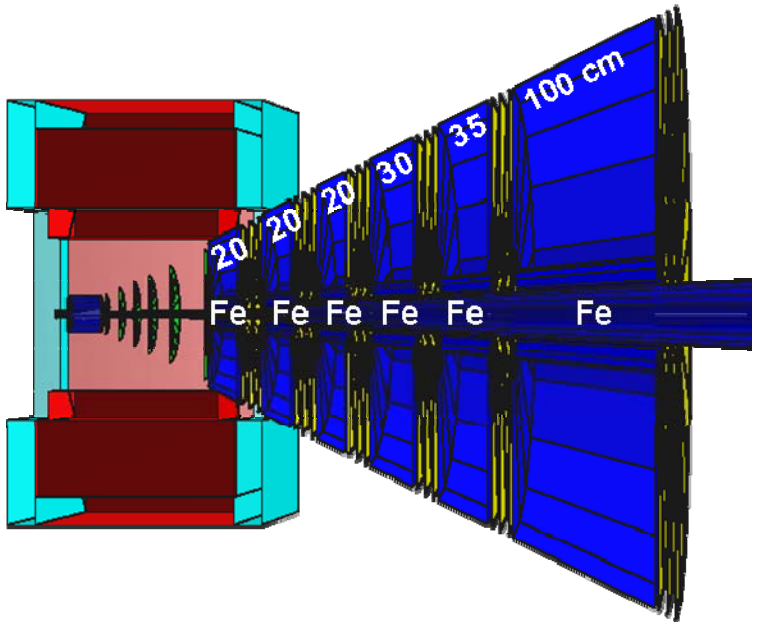


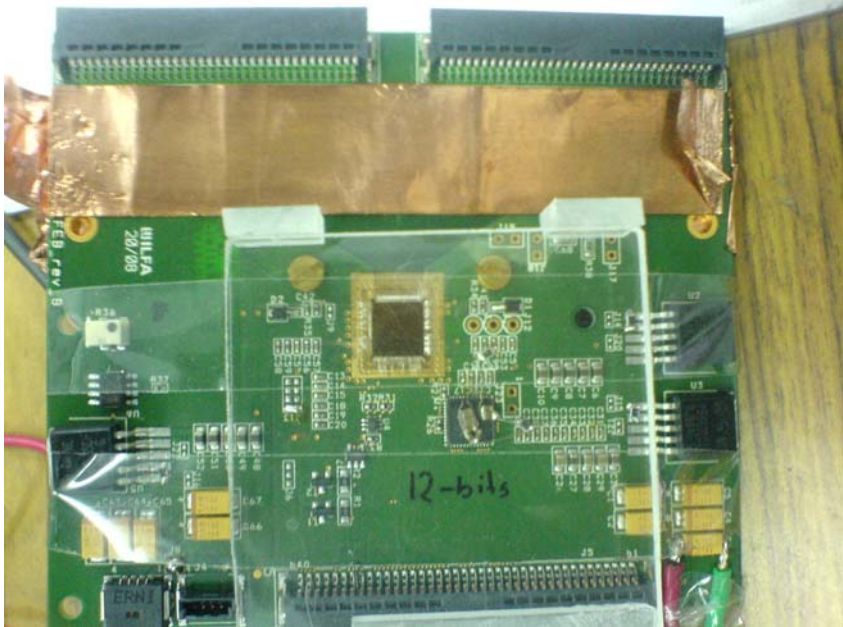
GEMs & thickGEMs for CBM muon chambers

by Anand Kumar Dubey

- Also medical applications foreseen
- Readout by NXYTER front-end electronics
- Rate ~ 10 MHz/cm^2

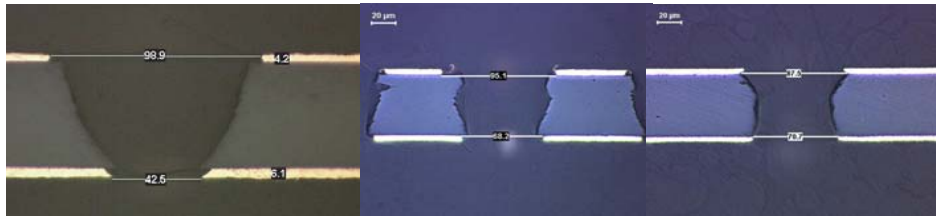


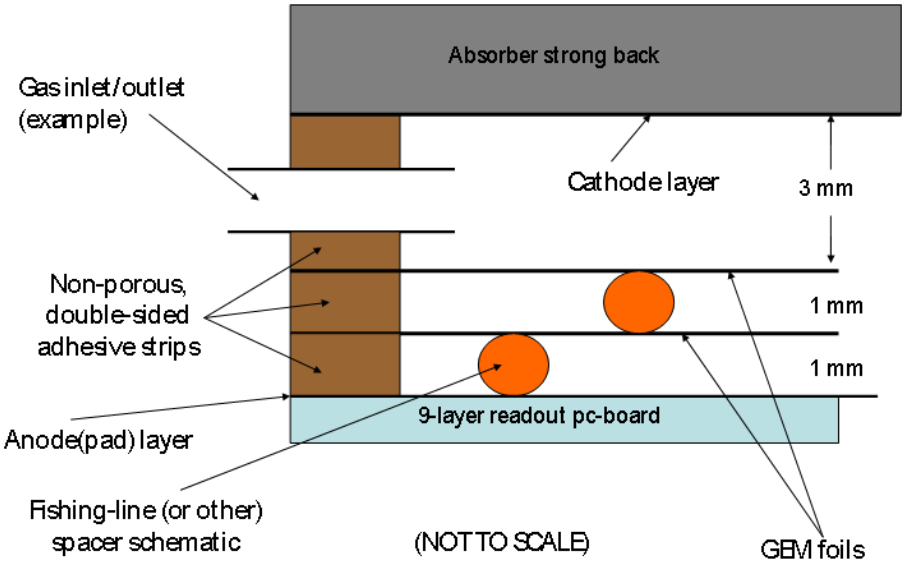


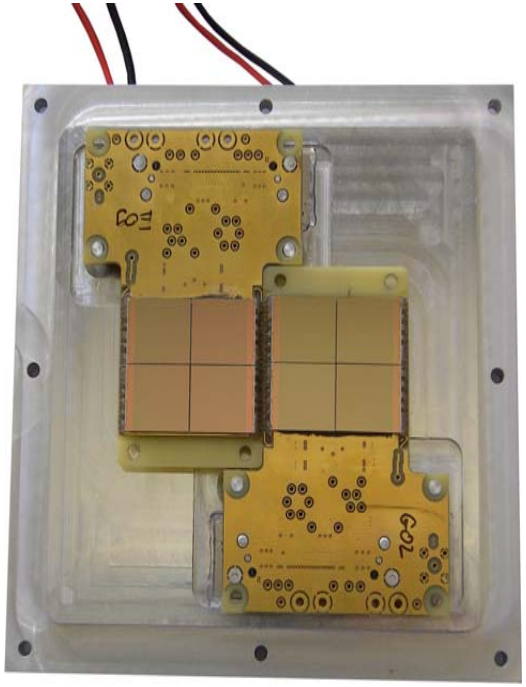


Further news on large GEMs

- Progress on large area GEMs, *Conference poster by M. Villa*
- DHCal for ILC. *Conference talk by A. White*
- TPC for ILC and PANDA. *Conference talks by J. Kaminski and X. Zhang*
- STAR tracker. *Conference talk by B. Surrow*



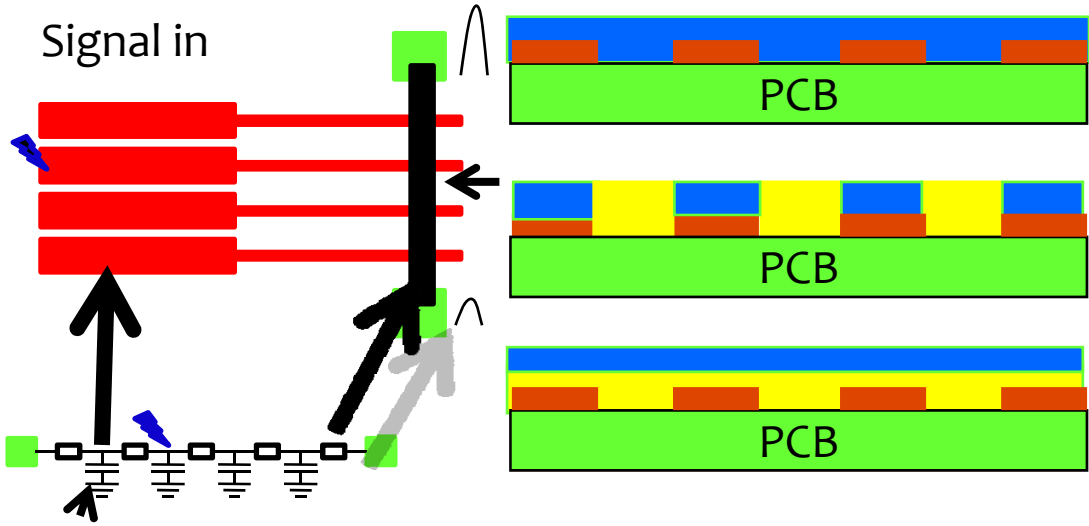


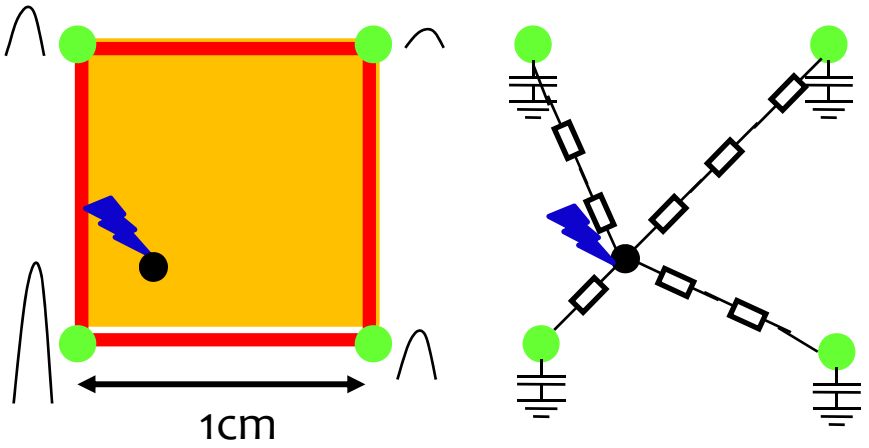


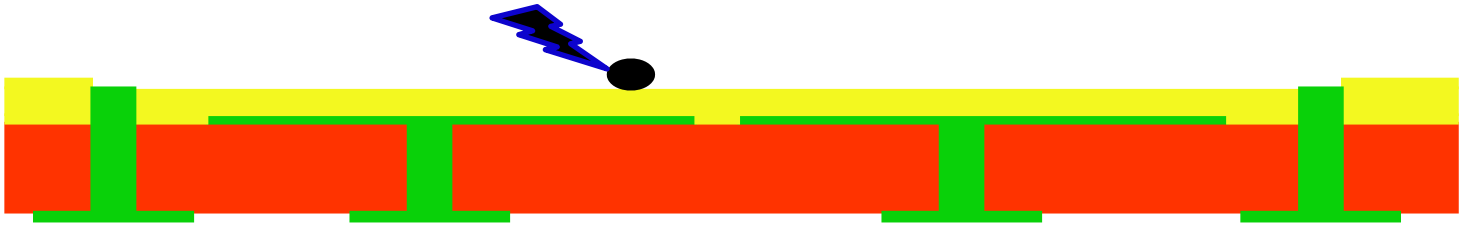
And thick GEMs for RICH applications, *Conference talk by F. Tessarotto*

Large area production

- Rui's talk at the conference about large area and large volume production, including involvement of industrial partners (which have already been contacted)
- In parallel session, more details and ideas from Rui about readout boards, particularly with resistive and capacitive layers
- Resistive anodes for reduction of channel count. *Conference talk by M. Dixit*



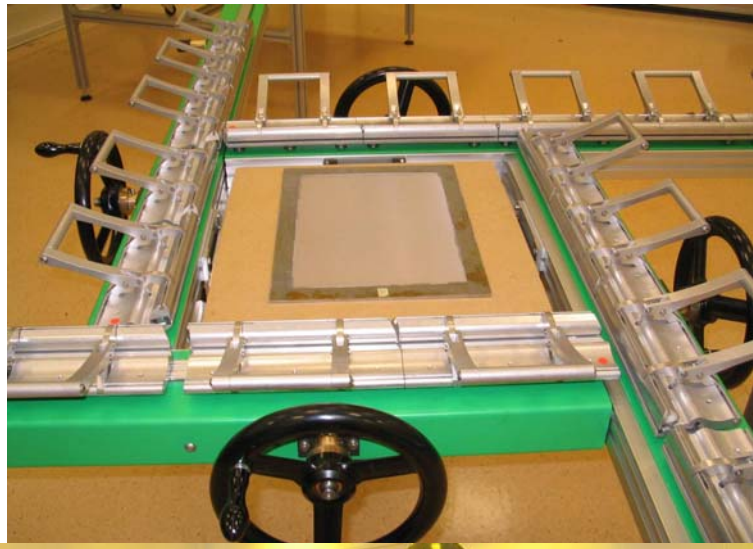




Bulk production in Saclay, Stéphan Aune

New lab built up last year in Saclay, with new equipment:

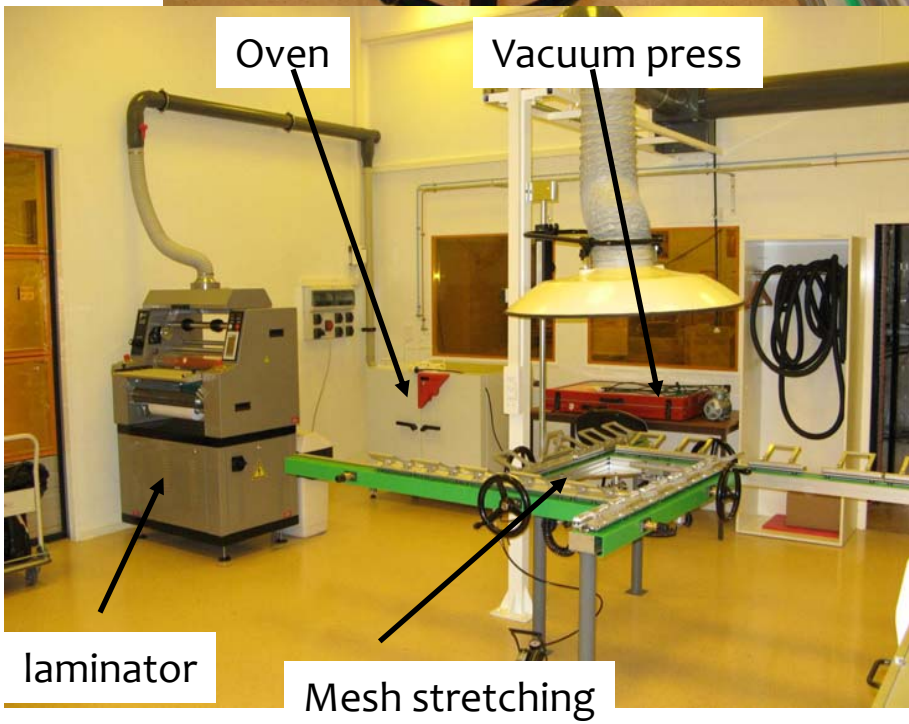
- Stretching machine (2008)
- Laminator unit (2008)
- Large oven (2008)
- Insulator unit (2009)
- Development unit (2009 ?)



Cost:

Budget R&D bulk 2008 et 2009 : 60 k€ + 20 k€ of safety

consumable: 10 k€/year



Task 4 – Portable detectors

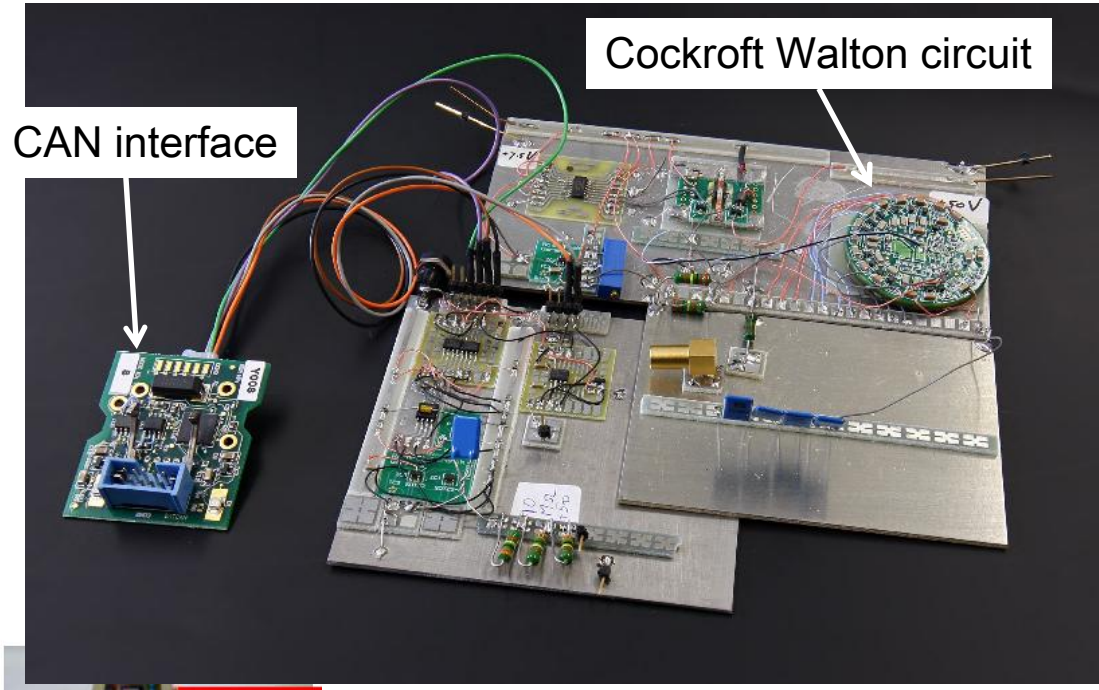
Two approaches to portable high voltage supplies:

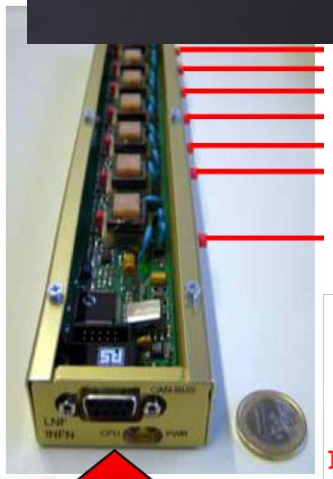
- µHV, Fred Hartjes.

  Cockroft-Walton supply with output current measurement, compatible with high magnetic field

- HVGEM, Fabrizio Murtas.

  7-channel active divider for proper field adjustment in case of a discharge





+ CARIOCA readout system,
Compact and scalable