CERN workshop upgrade

Rui De Oliveira

CERN workshop upgrade for MPGD

- First step: buy and install 9 machines.
  - These 9 machines are at CERN
  - 3 are still not installed
    - Large photoresist developer
    - Large photoresist stripper
    - Large copper etching

- Second step:
  - -Redefine all the process parameter related to the new equipment
    - -The last one to be define is the Polyimide etching
    - -We have already parameters done with a small spraying machine.
  - -Build some prototypes of the # detectors
    - -Many have been already produced

TE/MPE/EM Workshop upgrade

- An agreement was reached with CERN management in 2010 to purchase the subset of machines necessary to carry out R&D on large size GEM (2m x 0.5 m) & Micromegas (2m x 1m) and the associated large size read-out boards in the current CERN TE/MPE/ME facility.

	market survey	call for tender	order	received	ready
GEM					
– 1 continuous polyimide etcher	x	x	x	x	02/2013
– 1 Cu electroetch line	x	x	x	x	06/2012
Micromegas					
– 1 large laminator	x	x	x	x	06/2011
– 1 large Cu etcher	x	x	x	x	postponed
– 1 large UV exposure unit	x	x	x	x	06/2011
– 1 large resist developer	x	x	x	x	postponed
– 1 large resist stripper	x	x	x	x	postponed
– 1 large oven	x	x	x	x	06/2011
– 1 large dryer	x	x	x	x	06/2011

Why postponing installation of 3 machines? Status of Polyimide etching

- These 3 machines : Copper etching, resist development and resist stripping are now constantly used in the std PCB production.

- The time needed exchange machines is evaluated at 1 to 1.5 week per machine.

- We can not afford stopping our production for the time being.

- We can still follow all the R&D program with our present equipment.

- The new machines will be installed directly in building 107 and will greatly simplify the transfer from 102 to 107.

- The commissioning of the polyimide etching machine have been delayed because of extra addings for security .
  It is now not yet stopping any R&D program but this year we have to make 2m x 0.5m GEMs and probably large read-outs.
  The machine will be ready in theory in one month.

- **Ovens limited to 1.5m x 0.6m → 2.2m x 1.4m**
- **In building 102 .**

- Double side , scanner type
- 2m x 0.6m
- Long exposure times
- Hot exposures (10 kW)

- single side , direct exposure
- 2.2m x 1.4m
- Short exposure
- Cold exposure (3.5kW)

- UV exposure unit limited to 2m x 0.6x → 2.2m x 1.4m
- Single side exposure
- We keep the old lamp anyway
- In building 254

- Spray continuous line etching

- Dead bath etching

- GEM polyimide etch limited to 1m x 0.5m → 2m x 0.5m
- The filling and emptying pumps are still not connected
- 1 foil/hour → 12 foil / hour
- No tooling needed
- In building 254

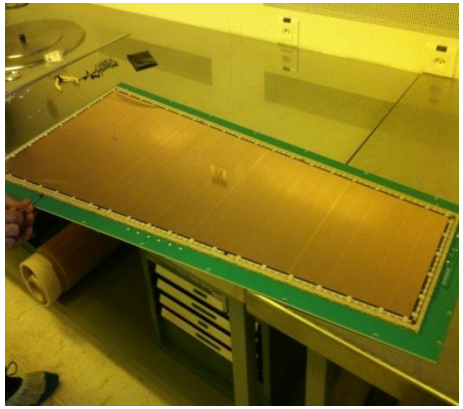
- Laminator limited to 0.6m width → 1.4m width
- Photoresist , Photoimageable coverlay
- In building 102 .

- Horizontal dead bath

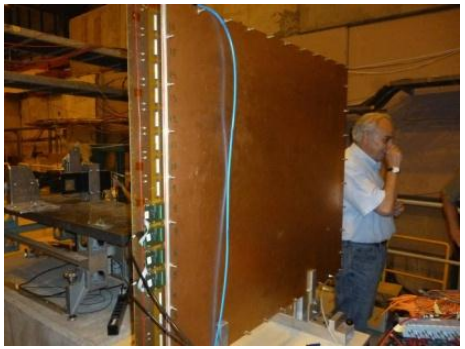
- Vertical filtered dead bath

- Ethanol GEM Resist stripping limited to 1m x 0.5 → 2m x 1m
- Reduces the consumption of ethanol
- Avoid Ethanol daily handling
- In building 102 .

Examples of detectors produced with these equipment



- CMS GE1/1 GEM detector
- 1m x 50cm
- 5 detector produced
- 6 more in production



- ATLAS Muons Micromegas detector
- 1m x 1m active area (1 detector produced)
- 2m x1m 1 detector produced
    - See Givi's talk
- second one in production

2013 program for significant size detectors

- J Lab
  - 40 GEMs and associated read-out (50cm x 40 cm)
- CMS
  - 4 To 6 detectors NS2 (1.1m x 0.45m)
- ATLAS
  - One detector 2m x 1m
  - One real prototype (4 layers stack , 3.5m x 2.5m)
- ALICE
  - To be define
- Geo Azur
  - 4 to 6 resistive BULK (1m x 50cm)
- Solid
  - To be define
- LHCb
  - To be define

Man Power affected to MPGDs

- 2012 MPGD team situation:
  - GEM : 2 technicians (2 FSUs)
  - Micromegas: 1.5 staffs
- 2013 MPGD team situation:
  - GEM : 5 technicians (2 staffs + 3 FSUs)
  - Micromegas: 2 staffs
- The std detectors are now produced by the other members of the std PCB team.
- Our production planning for GEMs is full till end of February
- Our production planning for Micromegas is full till end of March

Conclusions

- This year we will make GEMs of 2m x 0.5m
- We will produce also Micromegas detectors 3.5m x 2.5m
- Man power situation better than 2012
- No large quantity project expected in 2013