GEM Status and Progress from Chinese Collaboration

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SoLID Collaboration Meeting
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JLab

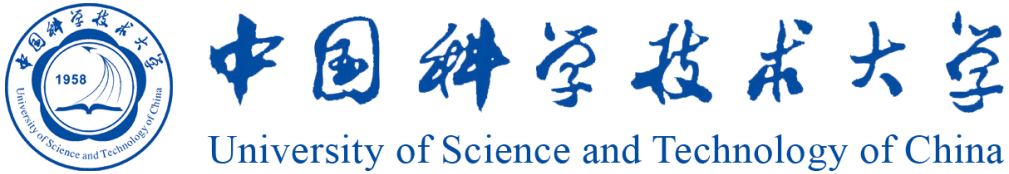
The Chinese Collaboration

China Institute of Atomic Energy (CIAE)

Lanzhou University

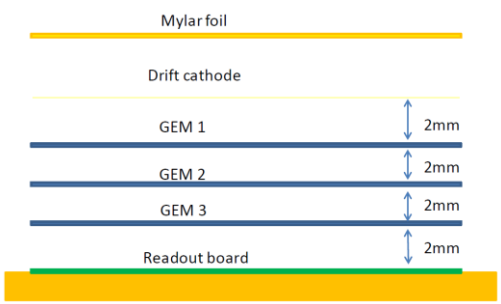
Tsinghua University

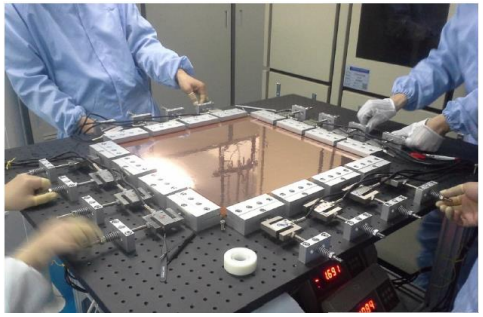
University of Science and Technology of China (USTC)

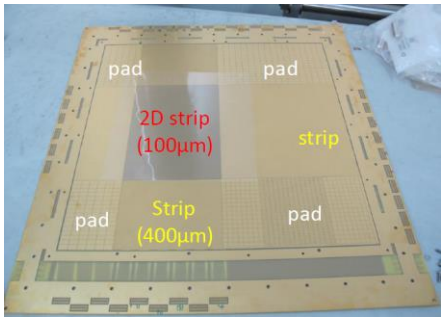


GEM Status at Tsinghua University

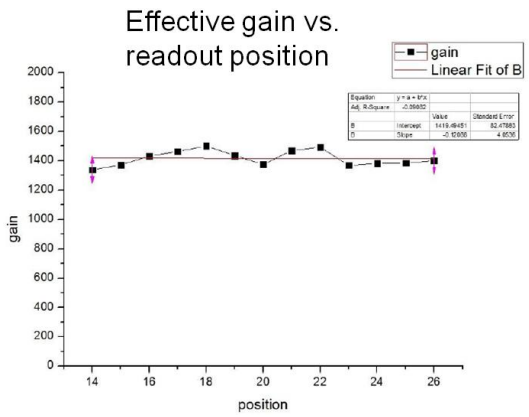
- The 45cm*45cm GEM chamber built early this year

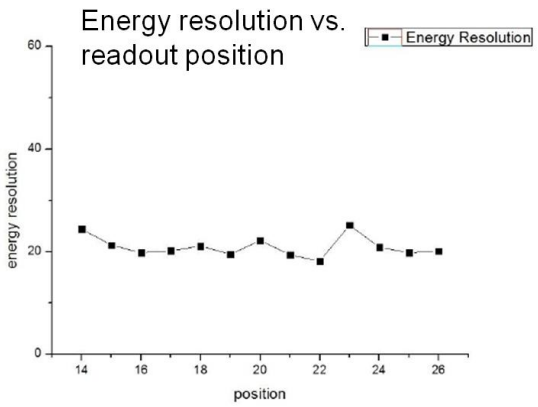






- Performance tests



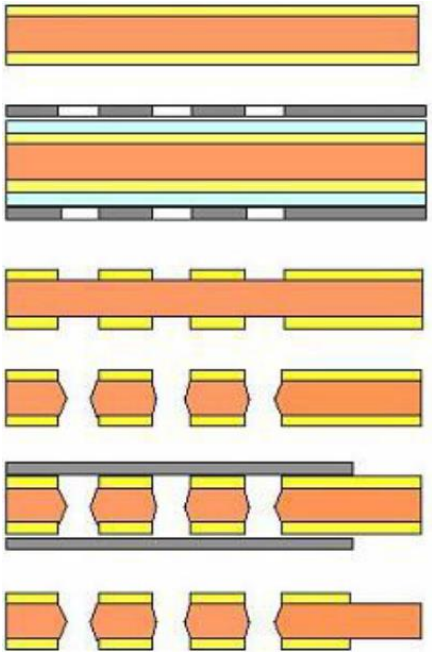


- Working on curing a shorted sector and optimizing the chamber design.

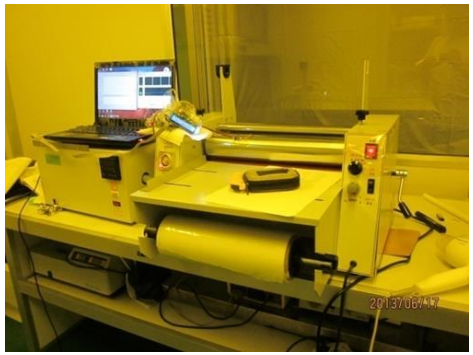
GEM status at CIAE

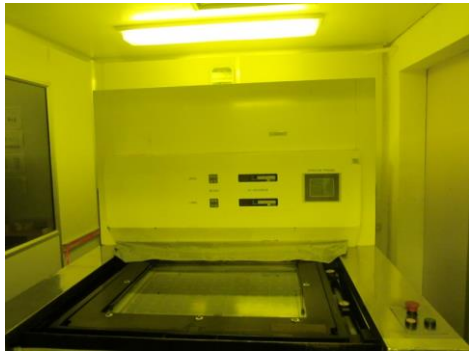
- Large-area GEM foil samples produced with double-mask technique
- GEM foil R&D still ongoing, now mainly on single-mask technique.

Double mask technique

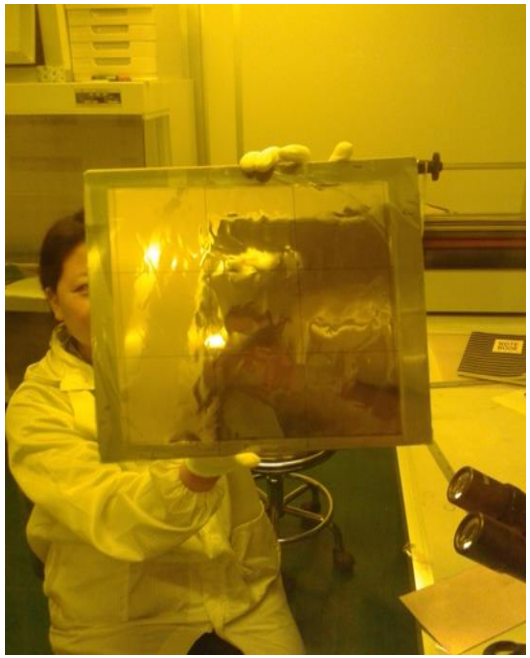


GEM foil production facilities



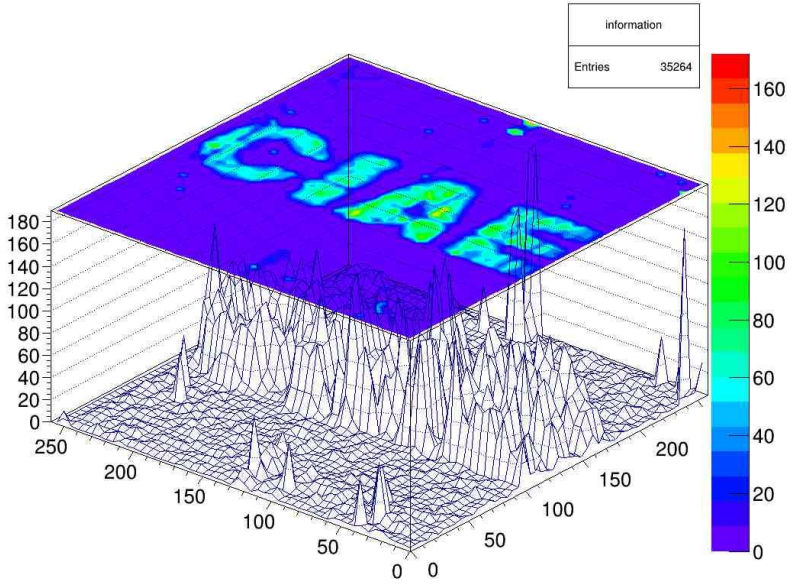


A 30*30cm^2 GEM foil produced at CIAE



GEM Readout at CIAE

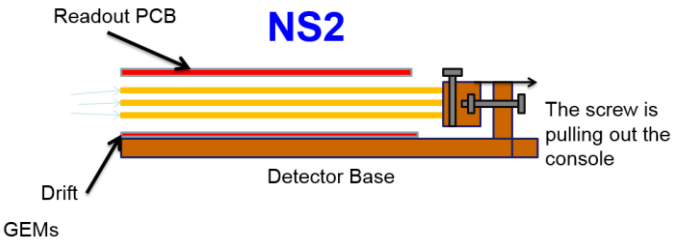
- Set up and tested a “INFN” GEM readout system. The system works now in general.
- DAQ performance needs to be further improved.

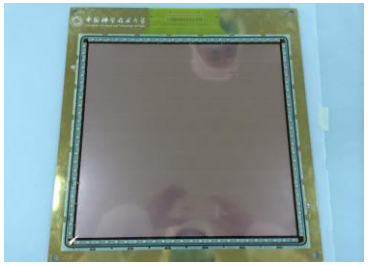


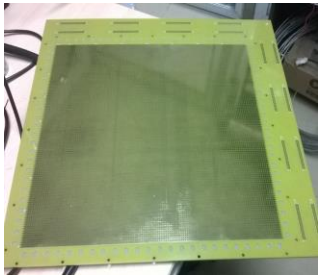
GEM updates from USTC

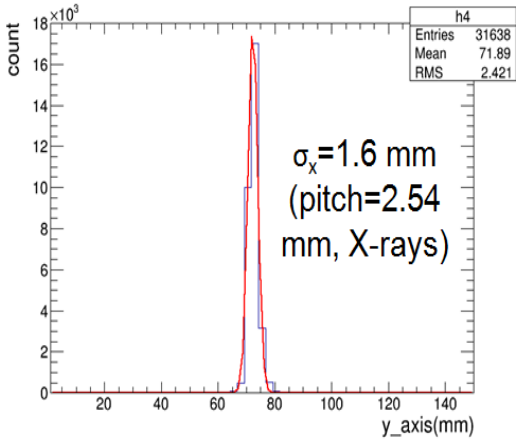
- Main focus still on large-size GEM chamber R&D.
- GEM stretching technique of choice
  - NS2 developed at CERN, free of gluing
- Has built two 30*30 cm^2 GEM chambers with the NS2 technique and tested them.

Results for 30*30 cm^2 GEMs

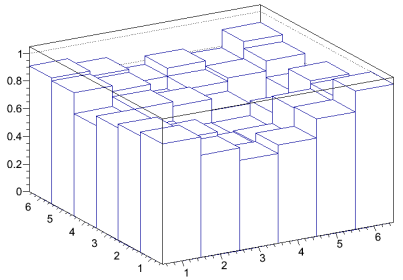




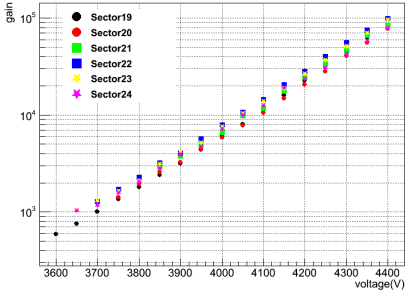




Gain Uniformity: 31%



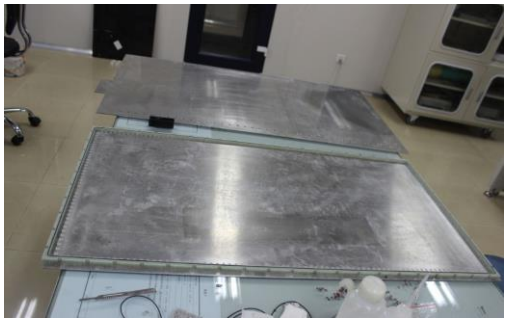
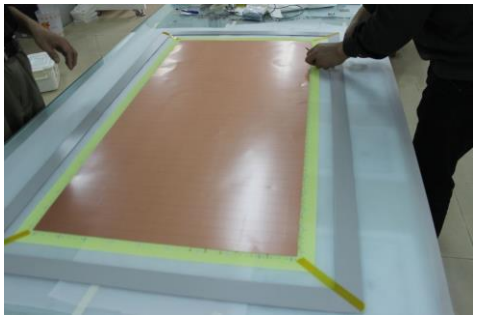
Gain vs. High voltage



Going larger (~1*0.5m^2)

- Moving on to GEM chambers in size of ~1m

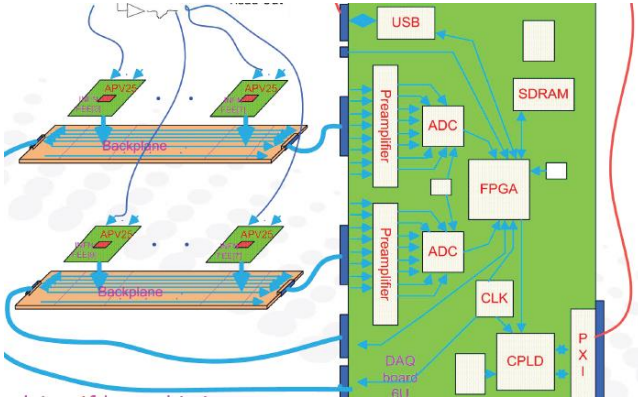
A full-size mock-up of a 1*0.5m^2 GEM chamber

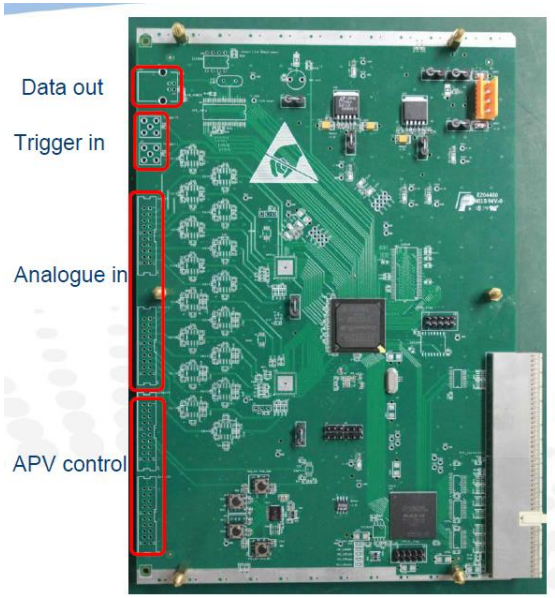

- 1*0.5 m^2 sized GEM foils ordered and being produced at CERN.
- Intensive design optimization work design still ongoing, to be finalized soon.
- The aim is to build a 1*0.5 m^2 GEM chamber by the end of this year.

Readout Design at USTC

Design schematic

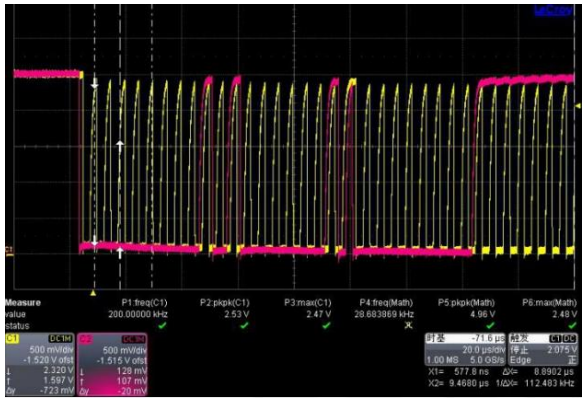


Main PCB



System testing

Tuning



- Developing a GEM readout system based on APV25
- Expected to be ready for test with GEM in a few months.

Summary

- R&D remains active in various aspects of GEM detectors in Chinese collaboration.
- Focus shifting towards fabrication of large-size GEM detectors.
- GEM foil and readout R&D efforts also significant.