GEM R&D and Funding from the Chinese Groups

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Activity of Large Area GEM R&D in USTC

1. **A new 30cm X 30cm is in manufacture;**

2. **A 1k-channel Gassiplex FEEs were get from JLab, the relative readout electronics and PCBs are ready, we are testing this system now;**

3. ***Some simulation and optimization work on the mechanical design and gas flow route;***

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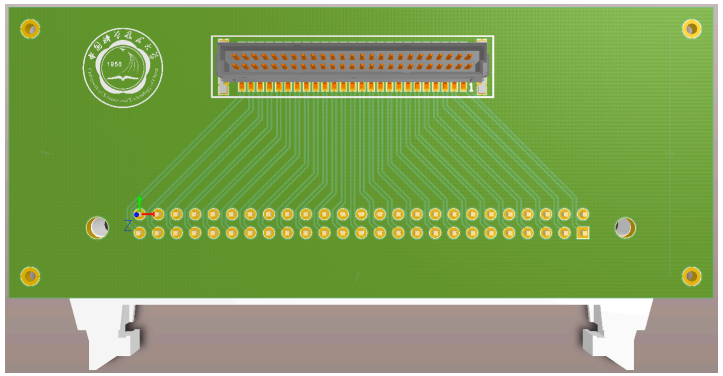
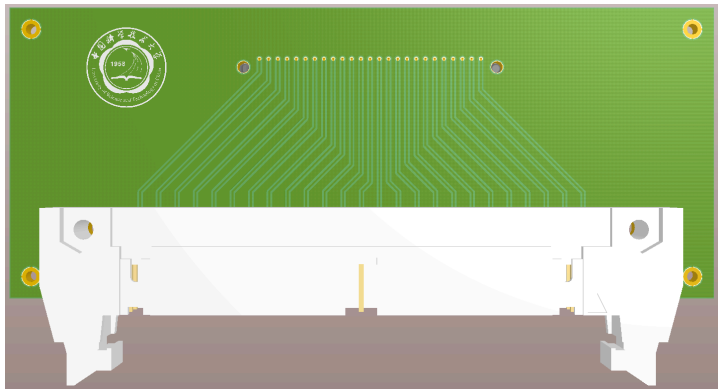
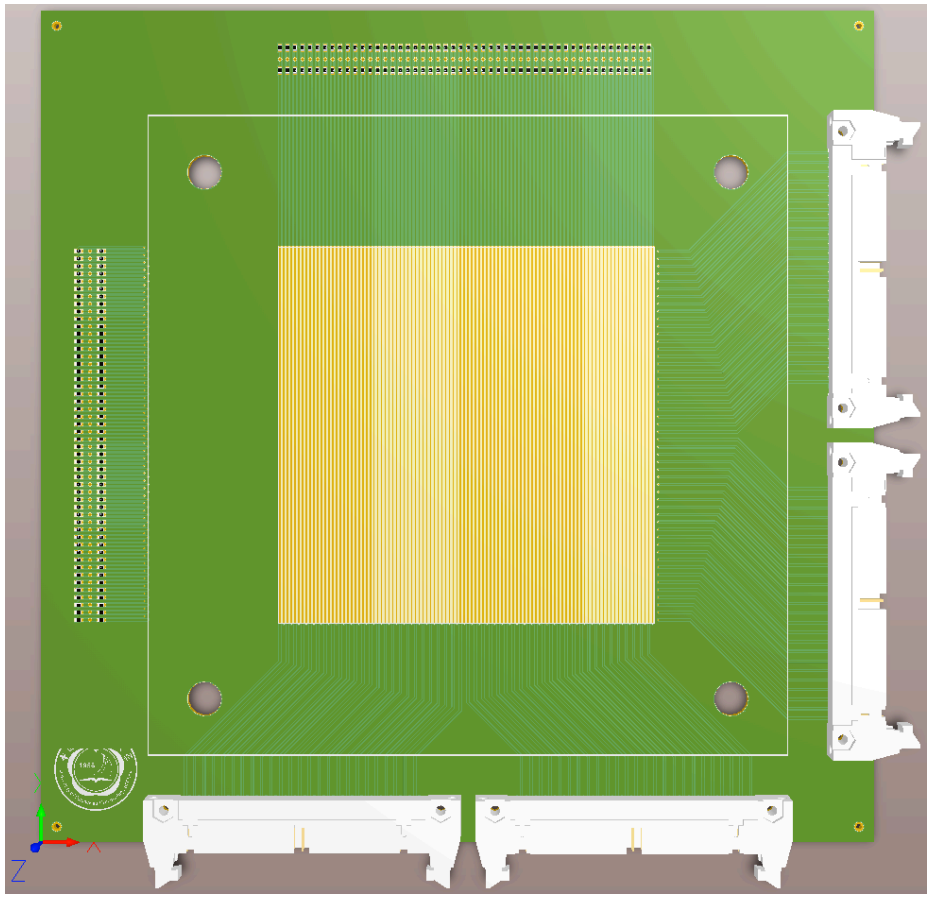
The Readout anode and adaptor for Gassiplex FEE







◆*Adaptor for Gassiplex FEE*

◆*GEM Readout PCB for Gassiplex FEE*

From NSFC

- Suggested for “Major Research Plan” (20 M CYN for 4 years)
- Draft application material prepared and applicants organized (USTC, QHU, Lan Zhou U. IMP, SHIAP).
- Not listed in the “Guide Line” of 2012 due to reason that a Key Project has been approved for it in 2011.
- A symposium will be held by NSFC in middle of Feb. to possibly prioritize all the on going and suggested projects for big science in China (Guanda Zhao, Zhengguo Zhao and Bingsong Zhou are appointed to chair the symposium).
- USTC will also apply for General Project from NSFC (maximum 1 M CYN for 4 years).

From CAS

- Wenlong Zhan of CAS vice president has suggested to apply for “International Collaboration” aiming at collaborating for key technologies for particle detection and accelerating.

- An application has been submitted to CAS in January of 2011, Zhengguo Zhao has discussed with officers of Bureau for Basic Research of CAS. Zhengguo was told that they would explore how to find out a path that this project can be supported.

- The institution that organized in the application are
  USTC, IMP, SHIAP and ITP.

Fund Received for GEM in Tsinghua

	Total in CNY	Invest in GEM
Tsinghua University initiative scientific research program	1670 K	500 K
NSFC key project fund for overseas collaboration	3000 K (from PKU)	~1000 K

Ongoing activities in Tsinghua

GEM Prototype R&D:

→ Foils ordered, 15 squares (45*45cm^2) + 5 Trapezoids

→ Simulation

Electronics:

→ APV license application ongoing

Alternative option for non-availability of APV:

→ ASIC-based FEE in production (400 Chs)

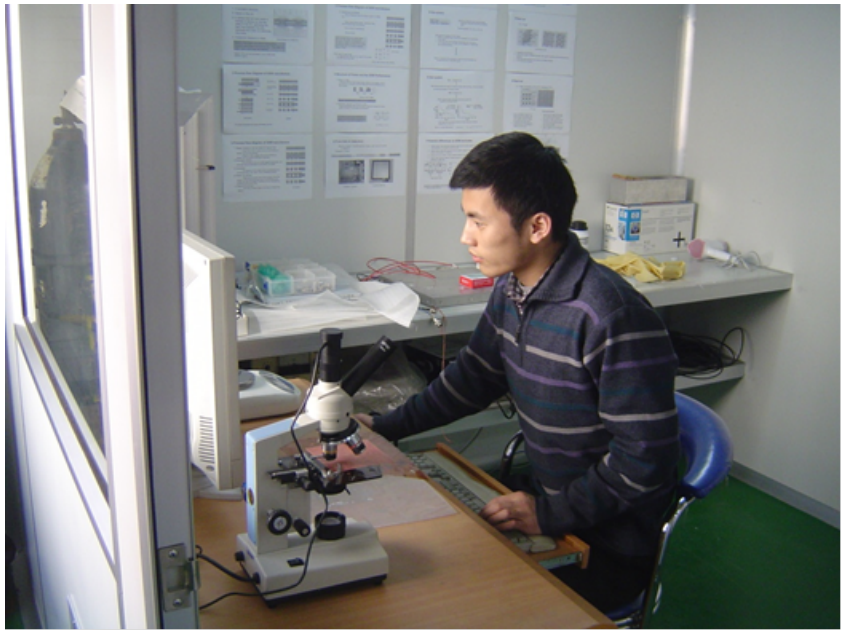
→ Peak sensitive VME ADC to be ordered (160 Chs)

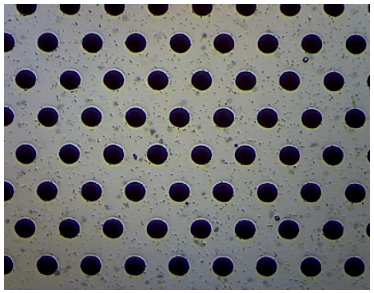
→ VME based DAQ under development

Manpower invest:

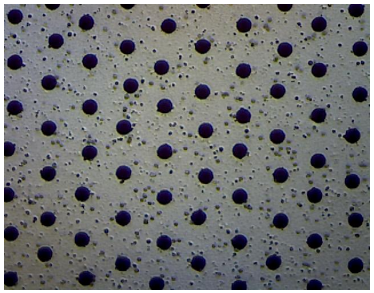
→ 2 Ph D student and 0.5 engineer

The Construction of Clean Room for GEM Foil R&D





Mask plate from CERN
60um diameter



Mask plate from CIAE
50um diameter

After half year negotiation, CIAE has signed officially the **LICENSE AGREEMENT FOR MANUFACTURING AND COMMERCIALISATION OF GEM FOILS AND GEM-BASED PRODUCTS** with CERN, and will get full technology support from CERN.

Building Collaboration with a PCB Factory

Laminator

Photoetching machine

Etching machine

The PCB factory is located in the south of Beijing. They would like to make the GEM foils for us if we provide the technology support.

Fund Application

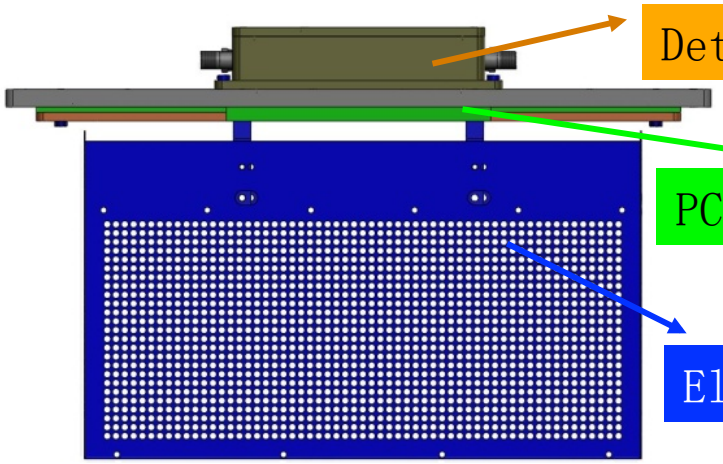
1. CIAE has sent an abstract to the 973 index collection, and the topic is "The Experimental and Theoretical Research on Hadron Physics". The proposal will be submitted in the end of March 2012.
2. Accomplished a pre-research fund of 973 project supported by CIAE on schedule, and got a new fund support on the research of spin physics.

Curren Status:

Micromegas detector has been developed in Lanzhou University

The imaging test has been done in the Am+Be neutron source in Lanzhou Univerisity

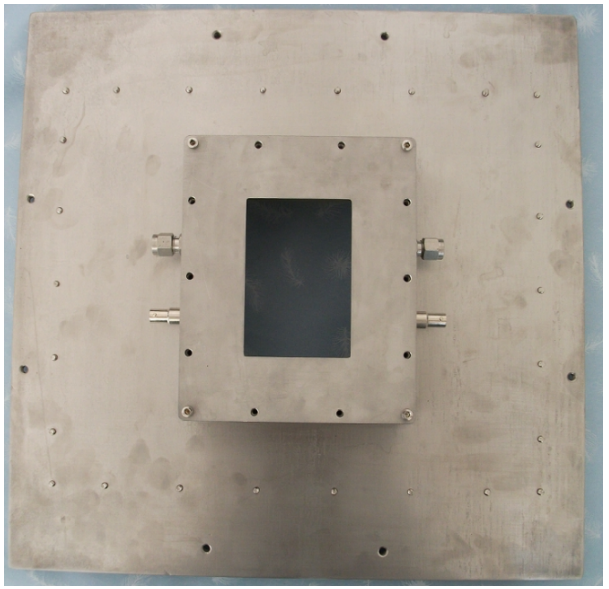
Detector Framework

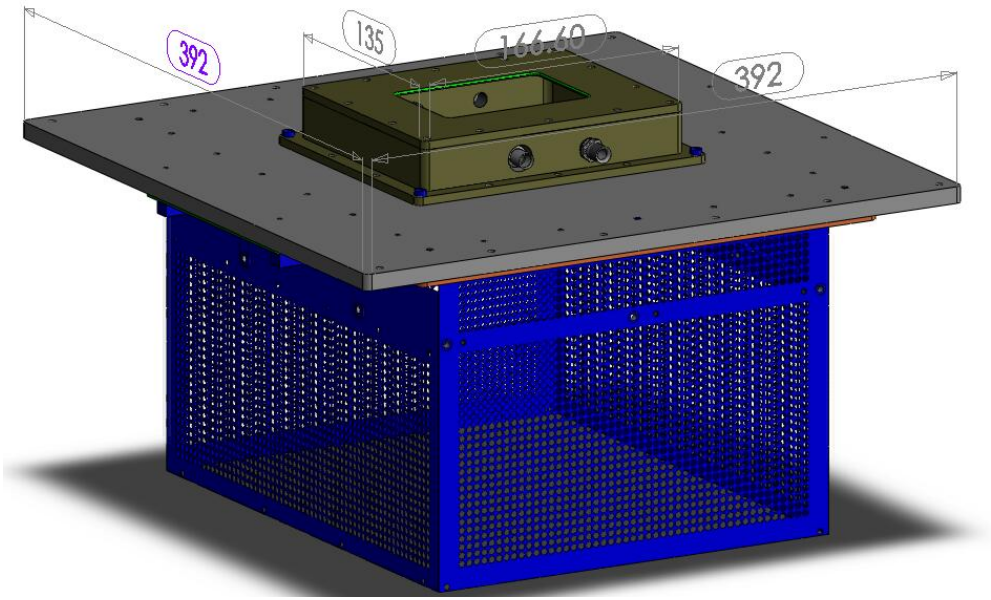


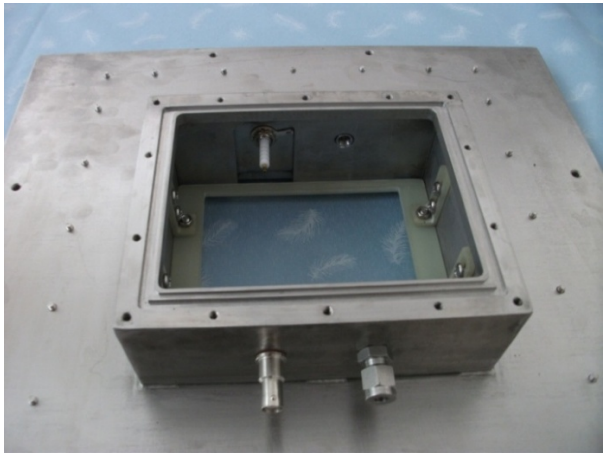
Detector Chamber

PCB: Pads array

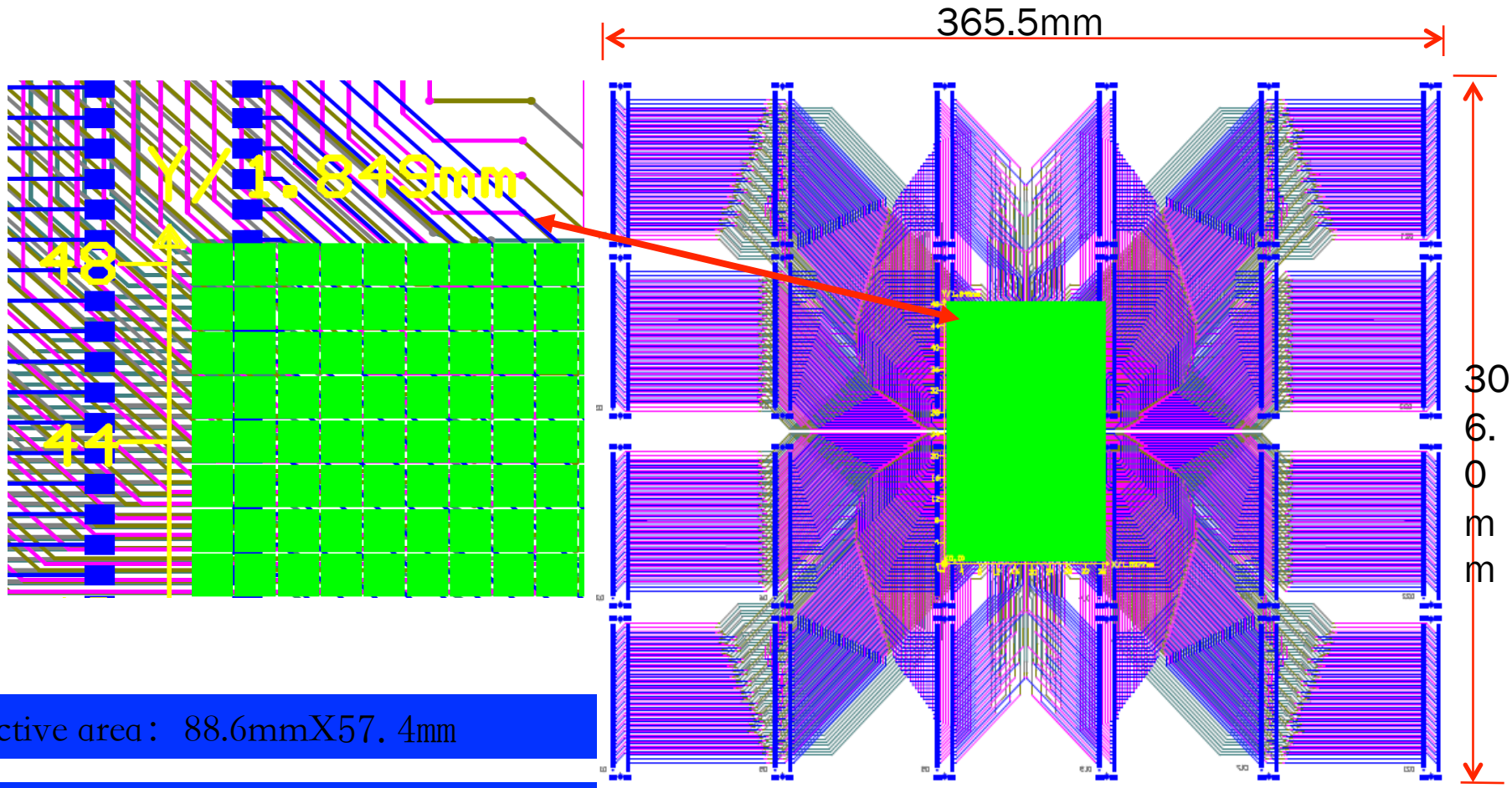
Electron shield box







Anode-readout Pads Array



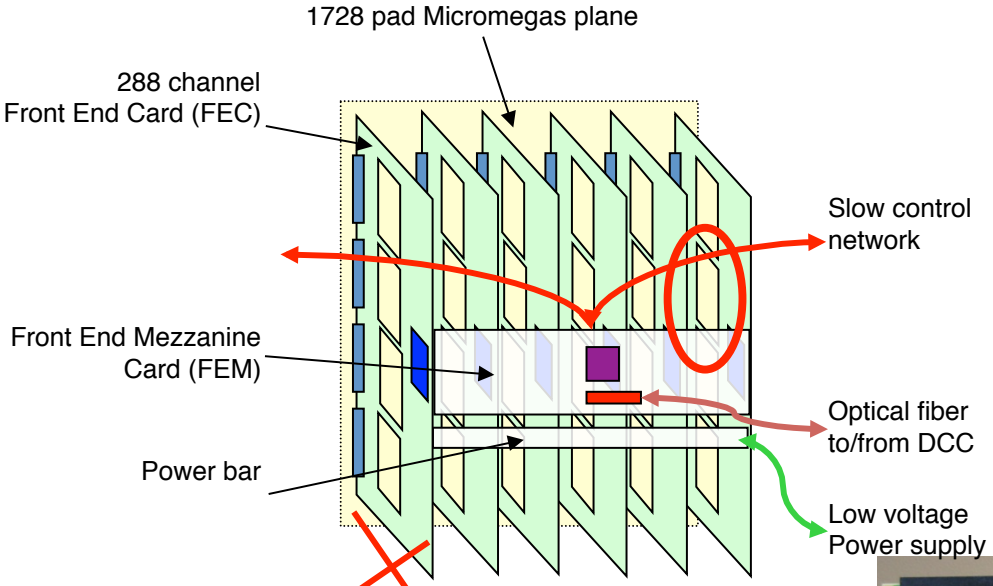
Active area: 88.6mmX57.4mm

One pad: 1.75mmX1.50mm

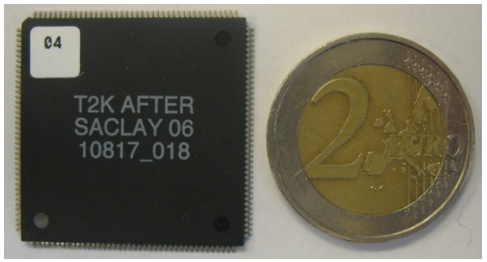
AFTER chip: 72 channels

The green is the sensitive area and a interval between of two pads is 0.1mm.

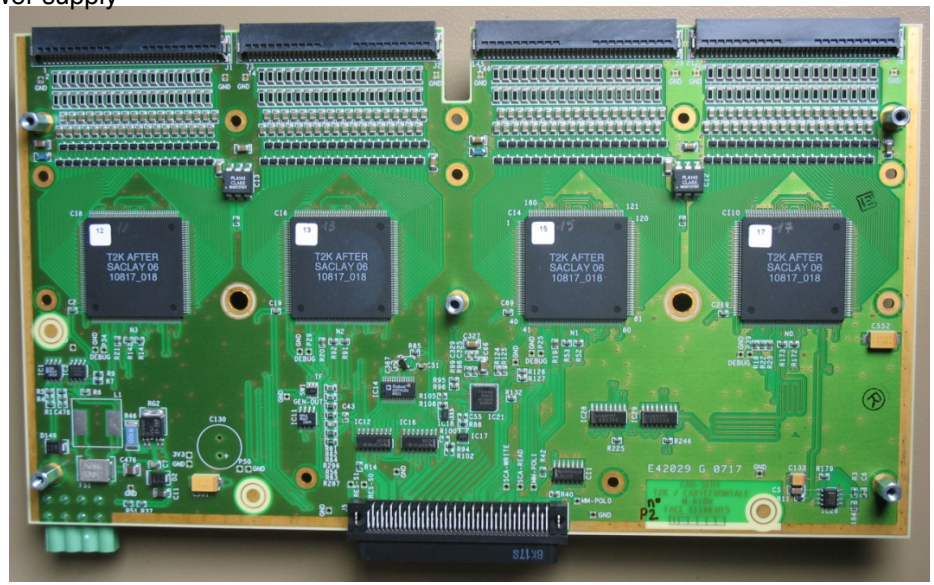
The T2K TPC Electronics



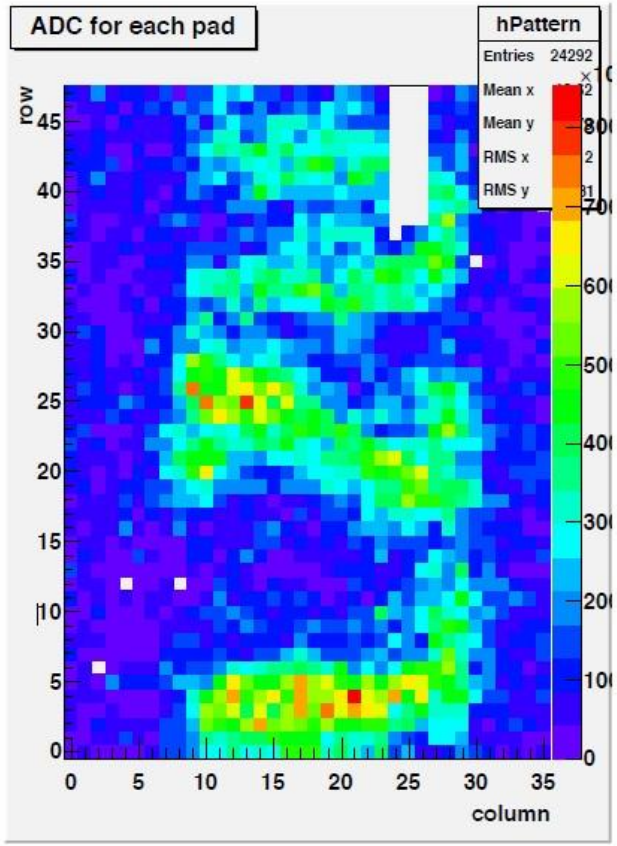
1 of 24 Front-End ASIC "AFTER"

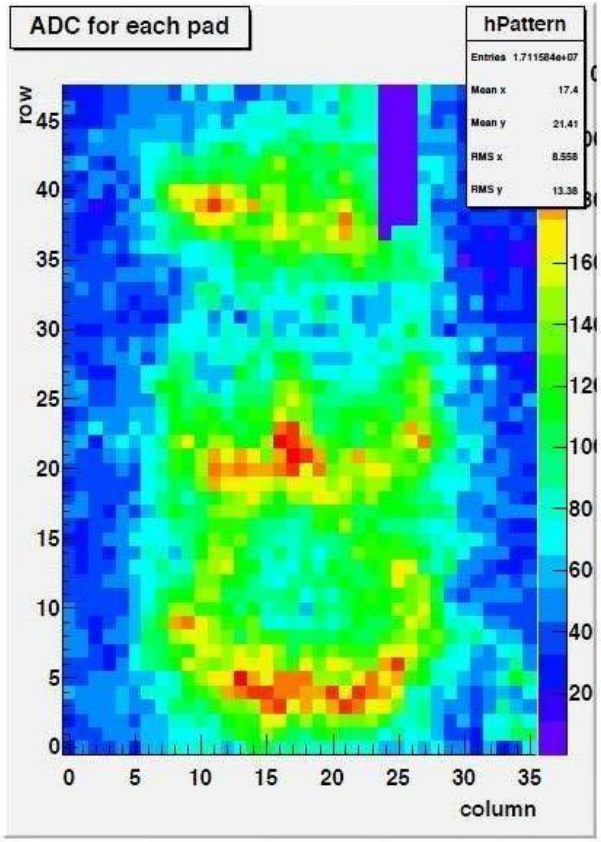


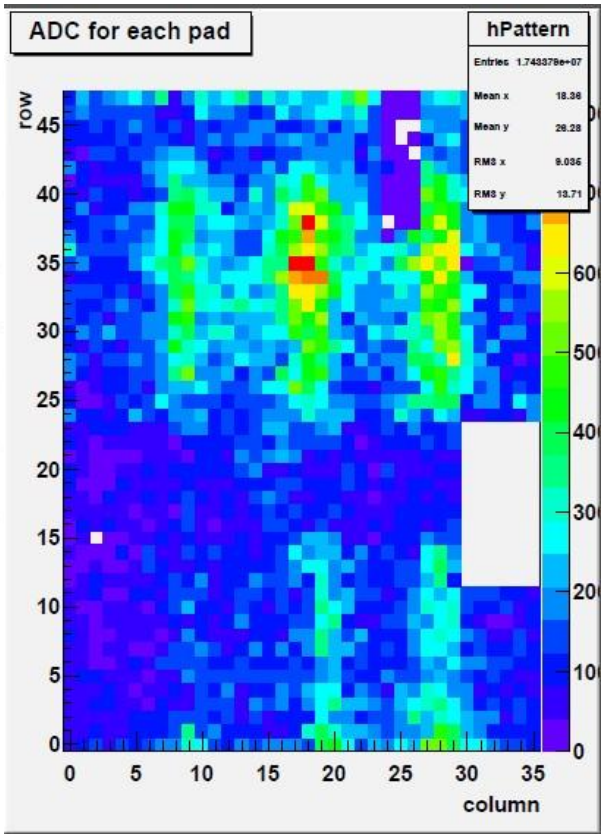
72 channel x 511 time buckets
Switched capacitor array



Imaging results based on Micro-megas in Am+Be neutron source







LZU CEA Slits

The Future Plan :

GEM foils has bought from CERN's printed circuit workshop.

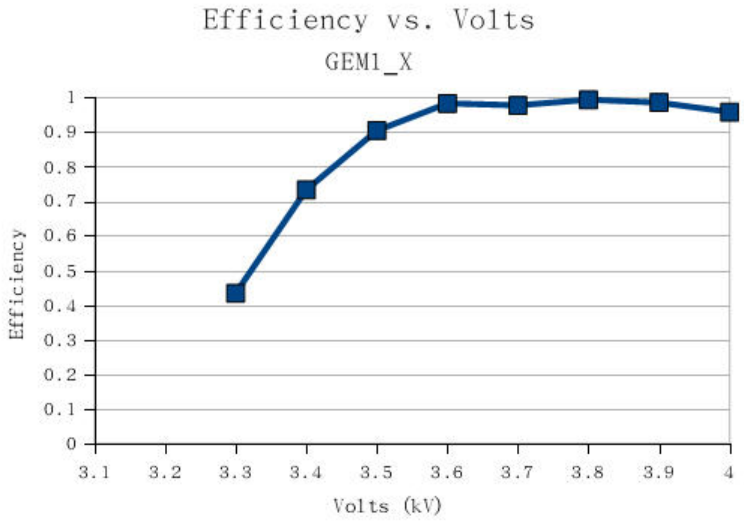
We are going to replace the Micromegas electronics (AFTER chip) with the APV25 chip.

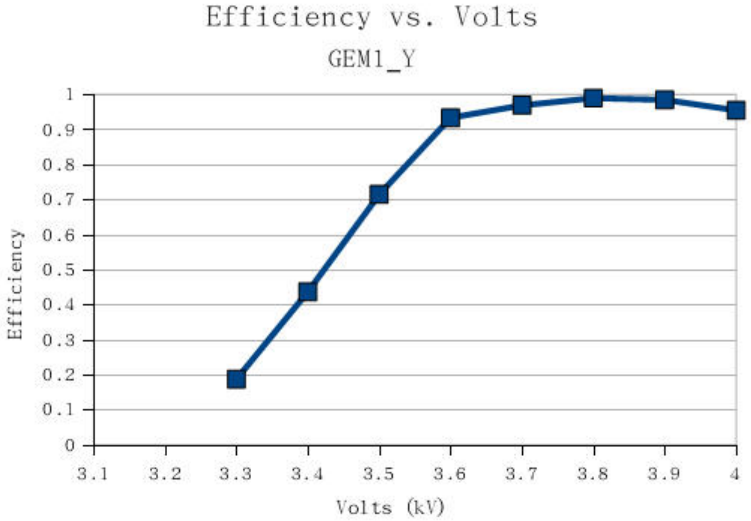
Test the GEM detector in different sides.

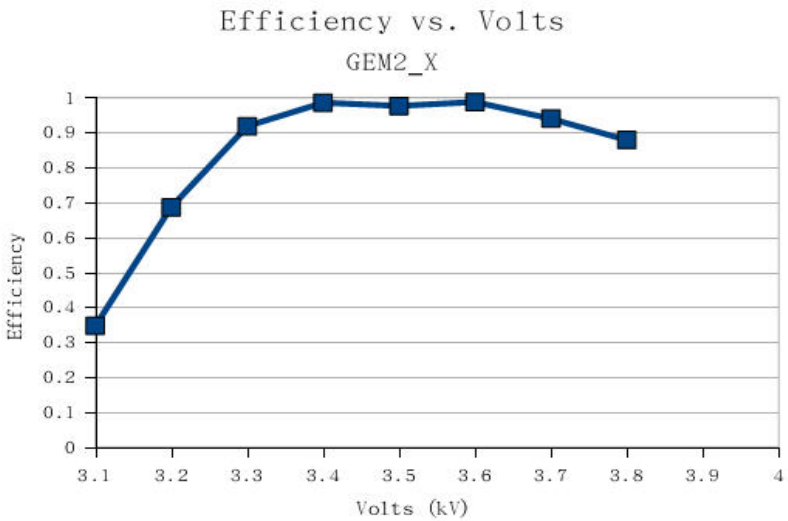
Update from PKU

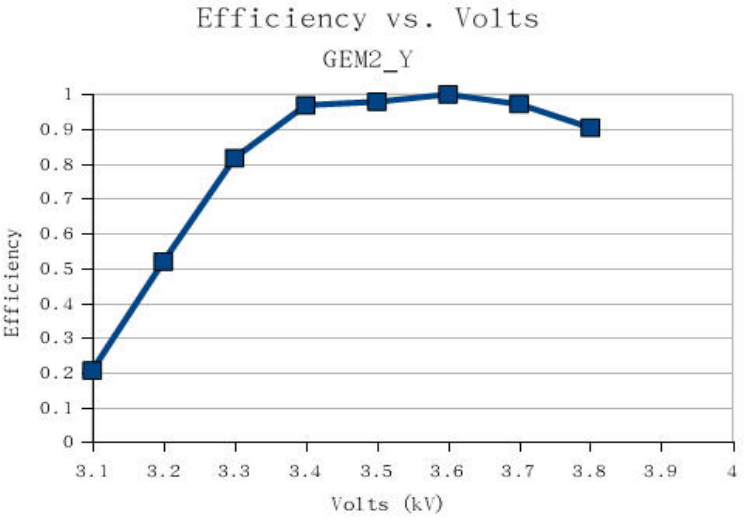
- NSFC major International Collaboration award (B.Q. Ma and H. Gao) starting 2012 for 4 years, 3M RMB (total), 2M (direct)
- 0.5 M PKU detector lab + 0.5 M from PKU detector R&D
- 1.0 M over three years THU GEM hardware and electronics
- PKU hired a new faculty member, Dr. Dayong Wang, currently a post-doc in FSU

The Preliminary Analysis of GEM HV Test at JLab with SRS APV25 Electronics 12/2011









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