GEM Updates from China

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SoLID Collaboration Meeting

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JLab

SoLID-GEM Chinese Collaboration

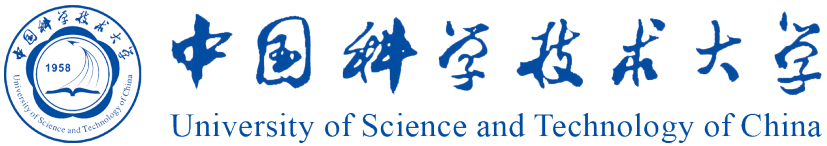
China Institute of Atomic Energy (CIAE)

Lanzhou University

Institute of Modern Physics, CAS (IMP)

Tsinghua University

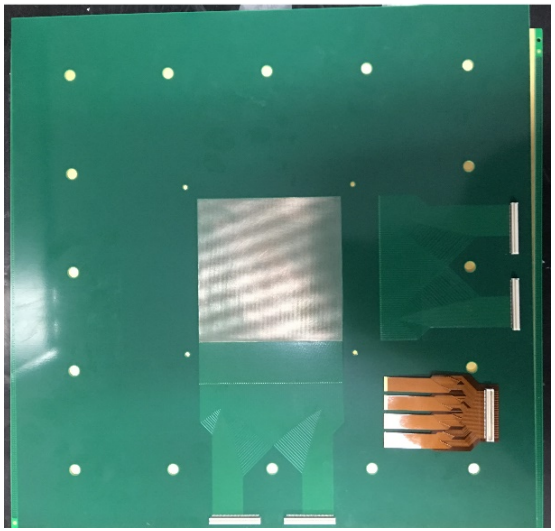
University of Science and Technology of China (USTC)

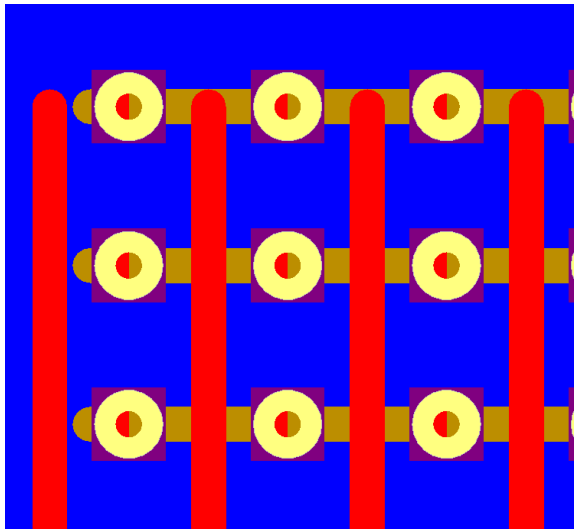


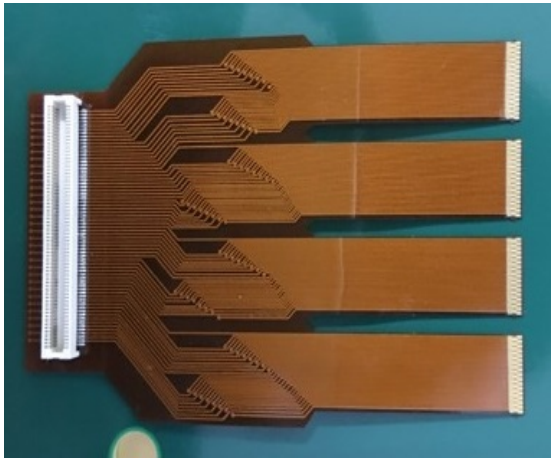
Progress from LZU

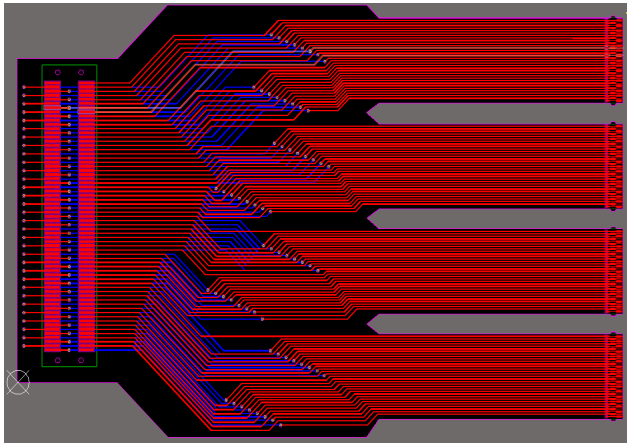
- Still working on online GEM background suppression
  - exploiting GEM signal time features to reject gamma background
  - trying hardware-level clustering to reduce event size
- Has built a GEM prototype to take data for the background suppression studies.

GEM Readout



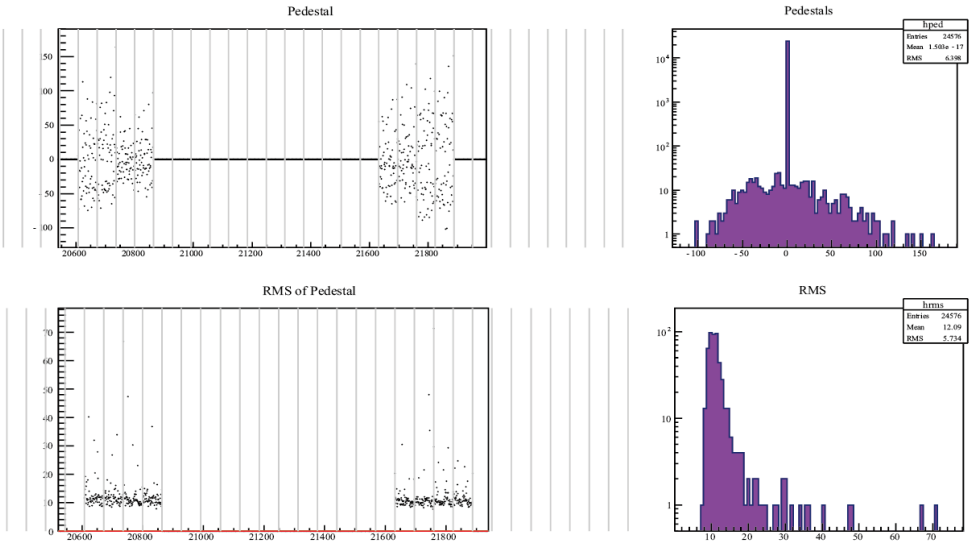






- 2d readout PCB
  - 10cm*10cm
  - Strip width: 130um
  - Pitch: 600um
- AVP25 readout
- Connector between readout PCB and AVP25
  - 130-pin panasonic

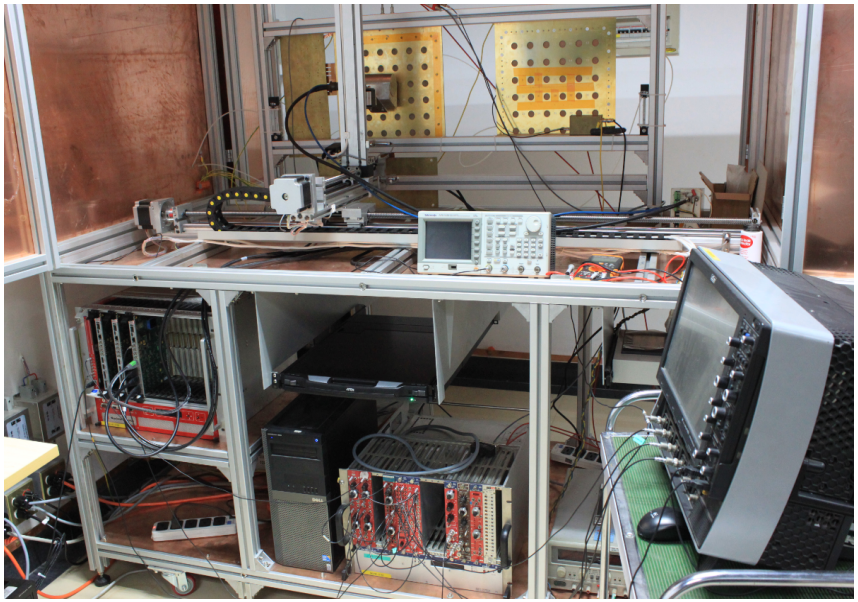
The Whole Setup

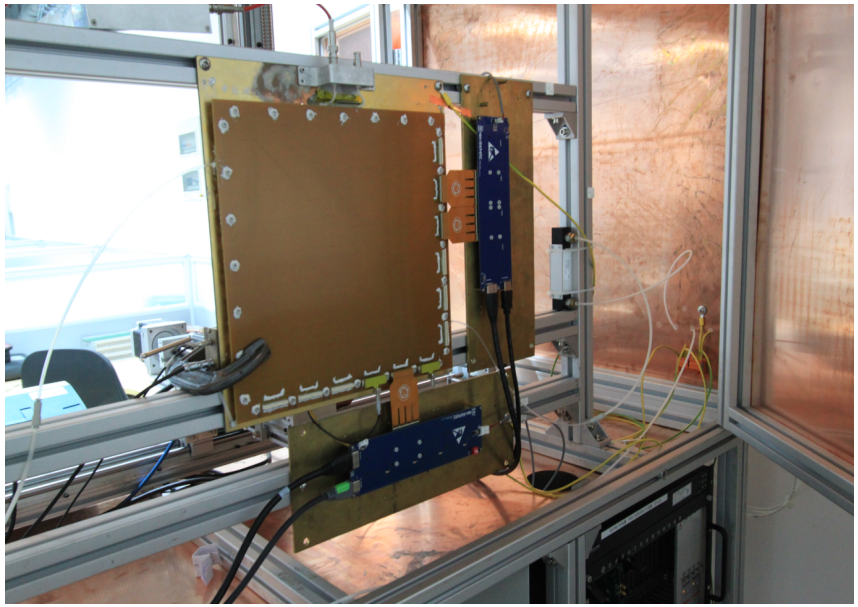


- Electronics works well.
- Noise gets very high once connected to detector, still under investigation.

Progress from USTC

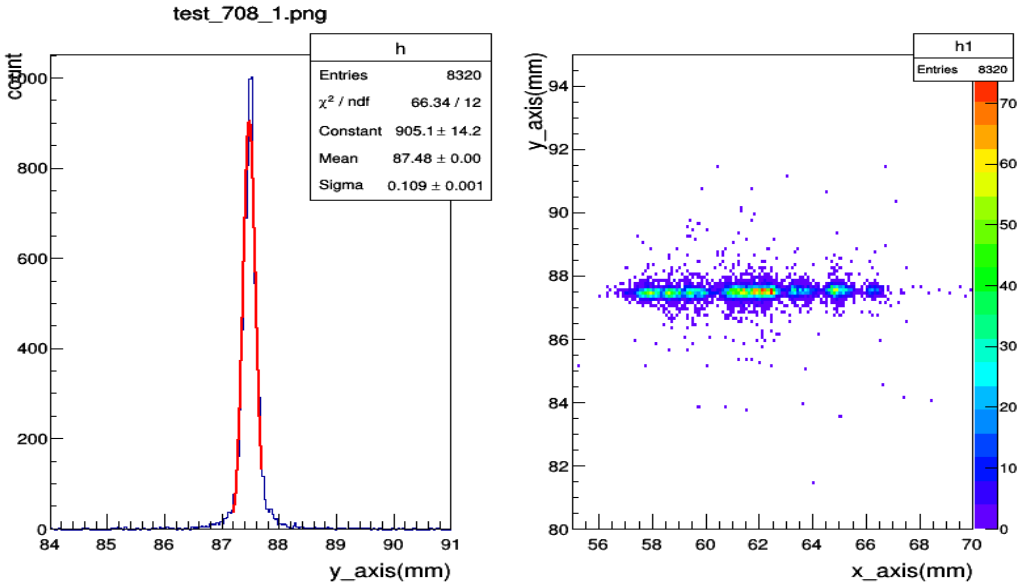
- GEM position resolution test with APV25 readout still going on.





Result

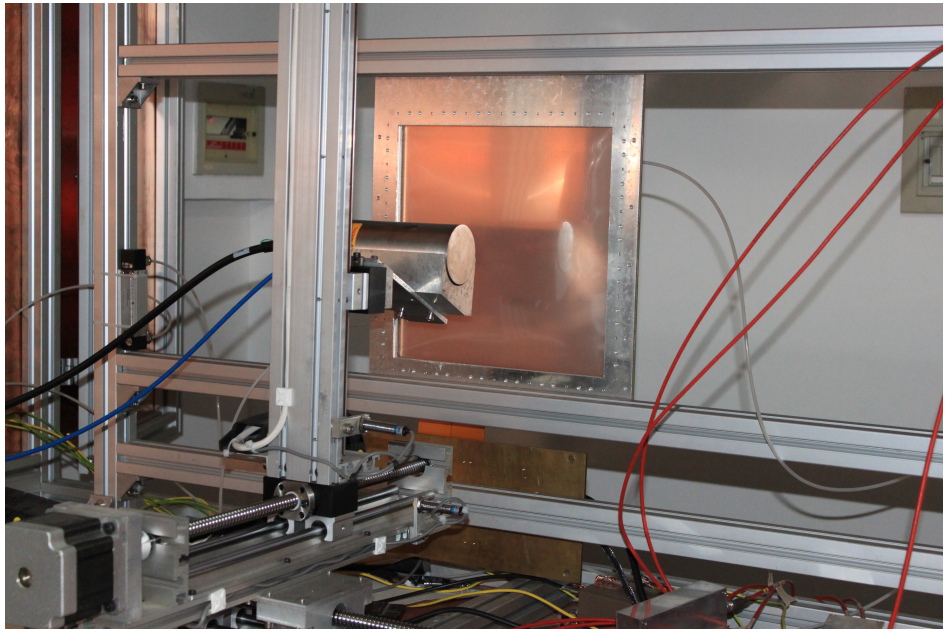
- Position resolution using collimated X-rays



~110um, worse than expected.

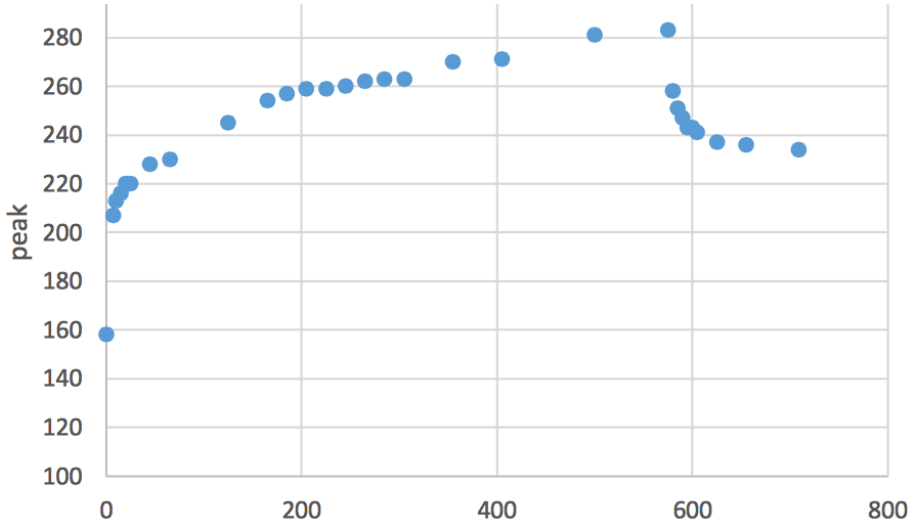
Test Condition Improvement

- Reduced X-ray scattering by replacing the drift PCB with a Mylar foil.
- New test to start soon.



Charging-up Simulation

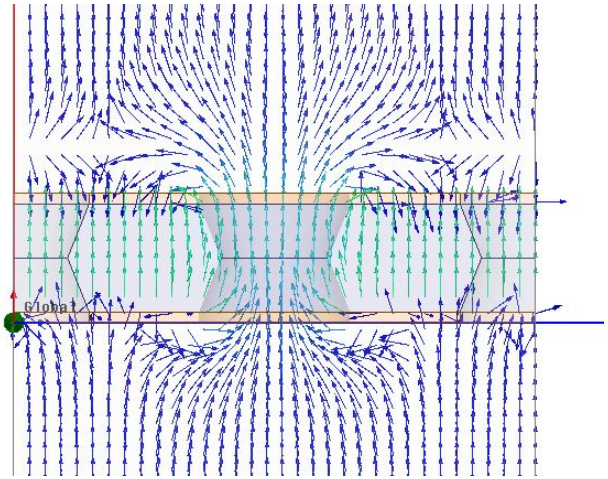
- Observation: GEM gain increases with time, reaching a plateau later on. The gain plateau varies depending on the irradiation level.



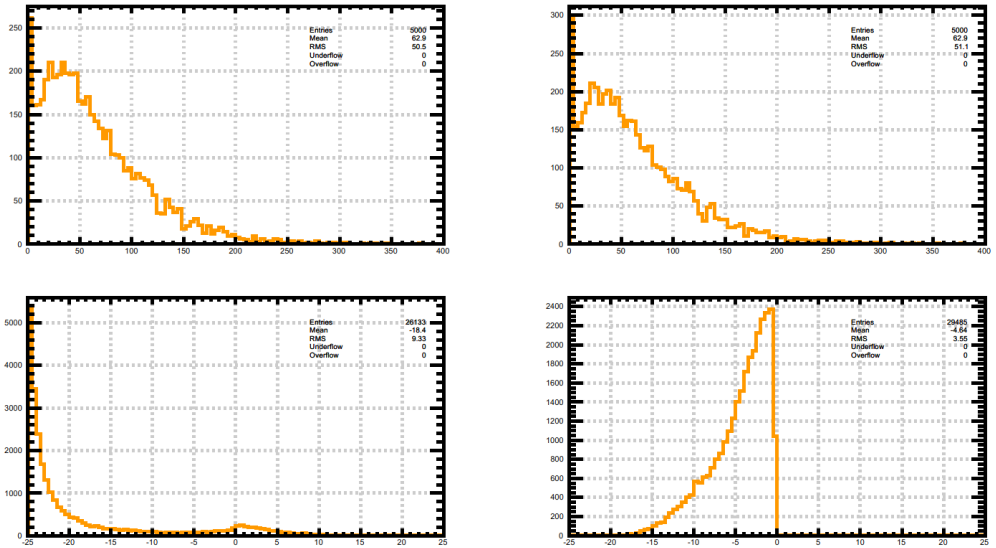
Tools

- ANSYS: electric field calculation
- Garfield: detector simulation

Electric field in GEM

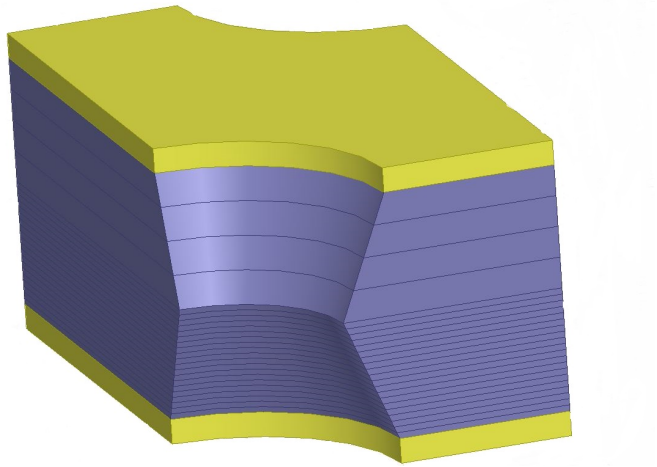


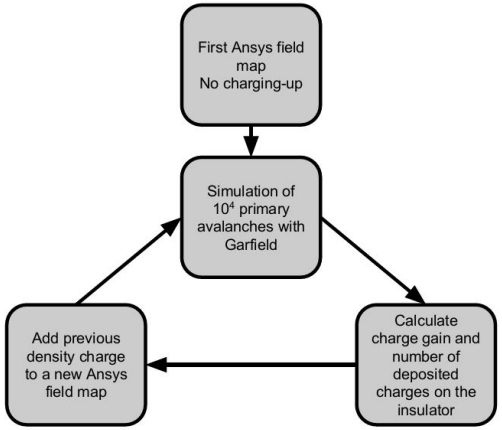
Avalanche simulation



Method

- Rebuild a new model for the uneven distribution of electrons on Kapton.
- Simulate avalanche process, feed the produced charge to the model to re-calculate the electric field in the GEM hole.
- Repeat the process till converged





Simulation still underway

News

- CIAE and USTC have acquired a large quantity of APV25 chips and had a large portion of them sent to EES for bonding and hybrid production, thanks to JLAB's big help! A special thanks to Jianping. And a big thanks also to Evaristo and Paolo!