

Preliminary results on the effects of the non-uniform inter-foil distance

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- Towards large GEM detector, the distance uniformity between two GEM foils or between the GEM foil and the readout plane may occasionally violated.
- How the performance will be changed in turn?
- To see the non-uniform inter-foil distance effect by introducing an extra spacer on one side of the GEM foils.





Experiments

- 2-D GEM detector, sensitive area 5cm*5cm
- Two GEM foils, 2D readout





Gain variation 1

• Configuration 1









• The gain increases with decreasing the inter-foil distance



Gain Variation 2

• Configuration 2









• The same trend. But it is stiffer than configure 1



Energy Resolution

• Configuration 1

FWHM_T



- FWHM varies non-monotonously
- Strip-by-strip calibration not yet done



1 To construct the geometry to calculate the field (ANSYS)









Garfield Simulation

2. Simulate the amplification



Simulation is ongoing



Status of Large GEM detector

Finally, the read-out plate is delivered



Region E: Signals were readout from back Region D: 8 groups of signals, with 4 groups being readout from back.

All others are readout from one side.





Status of Large GEM detector

We expect to assemble the large detector in the next two month. Note that there will be one month winter holiday.



Tension control

Window + readout plane



Near Future Plan

- 1. Complete the non-uniformity effect studies: Energy resolution and position resolution
- 2. Complete the GARFIELD simulation in comparison with data
- 3. Proceed the assembly of the large GEM detector in an iteration way.





- 1. We did some studies on the non-uniformity effect of the inter-foil distance on the performance of the detector. The gain shown sensitive response on the distance change. Further test is ongoing to see the resolution performance.
- 2. ANSYS+Garfield simulation is ongoing
- 3. Readout board for the large GEM prototype is done. We will start assembling the detector soon in Lanzhou.

Merry Christmas and Happy New Year!

