Comparison of Analysis Results

Astrid Münnich

Analysis Meeting #21

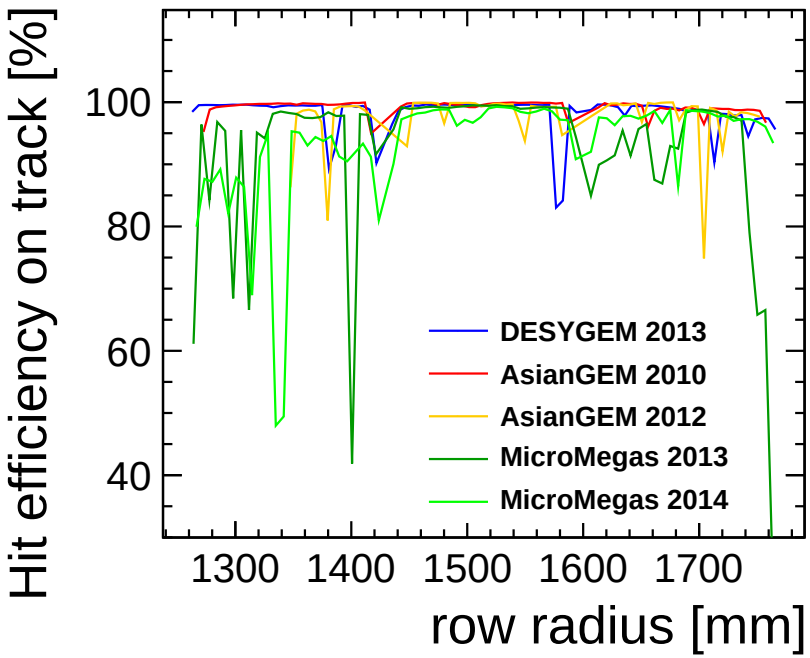
24th June 2014

Outline

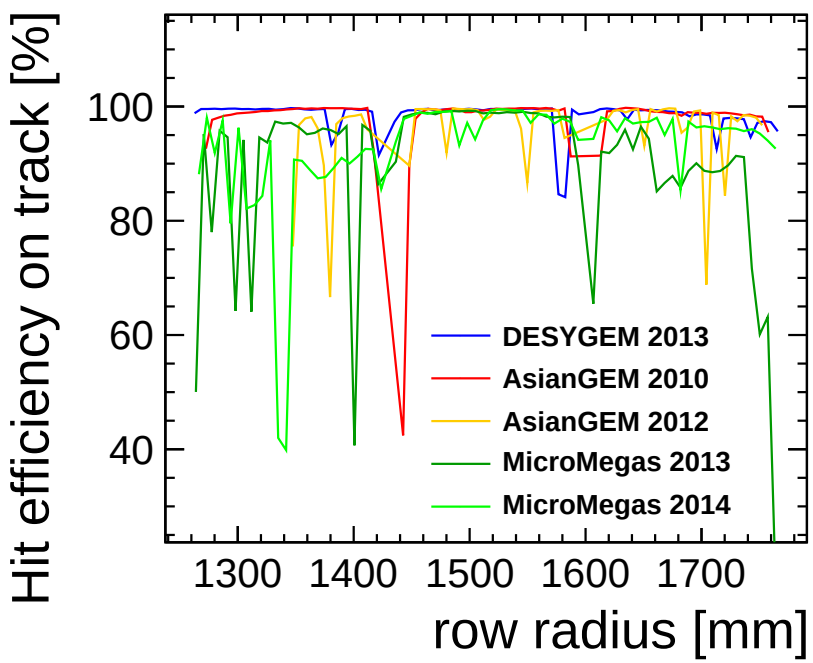
- Data Sets:
  - B=1T
  - minimal cuts
  - DESY GEM 2013
  - Asian GEM 2010, 2012
  - MicroMegas 2013, 2014
- Quantities
  - Data Quality
  - Resolution
  - PRF
  - Distortion

Track Hit Efficiency

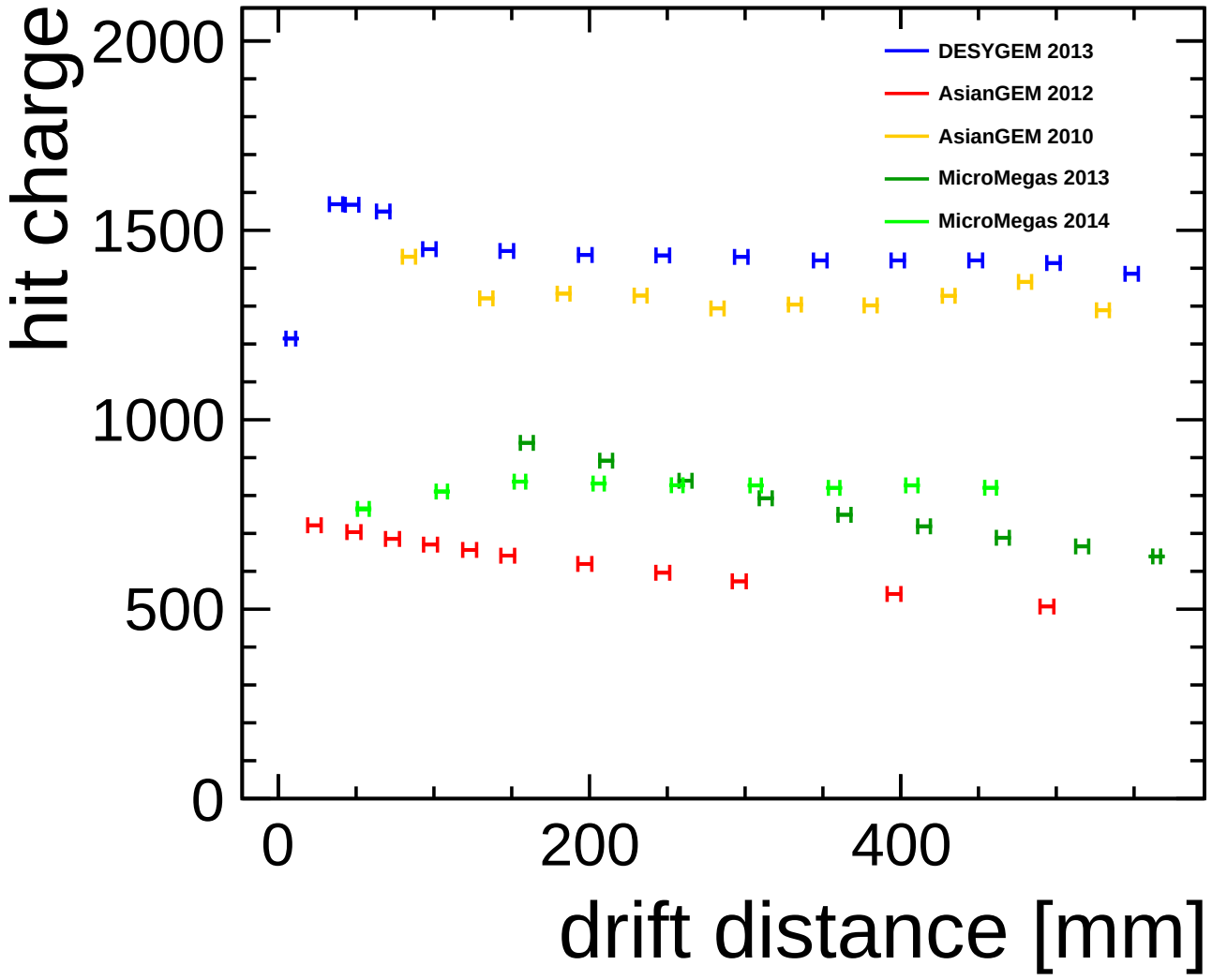
small drift



large drift

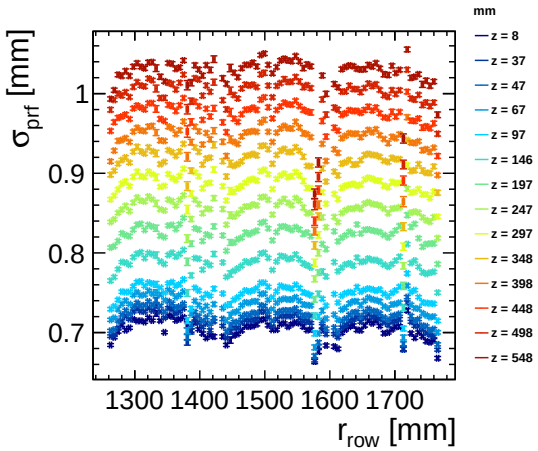


Hit Charge vs z

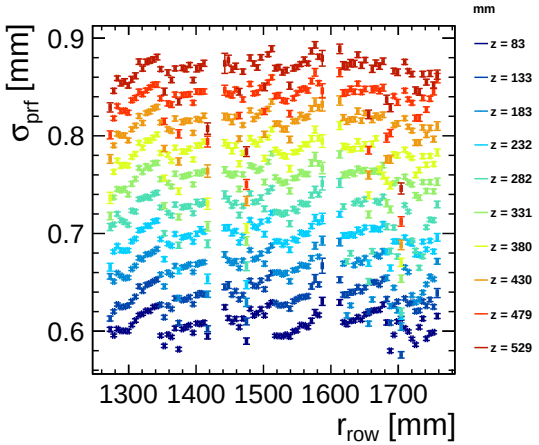


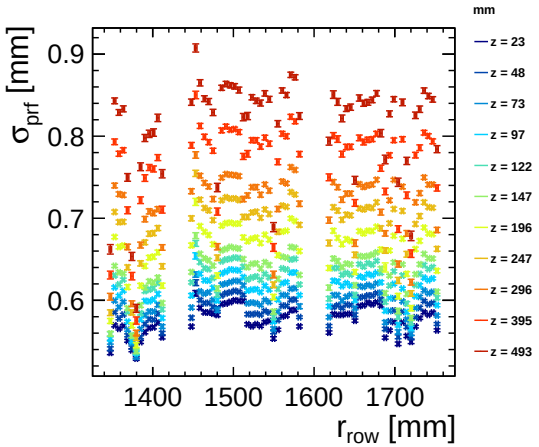
PRF vs Row

DESY GEM 2013

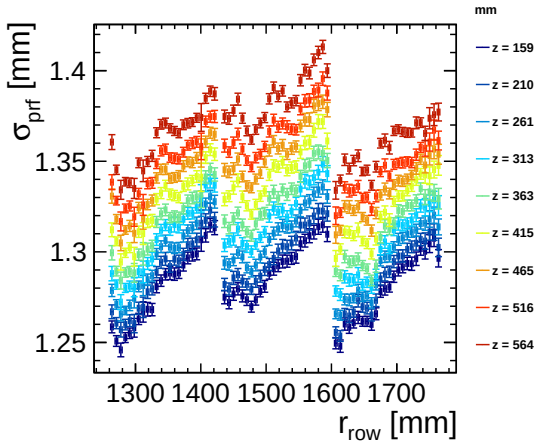


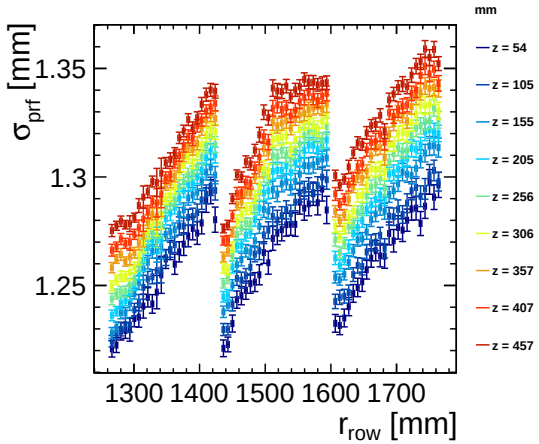
ASIAN GEM 2010/2012



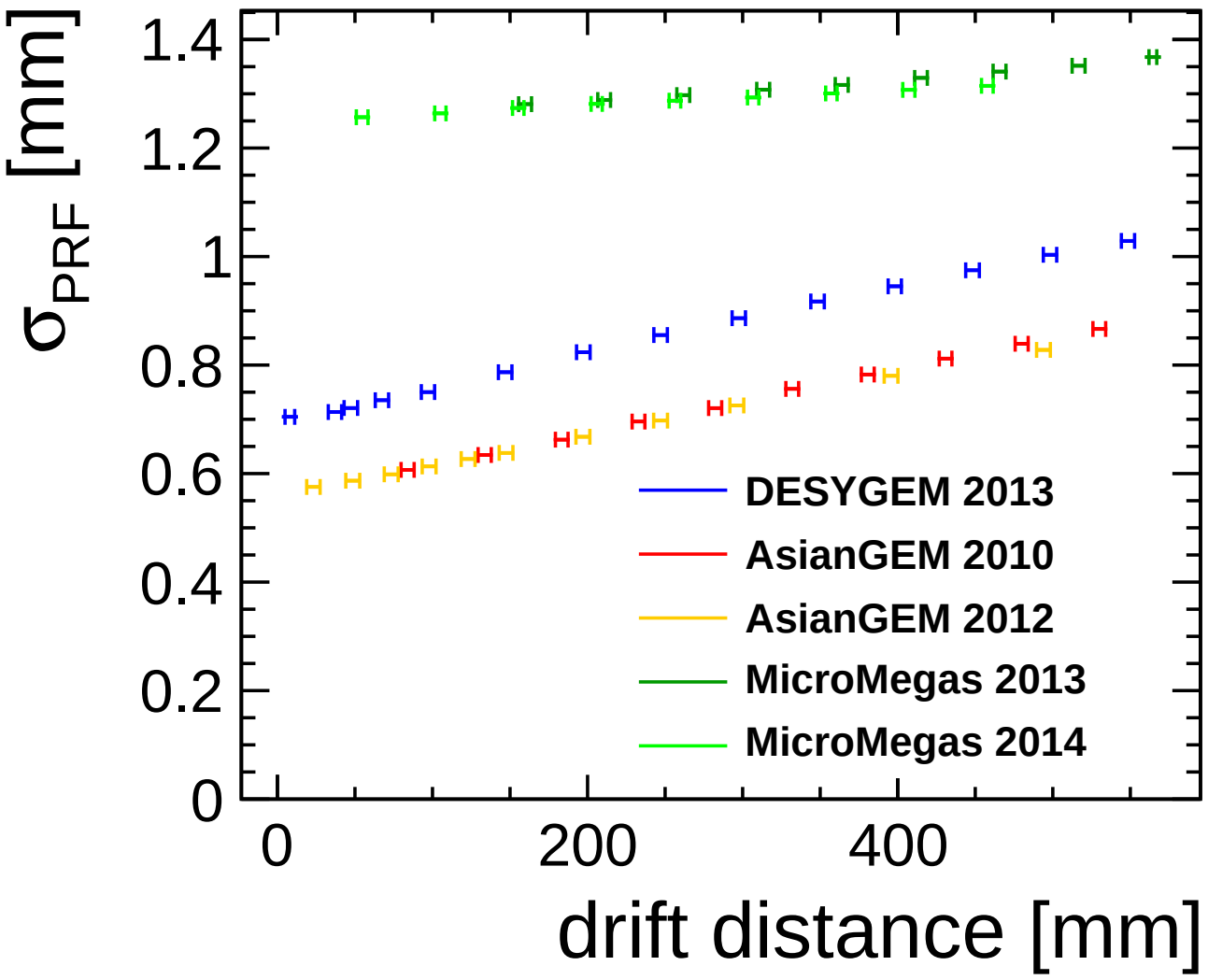


MICROMEGAS 2013/2014



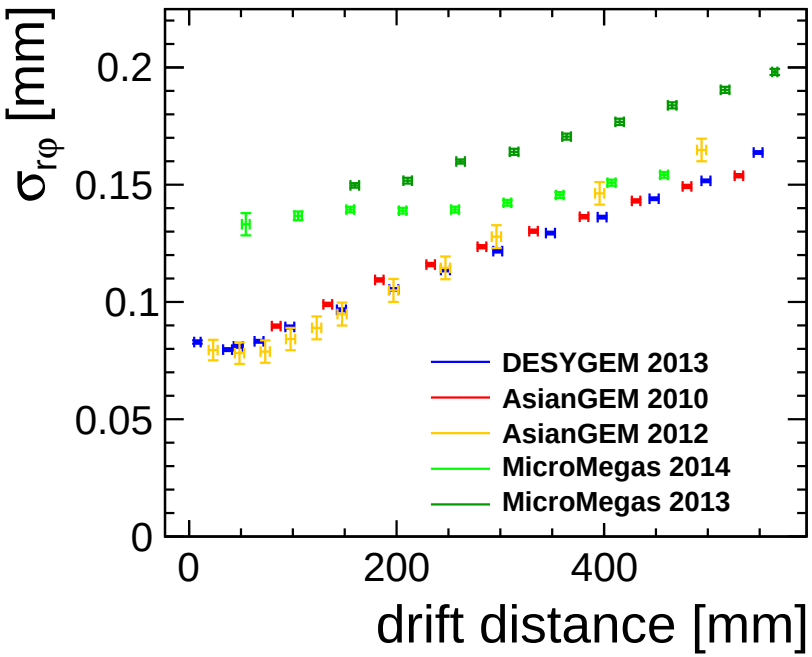


PRF Width

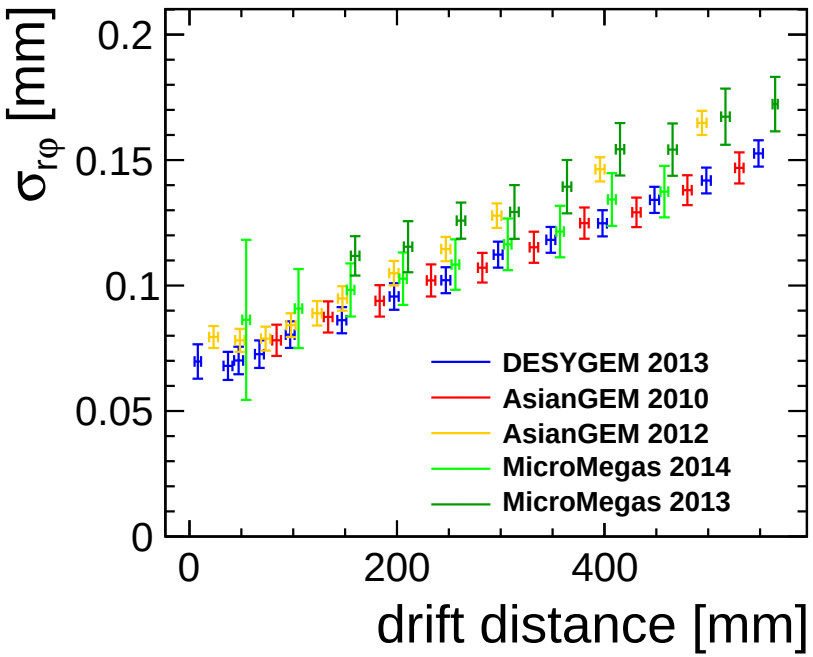

σ_{PRF} [mm]
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
200
400
drift distance [mm]
DESYGEM 2013
AsianGEM 2010
AsianGEM 2012
MicroMegas 2013
MicroMegas 2014

Resolution in $r\varphi$

Mean all rows

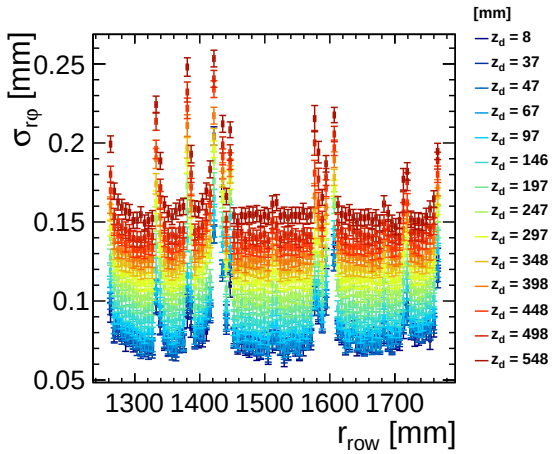


Best row

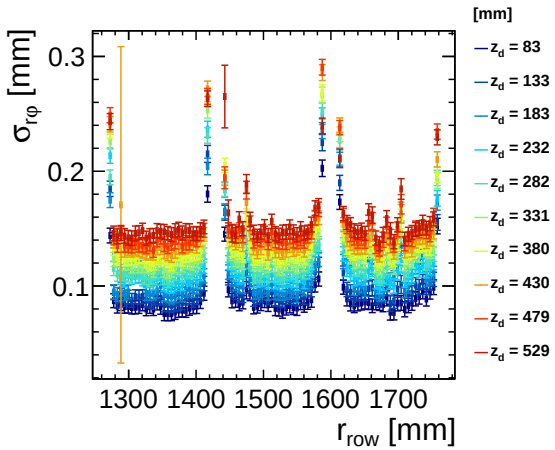


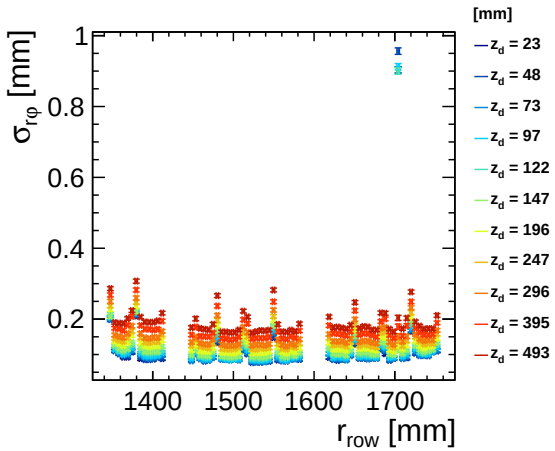
Resolution in $r\varphi$ vs Row

DESY GEM 2013

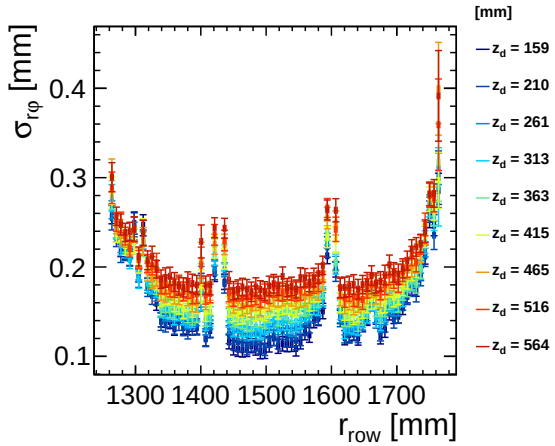


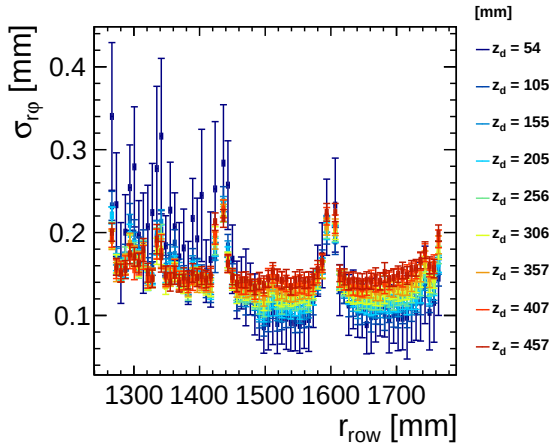
ASIAN GEM 2010/2012





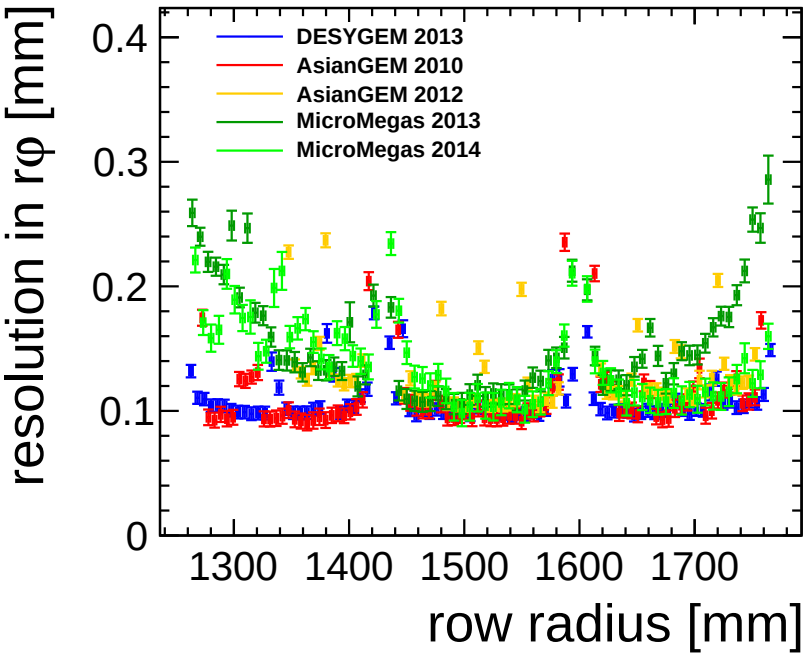
MICROMEGAS 2013/2014



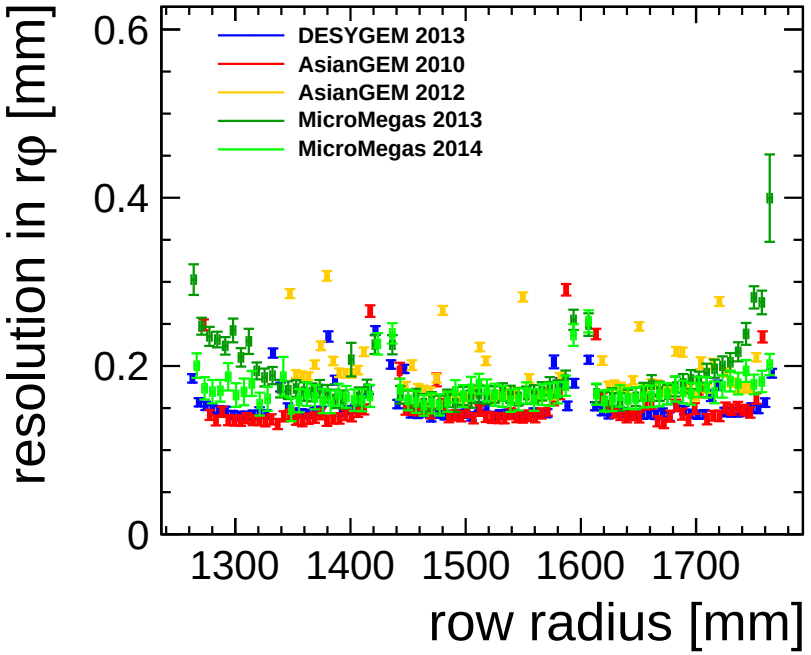


Resolution in $r\varphi$ vs Row

small drift

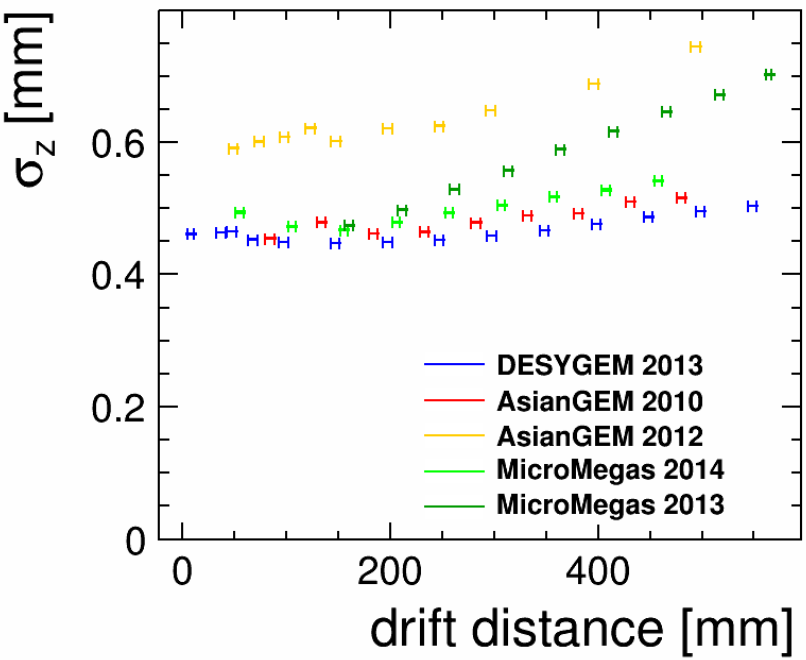


large drift

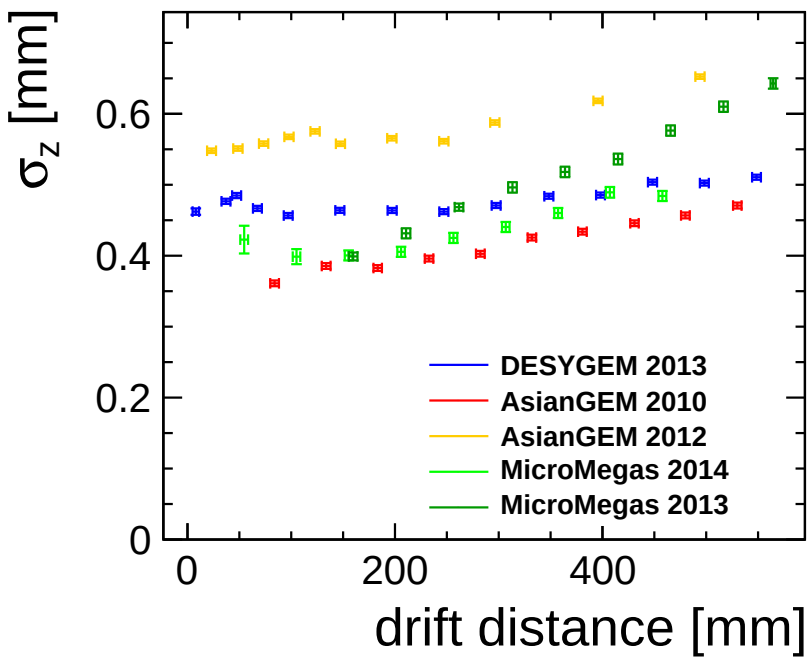


Resolution in z

Mean all rows

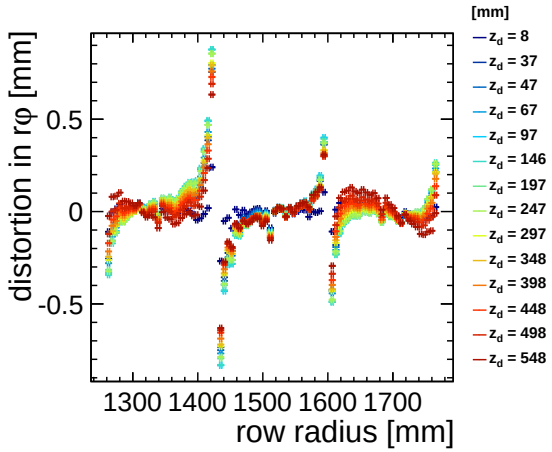


Best row

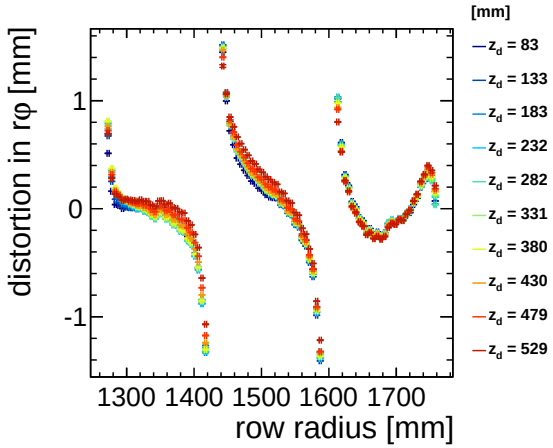


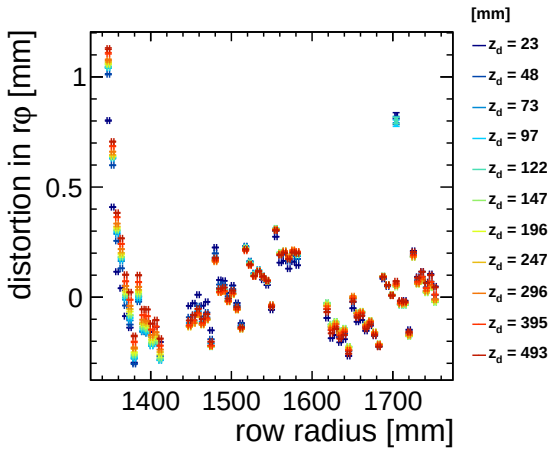
Distortion in $r\varphi$

DESY GEM 2013

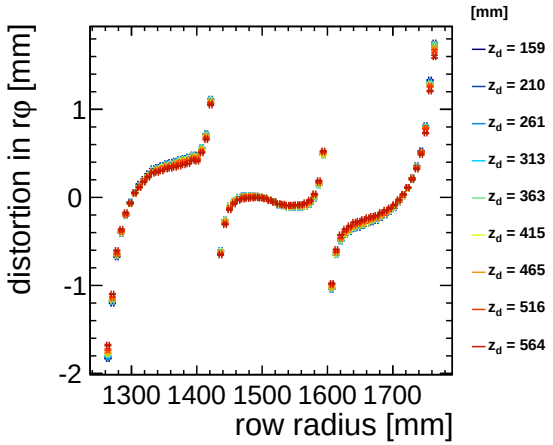


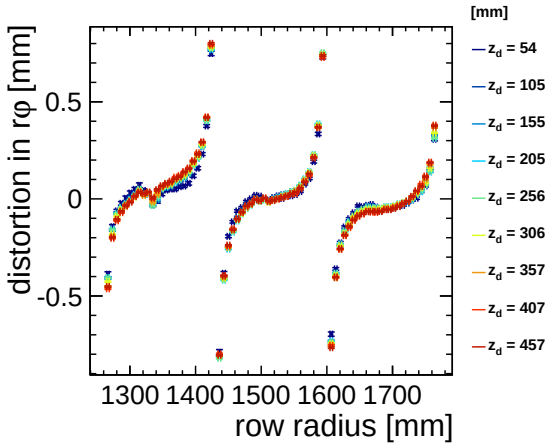
ASIAN GEM 2010/2012





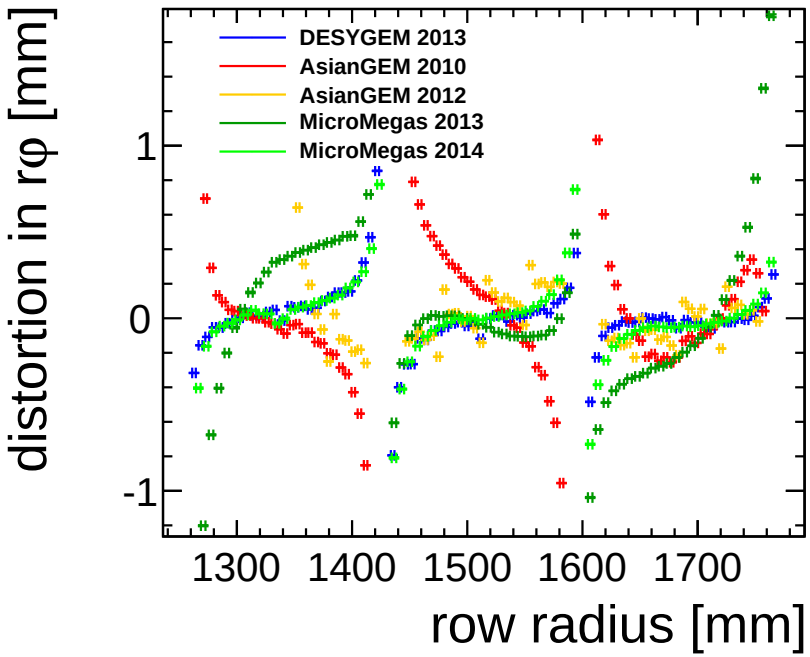
MICROMEGAS 2013/2014



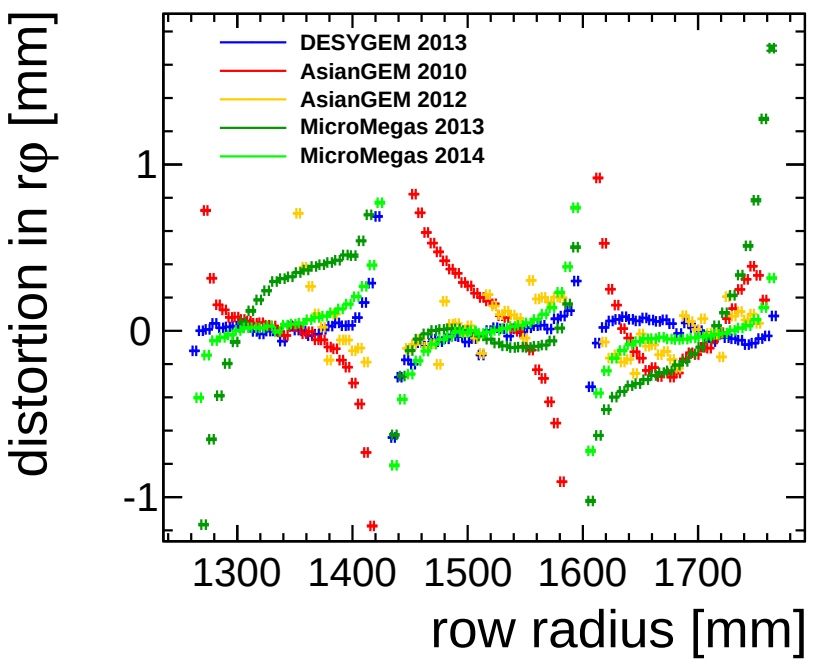


Distortion in $r\varphi$

small drift



large drift

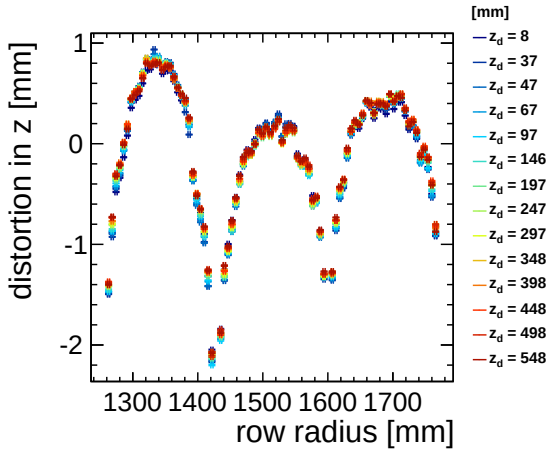


Asian distortion are mirrored, due to different y acis direction.

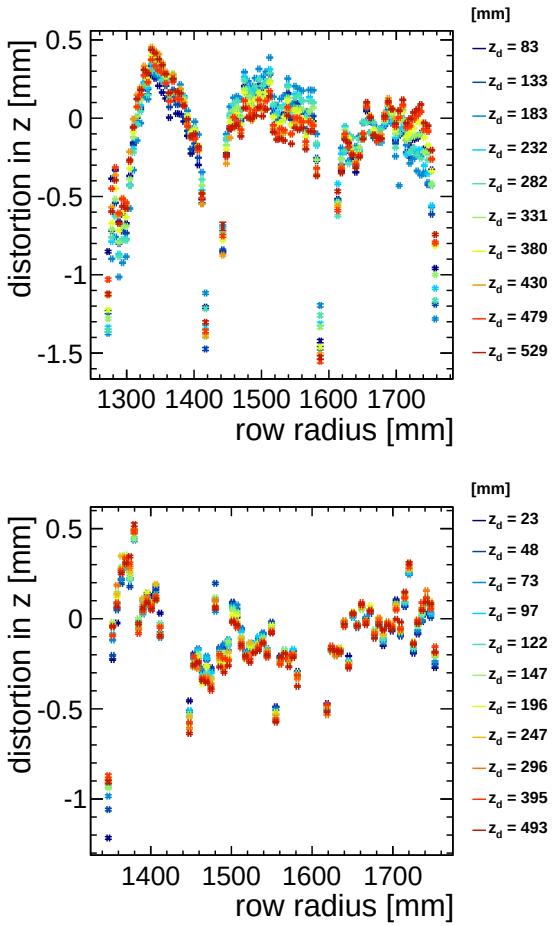
Larger distortions and offsets in MicroMegas data 2013

Distortion in z

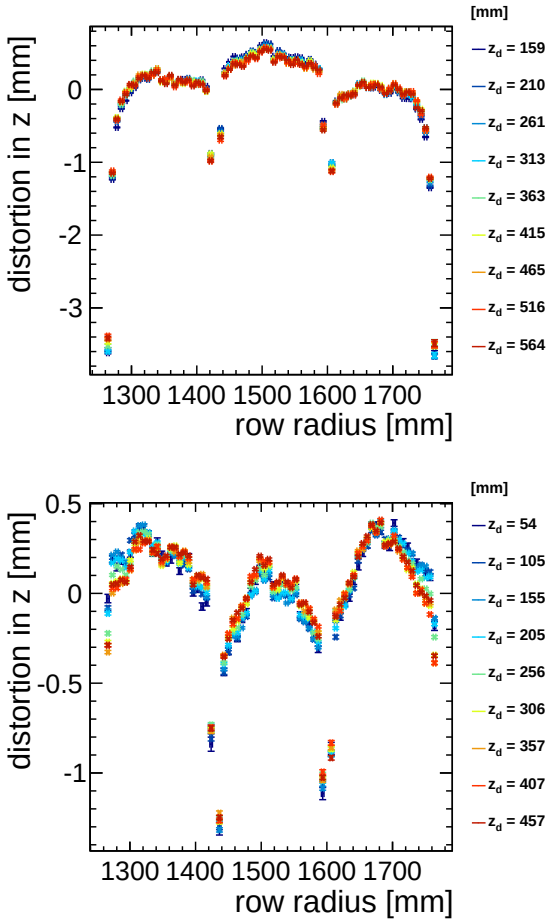
DESY GEM 2013



ASIAN GEM 2010/2012

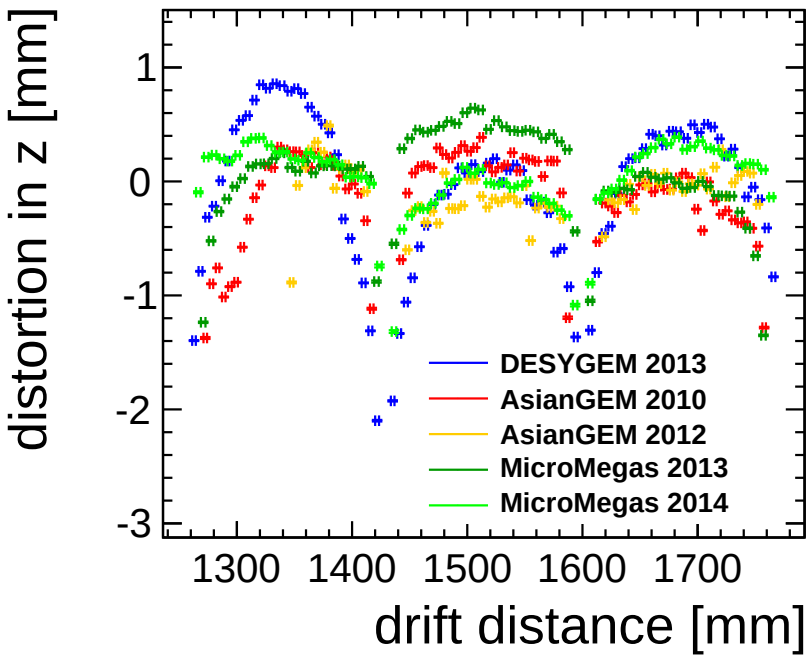


MICROMEGAS 2013/2014

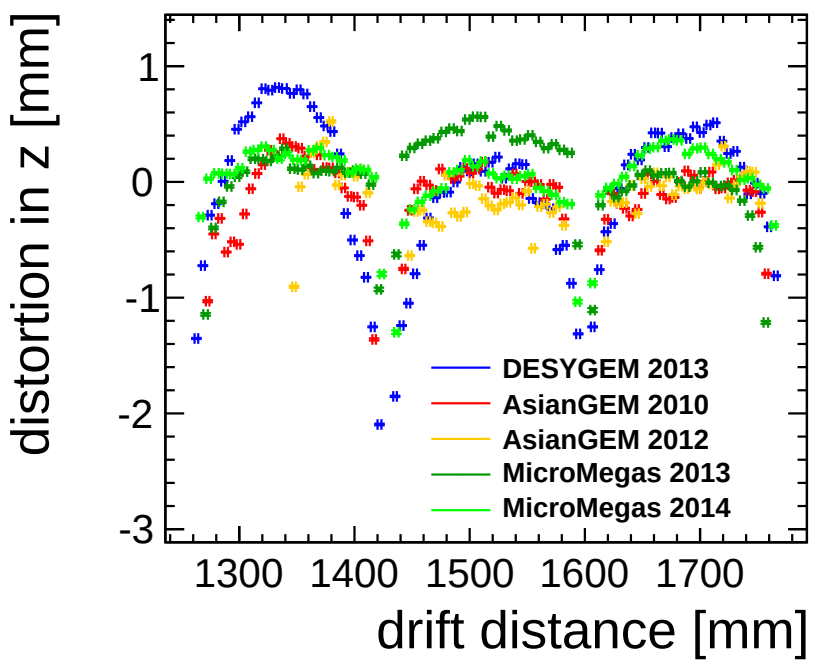


Distortion in z

small drift



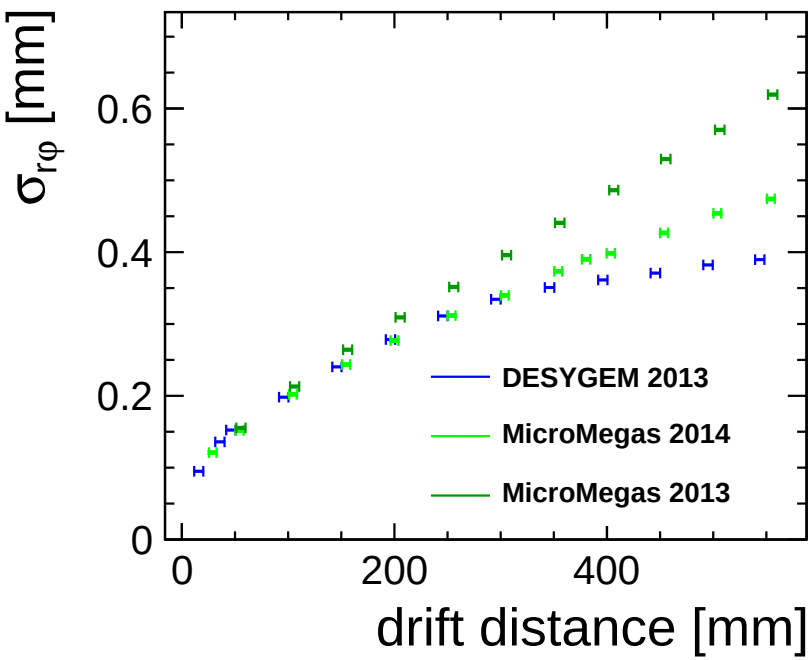
large drift



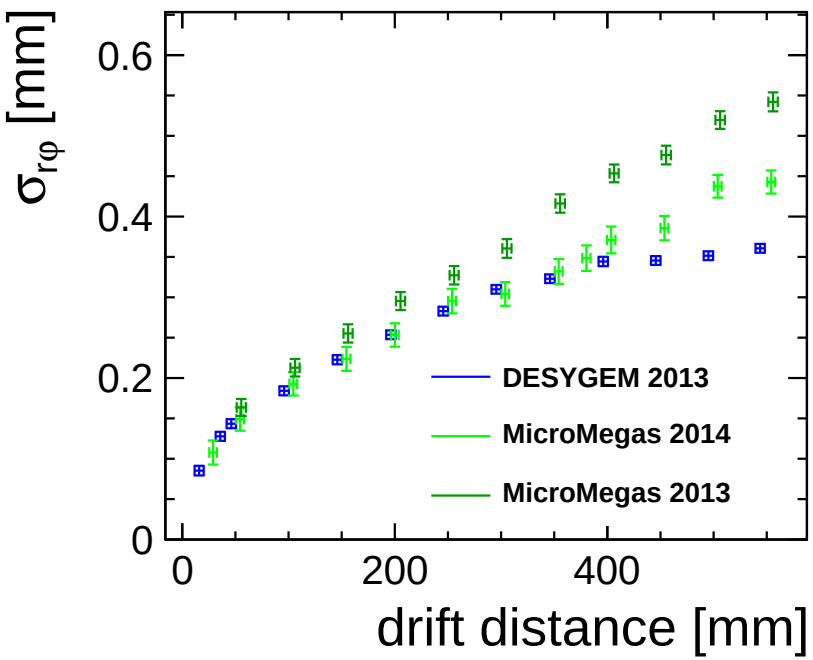
Comaprison: B = 0 T

Resolution in $r\varphi$

Mean all rows

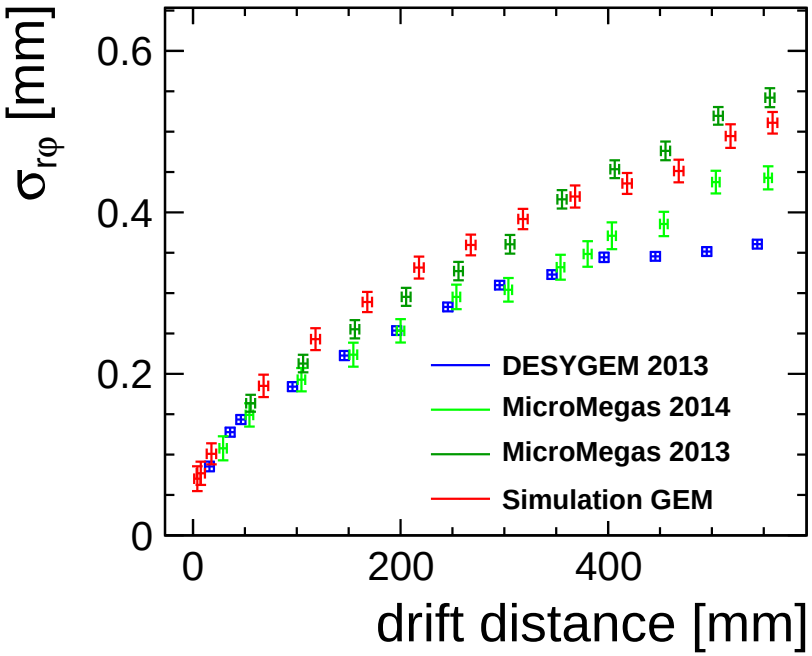


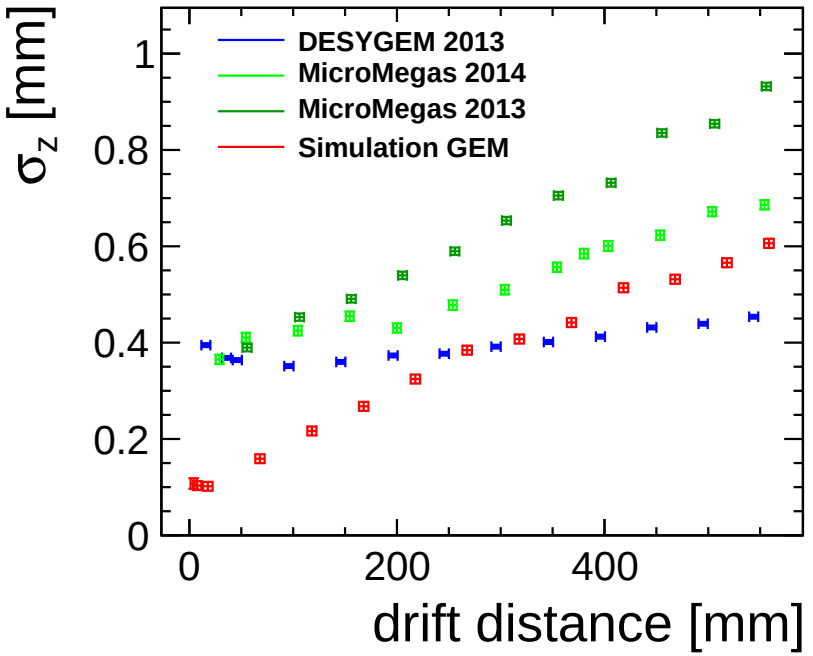
Best row



Resolution in $r\varphi$

Comparison with GEM simulation:

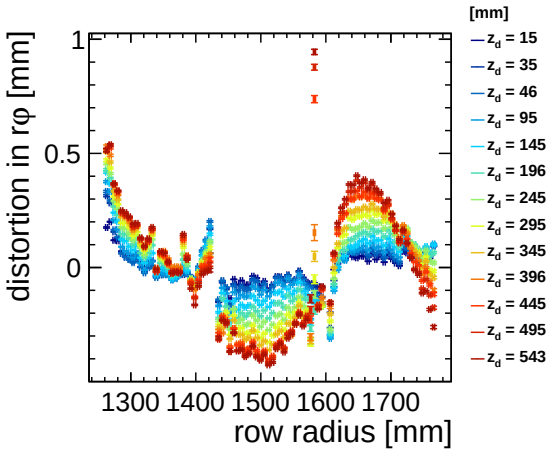




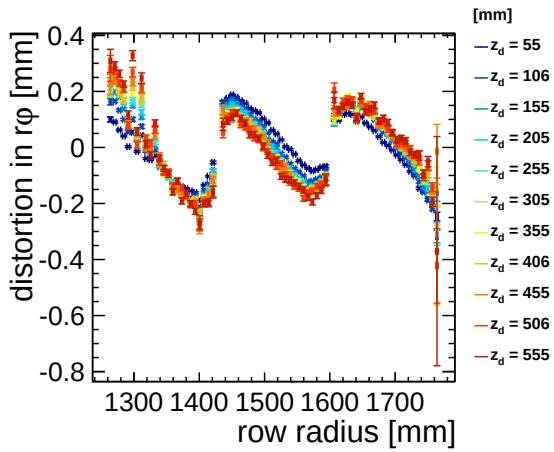
Simulation fits bests with 2014 MM data.

Distortion in $r\varphi$

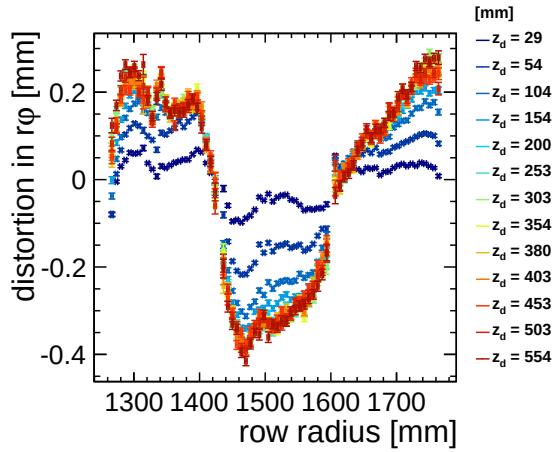
DESY GEM 2013



MICROMEGAS 2013



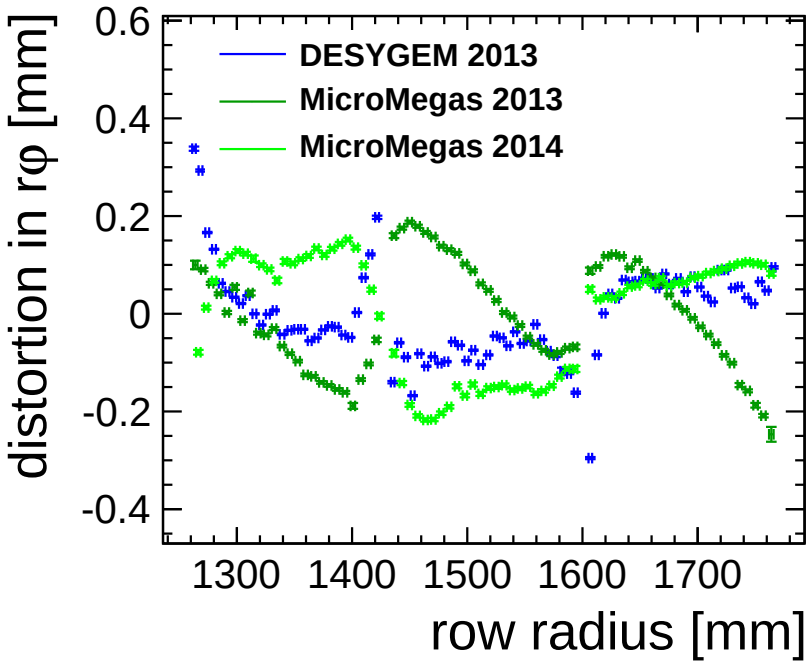
MICROMEGAS 2014



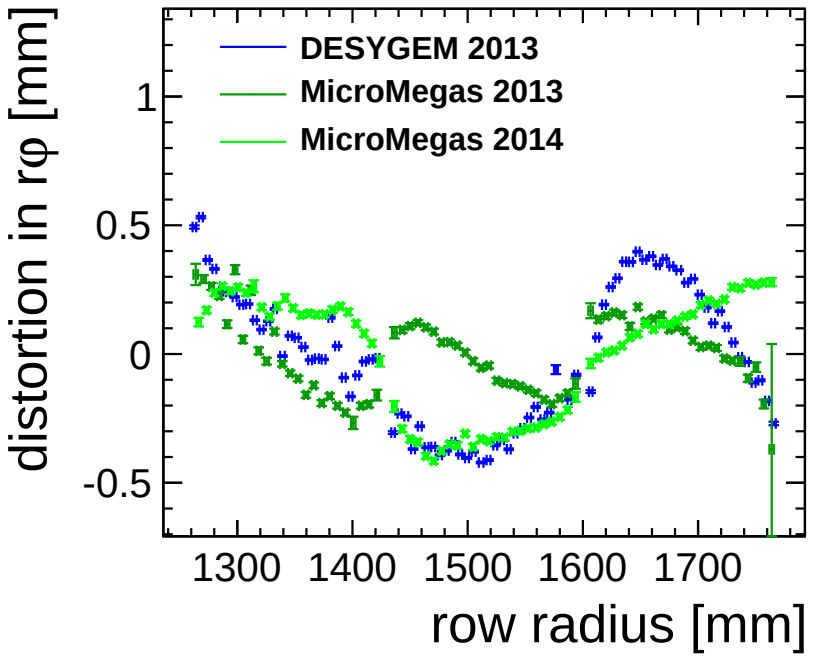
- MM distortion 2014 look similar to DESY
- Large difference between MM distortion in 2013 and 2014. Interesting, what could it be?

Distortion in $r\varphi$

small drift



large drift



Summary

Resolution:

- Best row very close to each other for all modules
- Distortion do effect the resolution due to change in track angle
  $\longrightarrow$ module design issue, technology independent
- Too little gain/total charge worsens resolution

Distortion:

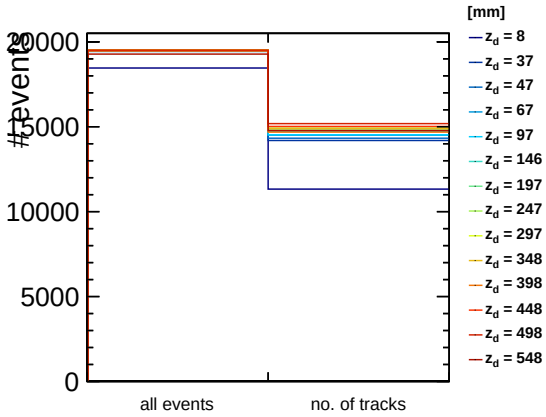
- Sign flip in AsianGEM distortion
- Significant difference in MM distortion between 2013 and 2014
  $\longrightarrow$ potential to learn from that

Thanks to Peter, Junping and Felix for analyzing the data and making them available.

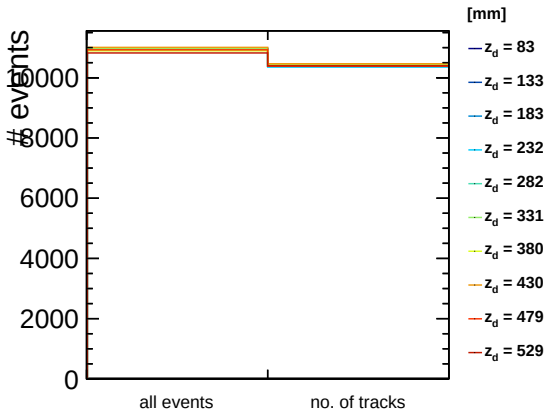
BACKUP: Quality Plots

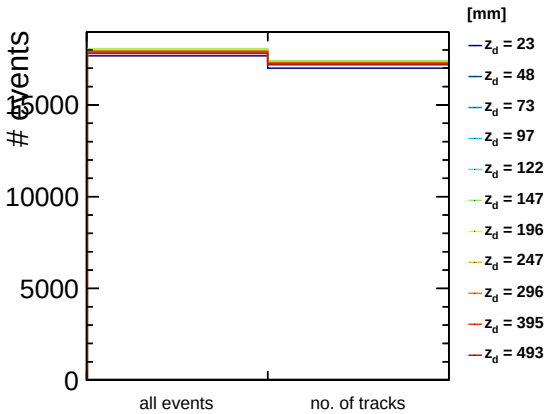
Event Cut Flow

DESY GEM 2013

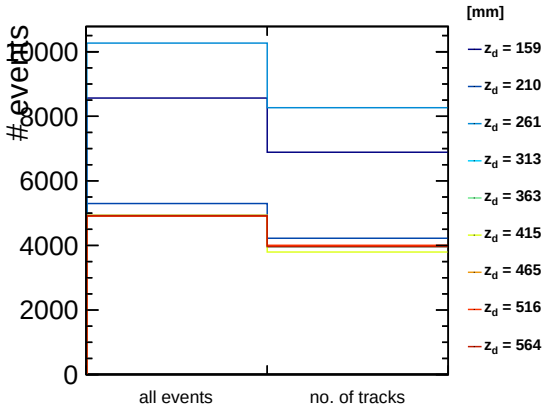


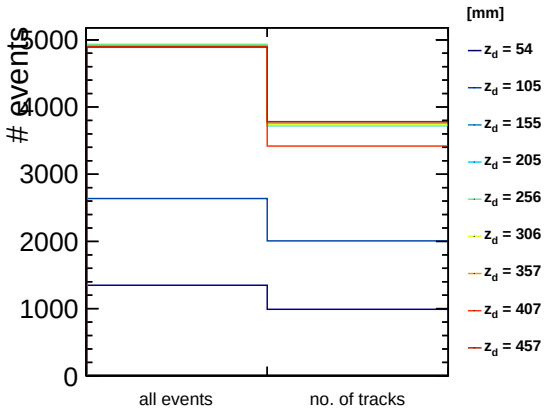
ASIAN GEM 2010/2012





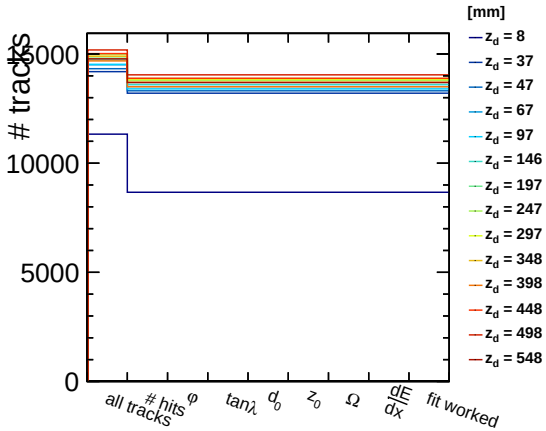
MICROMEGAS 2013/2014



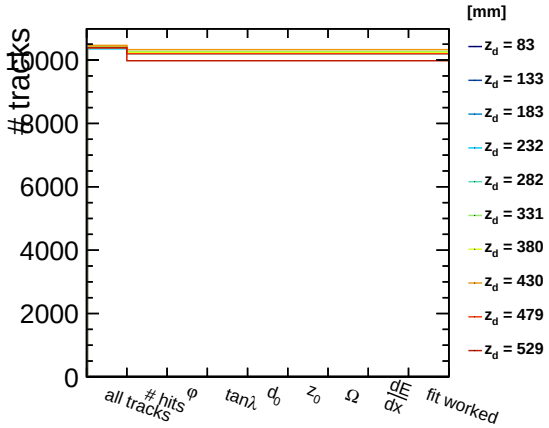


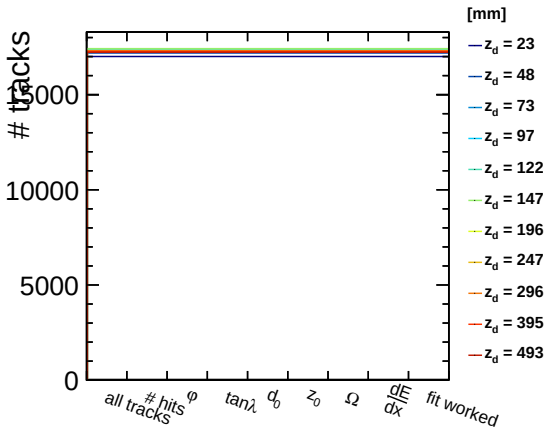
Track Cut Flow

DESY GEM 2013

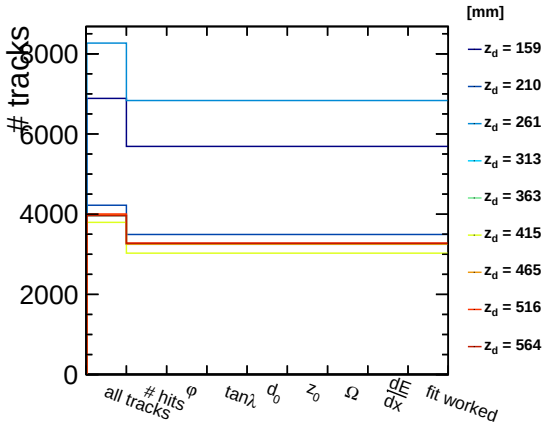


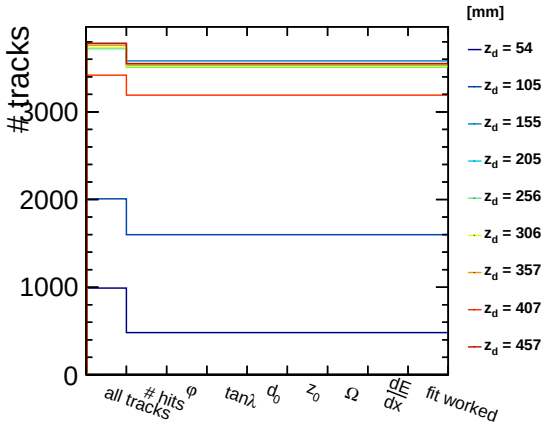
ASIAN GEM 2010/2012





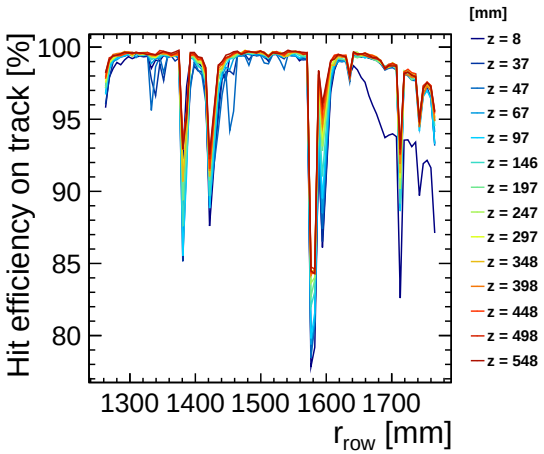
MICROMEGAS 2013/2014



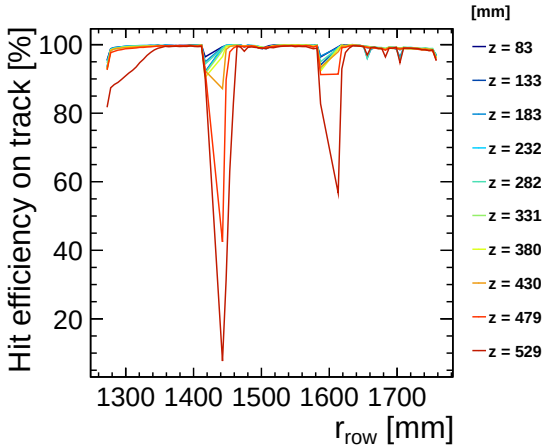


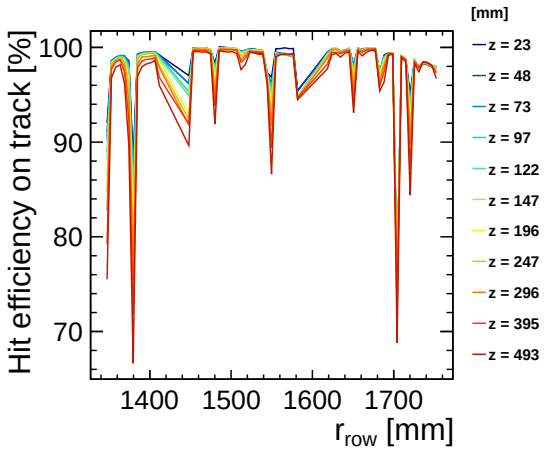
Track Hit Efficiency

DESY GEM 2013

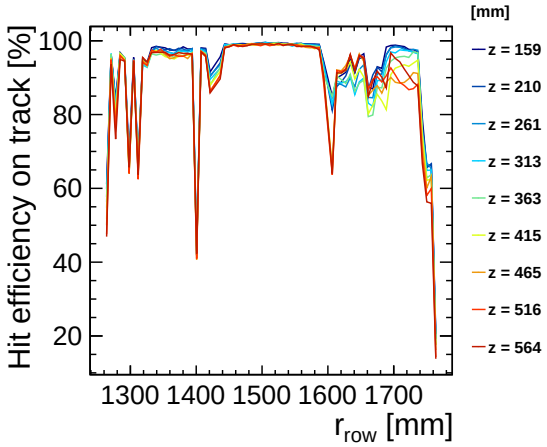


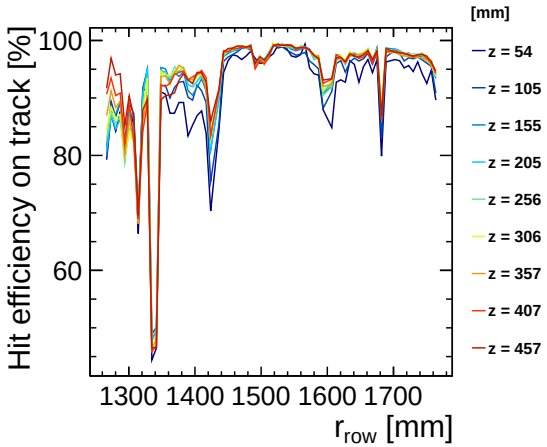
ASIAN GEM 2010/2012





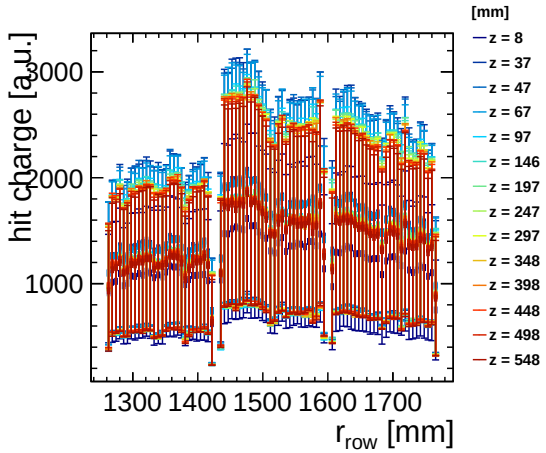
MICROMEGAS 2013/2014





Hit Charge vs Row

DESY GEM 2013



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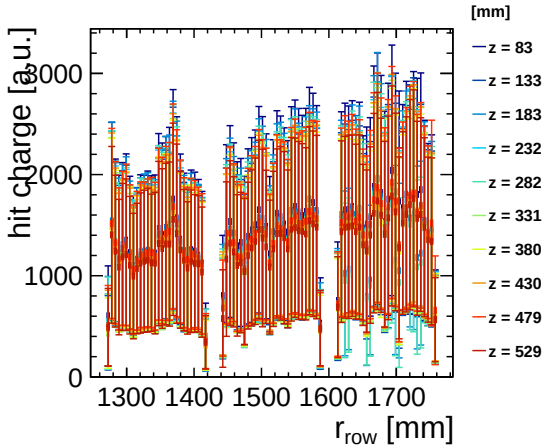

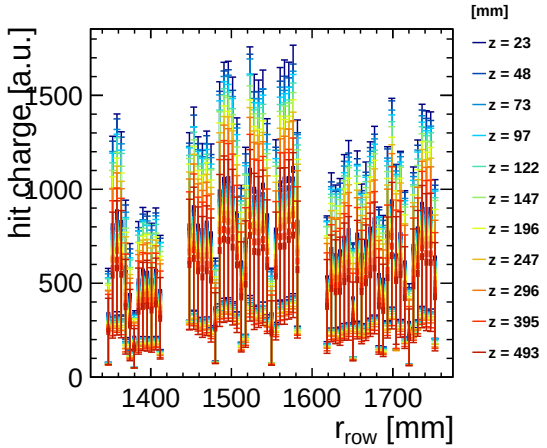
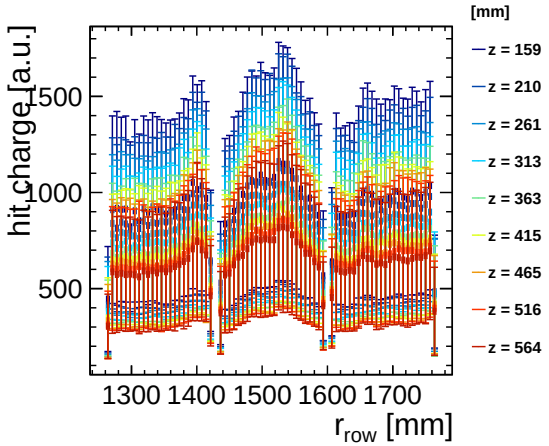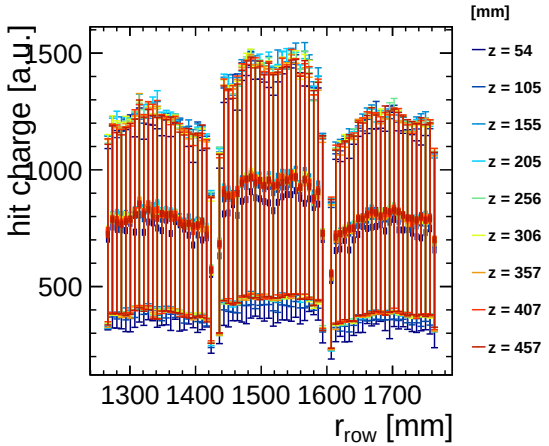
MICROMEGAS 2013/2014