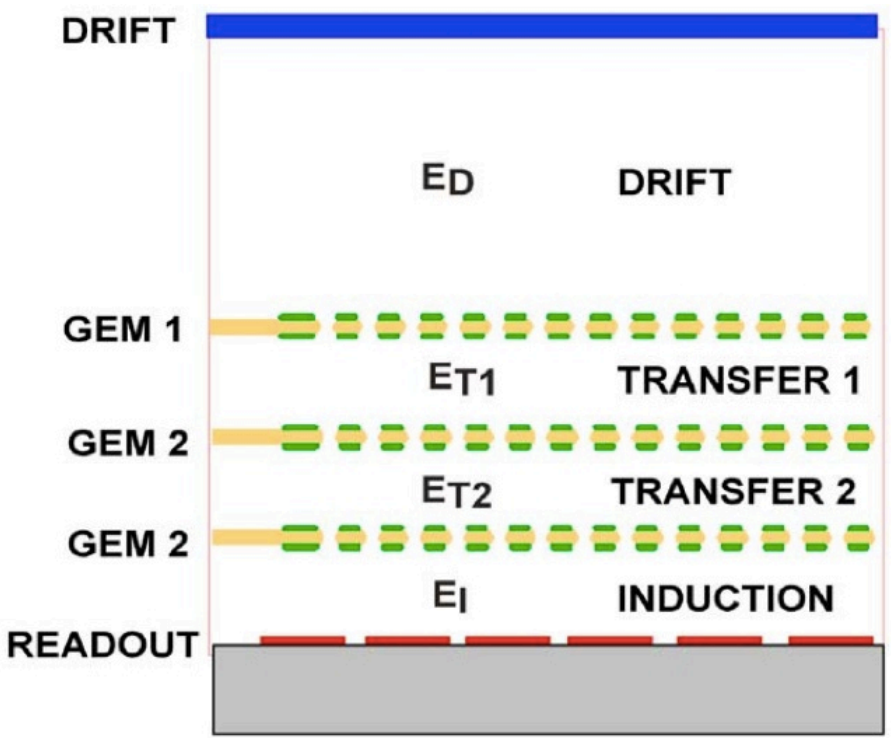
TPC Simulation

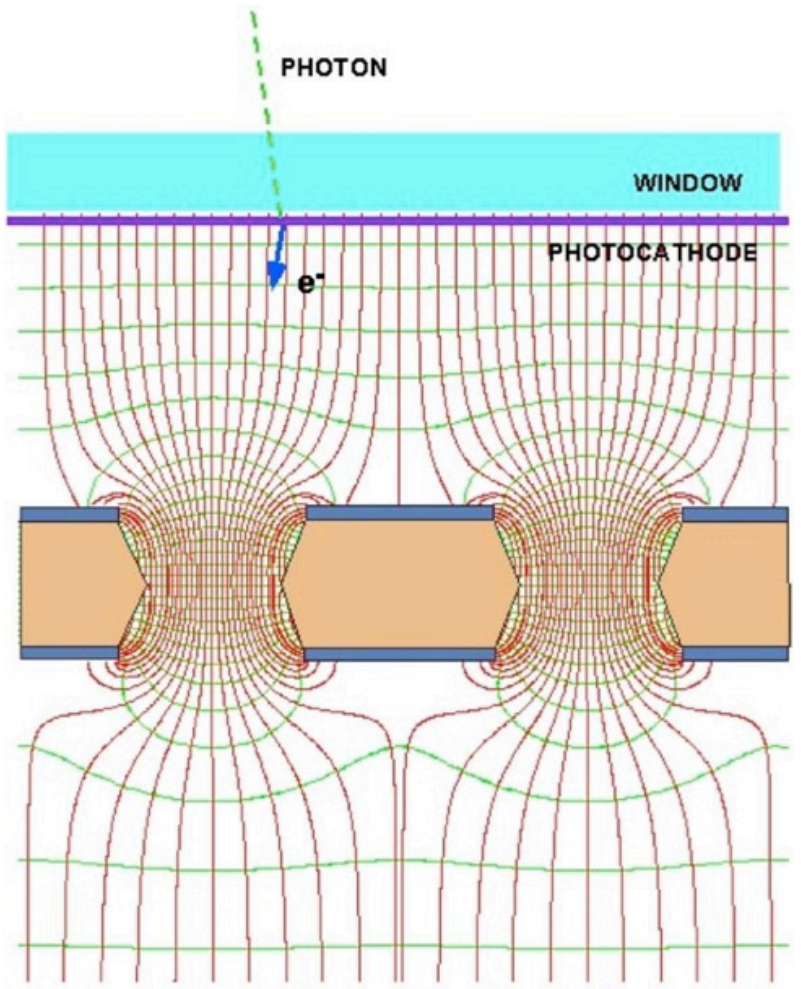
JungWoo Lee

Group Meeting 2013/09/13

COMPASS @ CERN (2010)

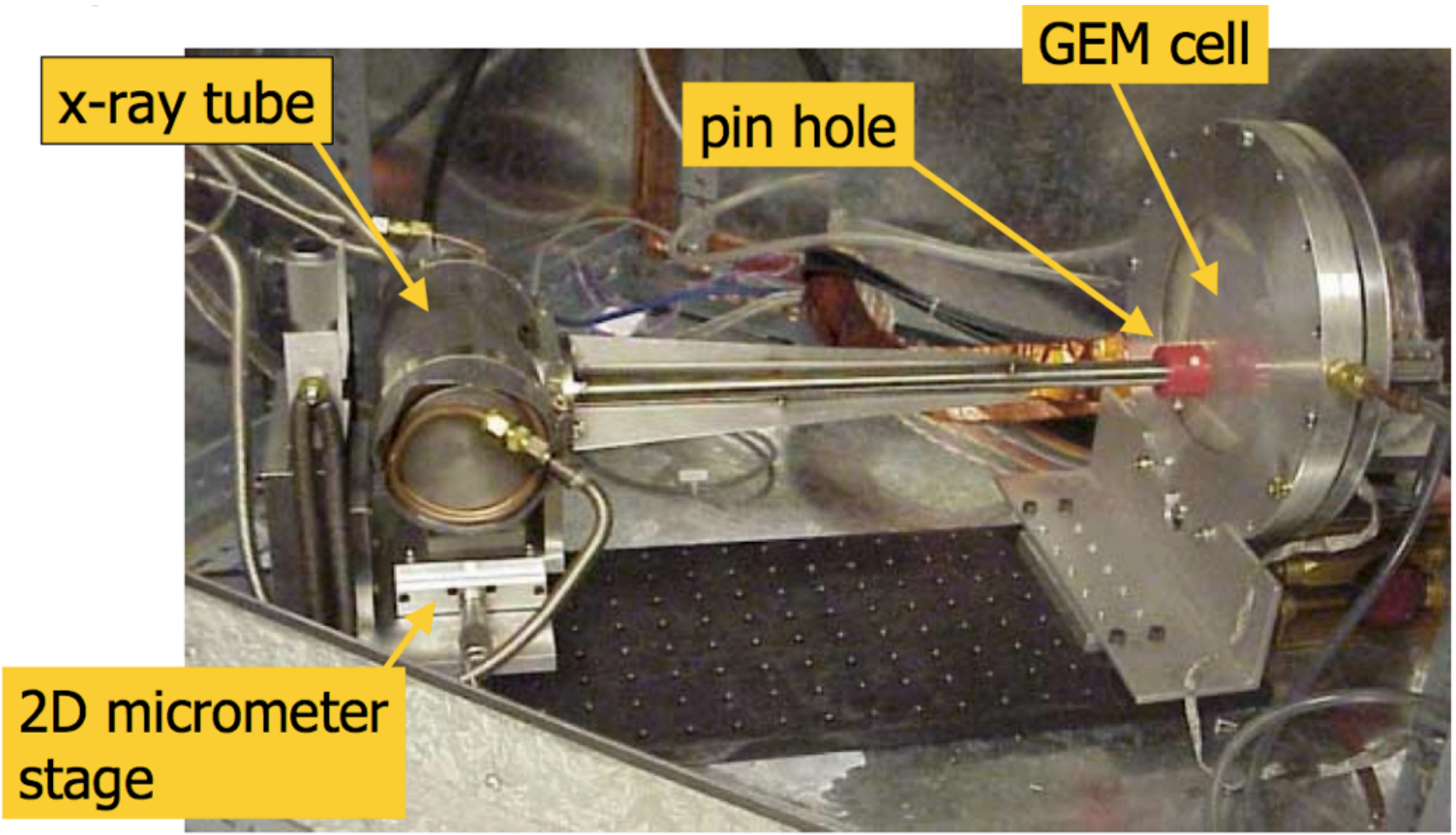
- Prototype-GEM detector, Triple GEM
- Hexagonal pad with r=0.25mm





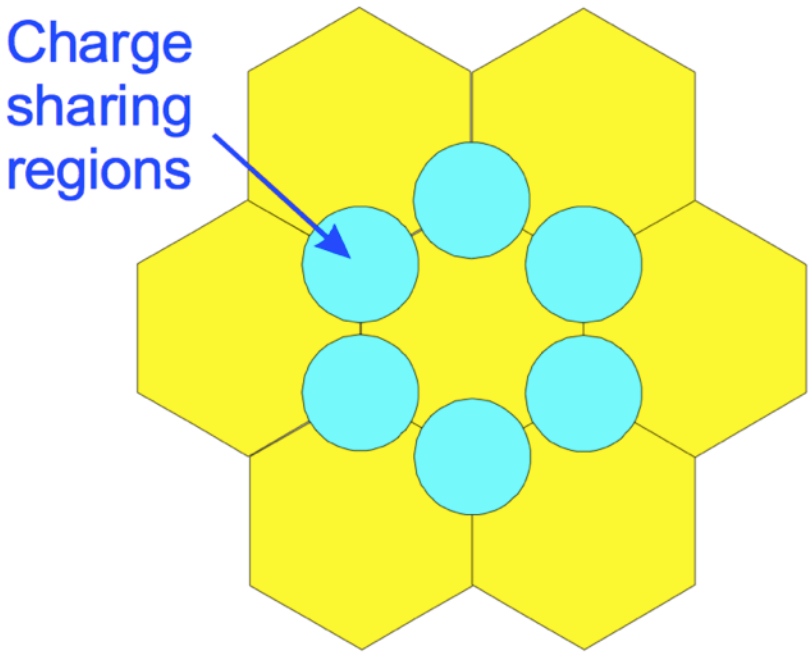
Carleton GEM Group (2000)

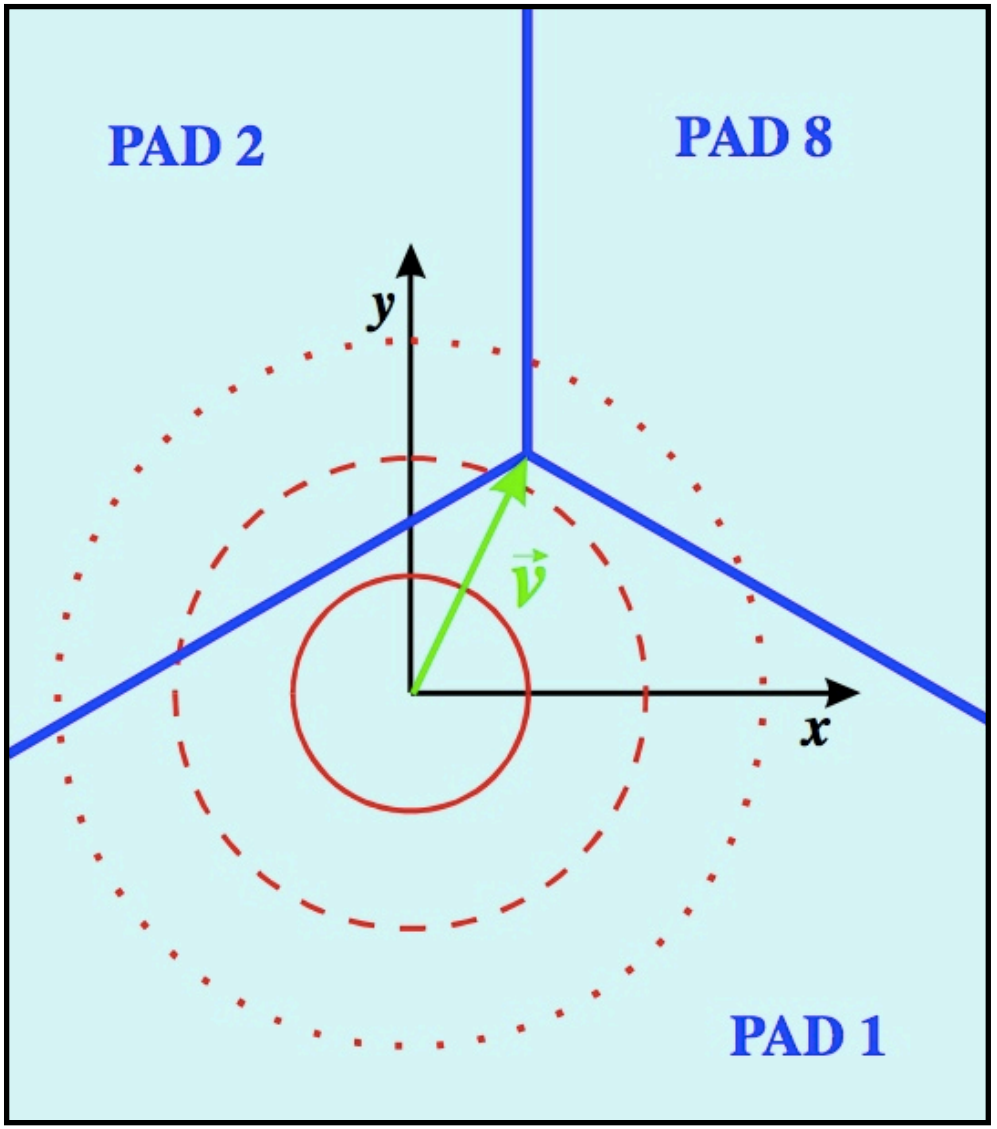
Point resolution study



Carleton GEM Group (2000)

Localization using **Charge Sharing**





diameter = 2.5 mm

point resolution ~ 0.1 mm

PANDA & FOPI @ GSI/FAIR

Clustering

Tracking

<2012 JINST 7 C03011, A prototype GEM-TPC for PANDA>

- No binning

- Bring data without binning, make a cluster when;
  1) two data are close enough in z-direction
  2) two data are direct neighbors.

- No mention about dividing clusters.

- Position is defined by center of gravity.

We can try r-binning!

PANDA & FOPI @ GSI/FAIR

Clustering

Tracking

"**GENFIT**" package
- Kalman Filter
- Deterministic Annealing Filter
- Written in C++

SAMURAI TPC @ RIKEN

Clustering

Tracking

"**KalTest**" package
- Kalman Filter
- Written in C++ (Root-based)

Summary & Conclusion

Charge Sharing

- Need to compare with center of charge positioning.
- Not efficient.

Clustering

- Try original work with charge ordered data.
- Compare with method used in GSI.
- Help from Doctor Kang Donghee.

Tracking

- “GENFIT”
- “KalTest” (Genie Jhang)