

# Test beam in DESY

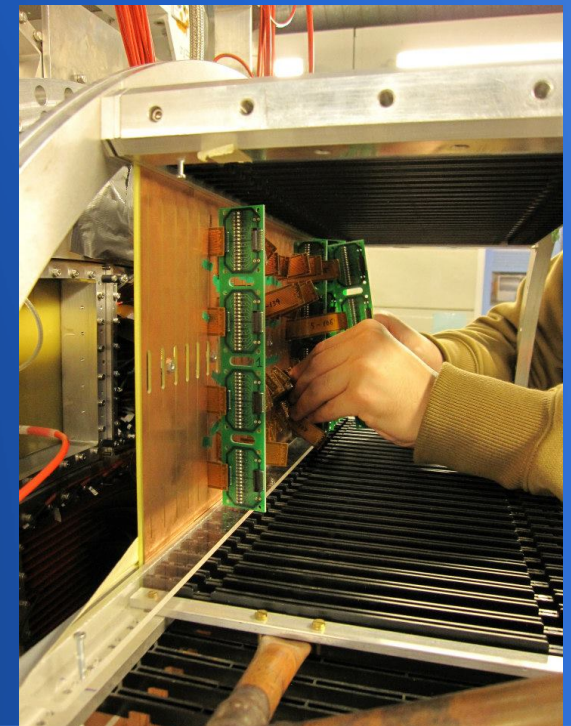
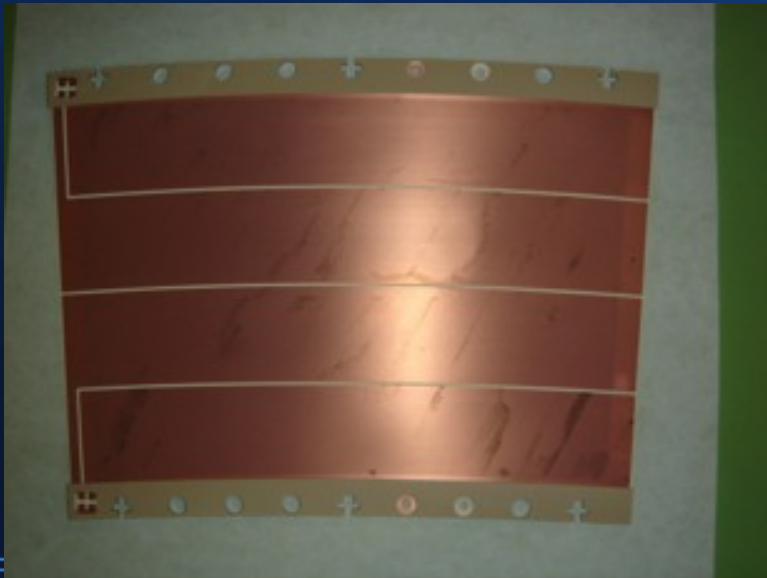


- Main manpower:
  - 3 postdocs
  - 1 PhD student
  - 3 master students
- ~1 month
  - installation
  - tests
  - data taking



# Configuration

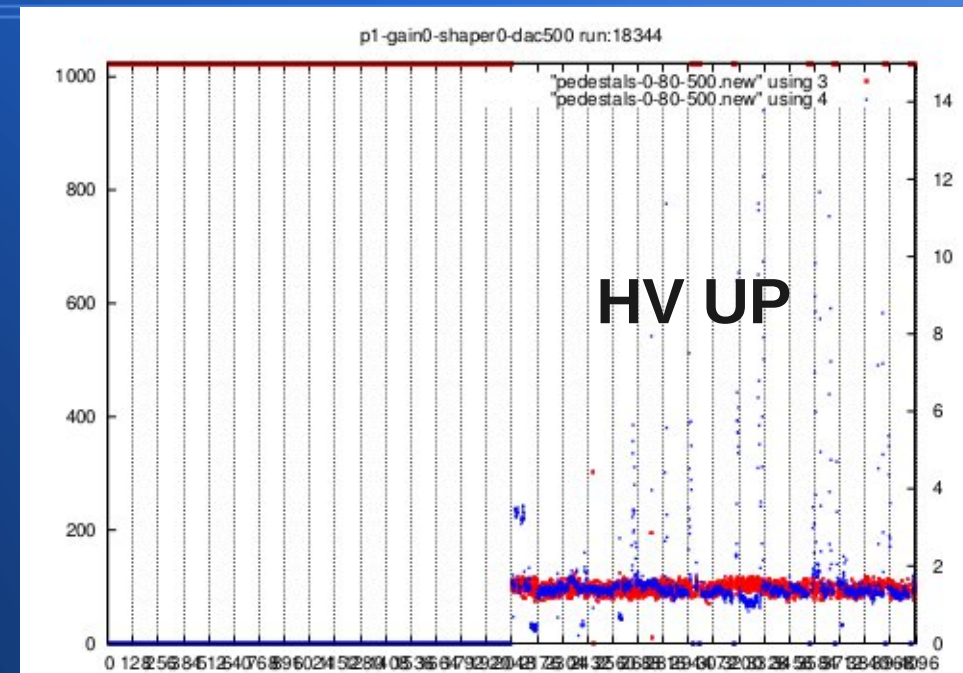
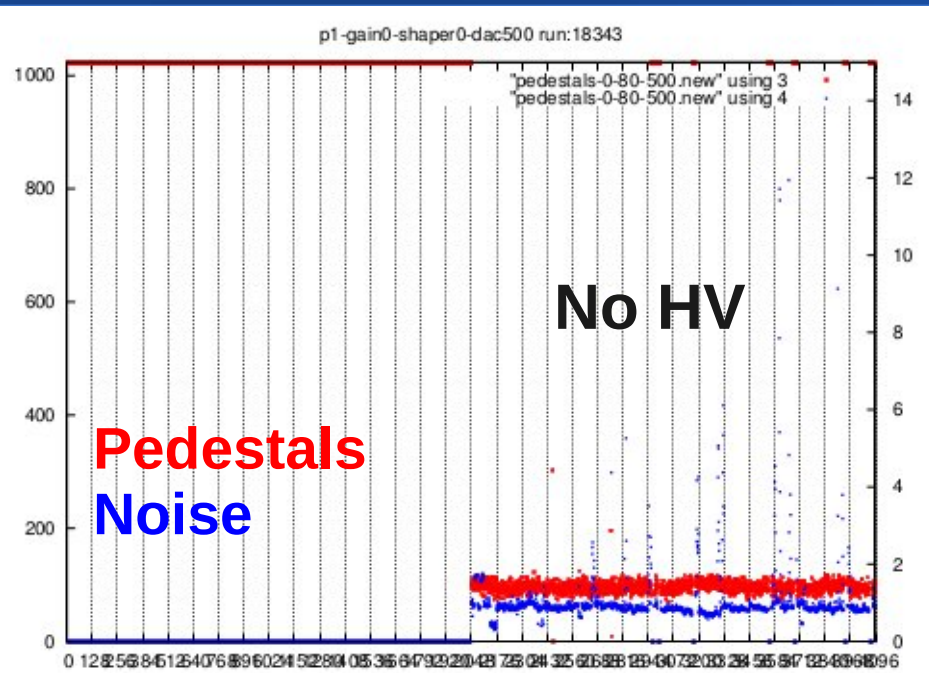
- 3 modules, ~1/2 pads instrumented (~7600 channels)
- 4segment GEMS
- ALTRO electronics
- New protection boards
- 



# Test beam campaign

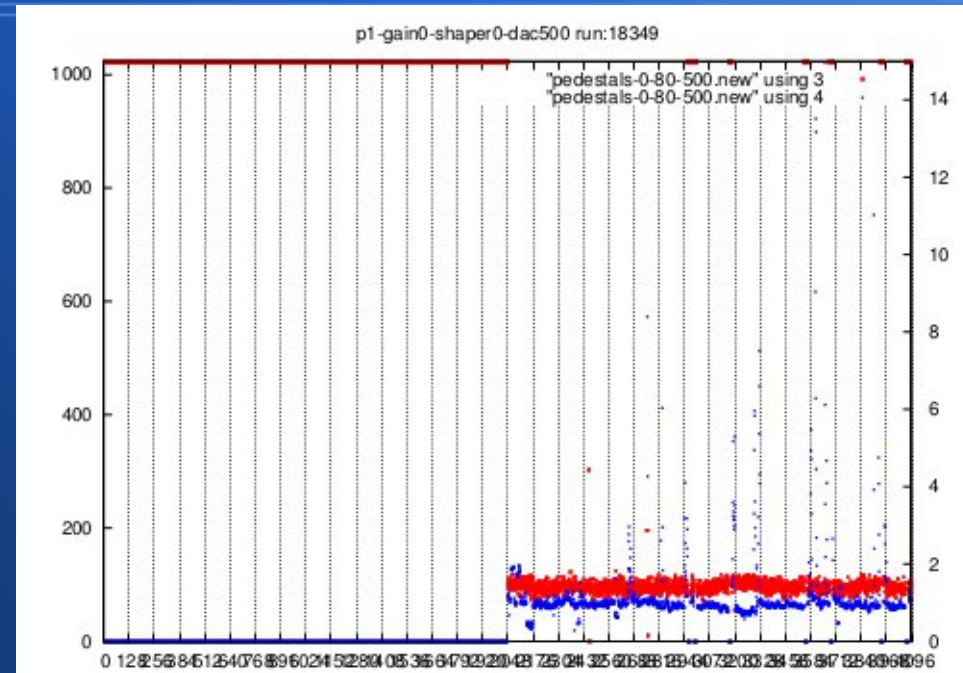
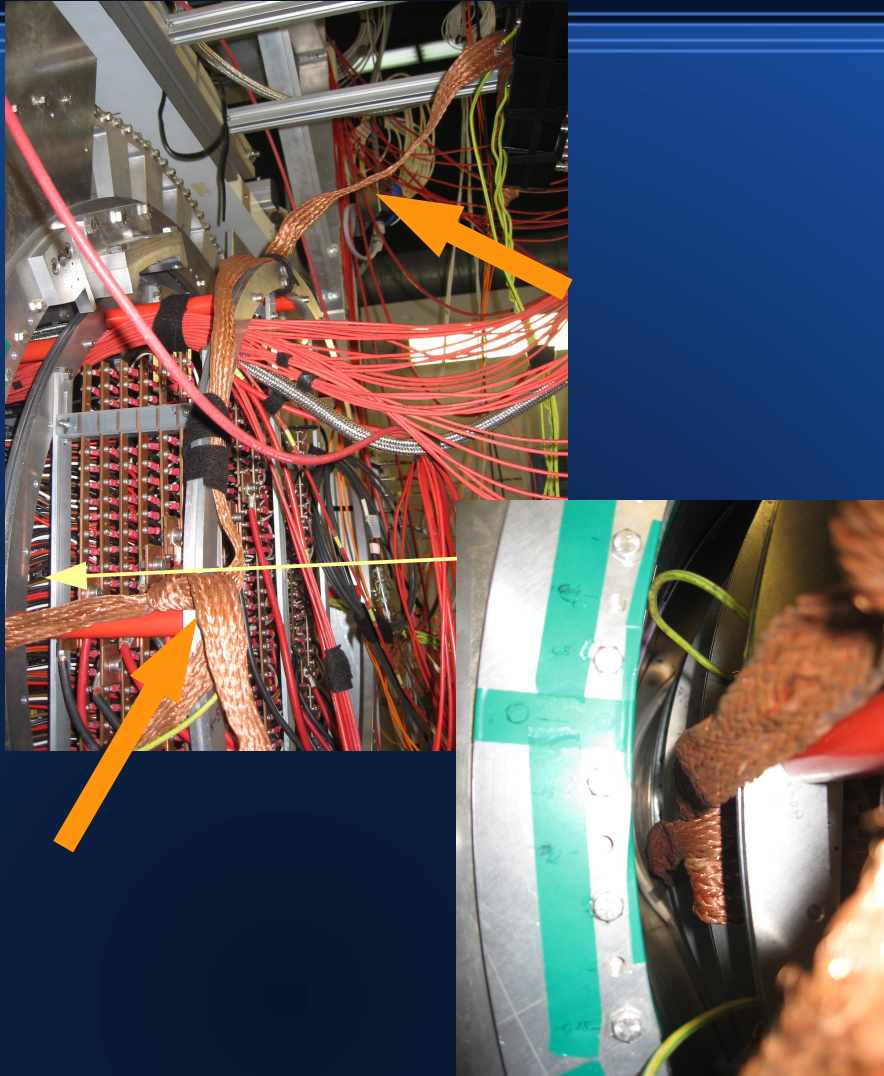
- High Voltage testing
  - in test boxes, no problems
  - in LP: HV trips => reduced HV, fixed GEM voltages
- Electronics tests
  - High noise
  - Improved by extra grounding
- Quick, low statistics test runs to tune parameters
- High statistics data taking for performance studies

# Electronics noise



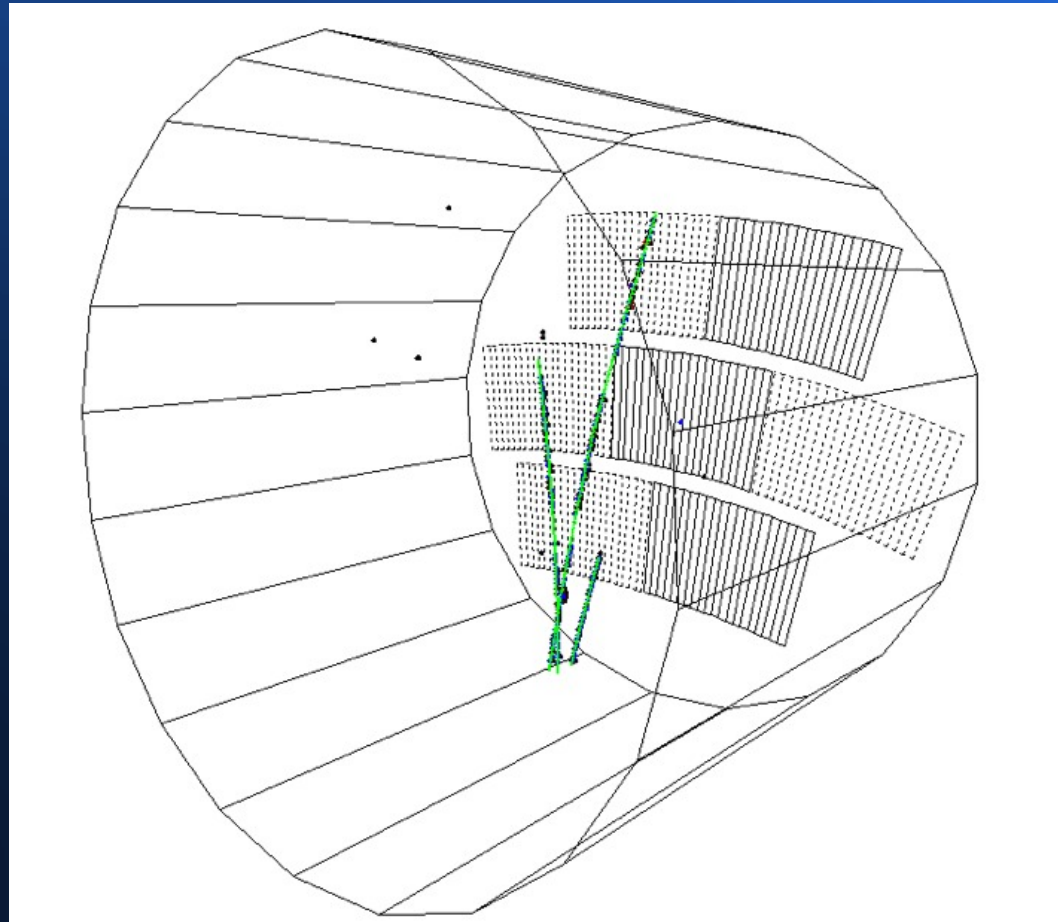
The electronics noise increased to unusually high levels when the High Voltage was turned on.

# Electronics noise

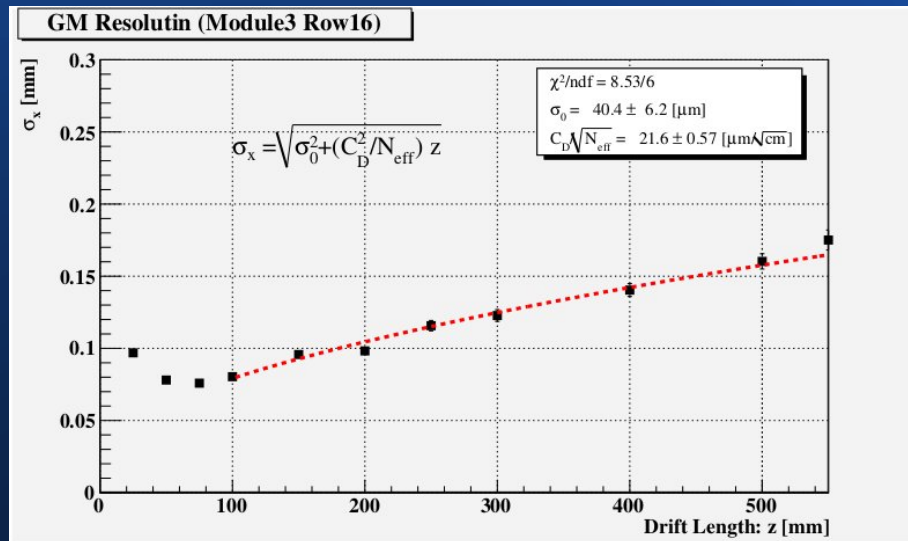


With improved grounding between the TPC and the HV distribution boxes, the noise is significantly reduced when the GEM HV is up

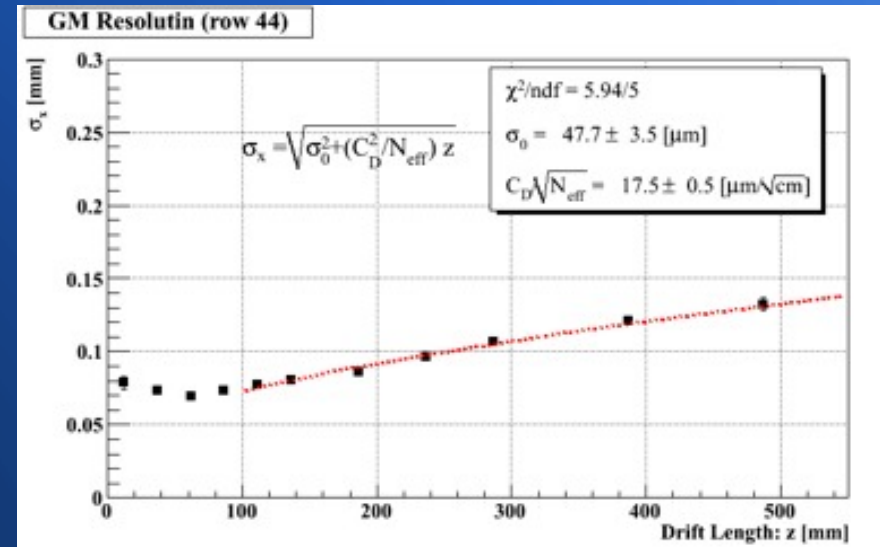
# Data taking



# Quick resolution study



First run with improved grounding  
VGEM 330V, 340V

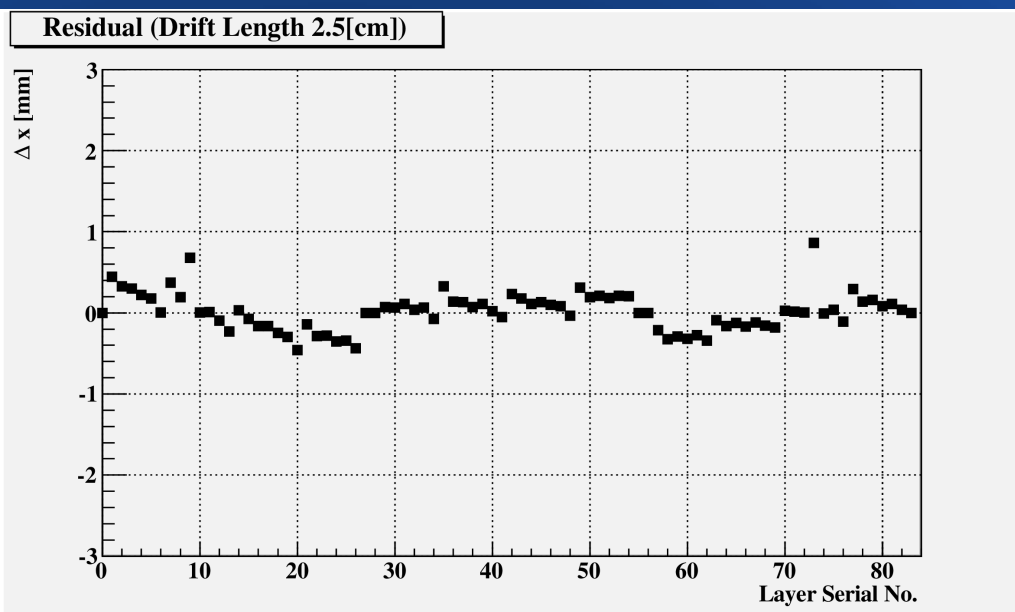


Increased GEM gain (330V, 355V):  
improved resolution at long drift

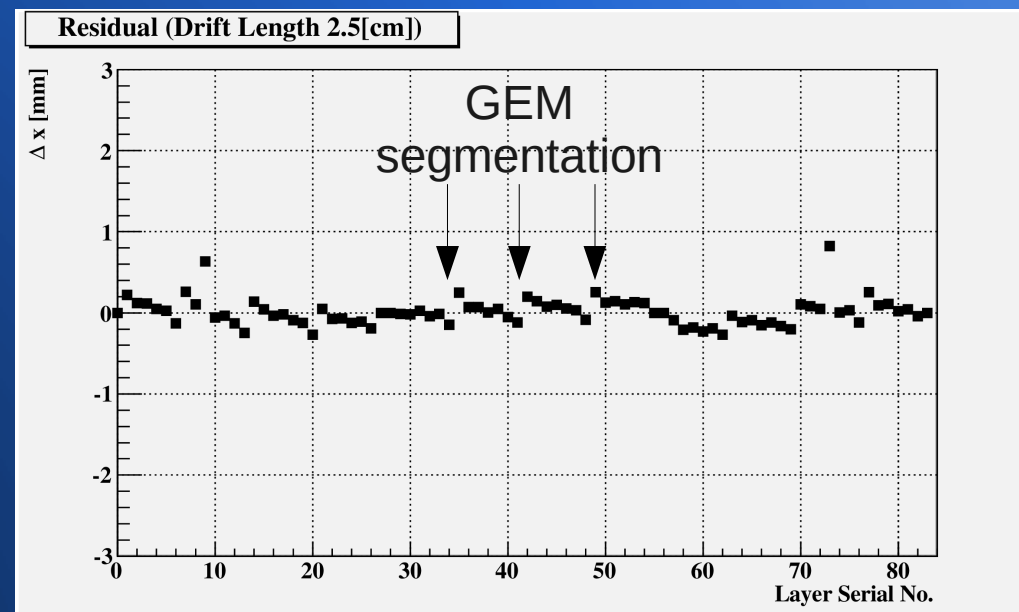
Increasing the GEM gain improves the resolution (as expected).  
The GEMs could not hold higher voltages.



# Space residuals: Correcting GEAR file

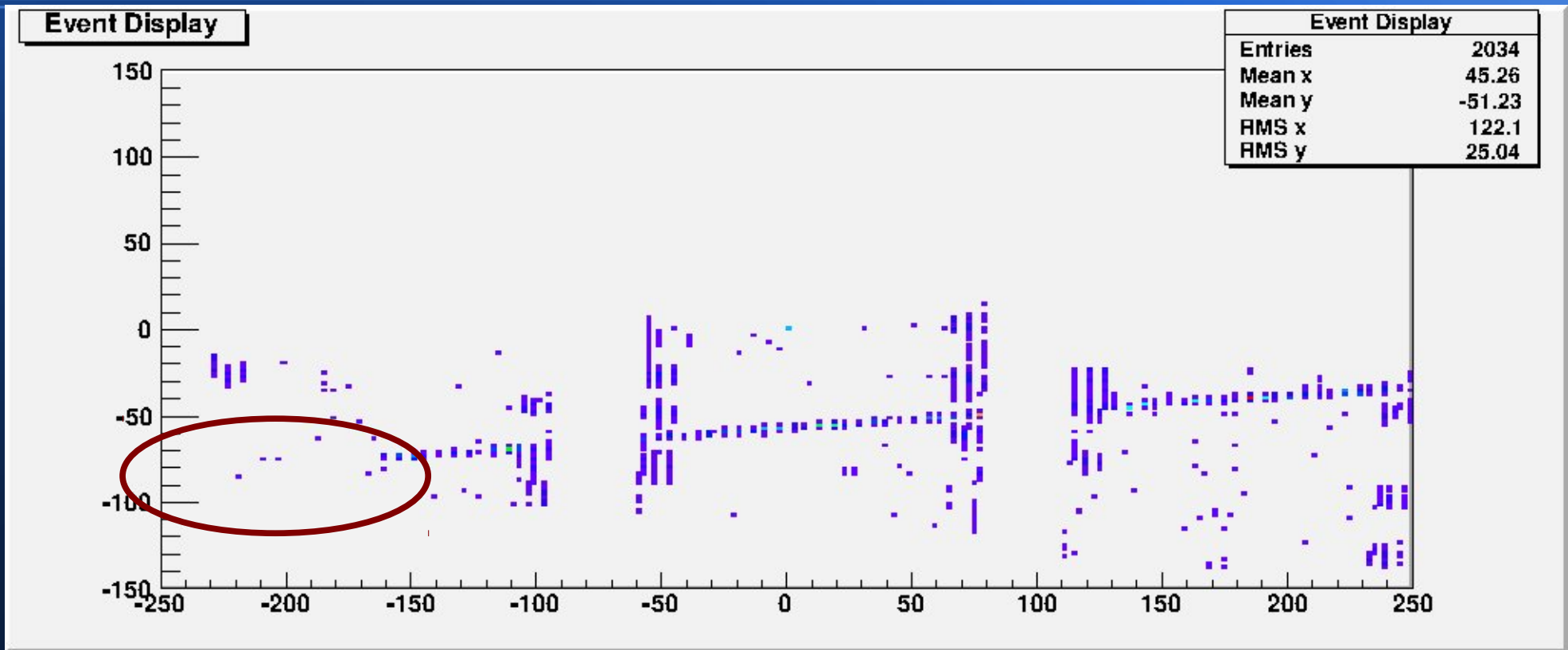


Old GEAR file



Corrected using pad plane  
measurements

# 1 GEM broken



One GEM shorted, reason unclear. Further data taking with 2.5 modules

# Long data taking

- High statistic to allow tight cuts
  - Z scans,  $\phi = -10, 0, 10$
  - X scans  $B=0, 1T$
  - Theta scan
- Study of angle effects
- Study of alignment and field distortions

# Conclusion

- Beam test with Asian modules completed
- Difficulties with HV trips and noise overcome
- Preliminary fast runs with low statistics (2000 events) very helpful for tuning parameters
  - with moving stage, a Z-scan takes ~1 hour
- Nice preliminary results, fun analysis to come
- Data summaries on our wiki:  
<http://www-hep.phys.saga-u.ac.jp/ILC-TPC/index.php?Large%20Prototype%201%2FTests%2FBeamTest%202012%2FData%20Taking>

# Backup slides

# Drift velocity

