Very preliminary results from the second beam test of the GEM panels at DESY T24

2009.04.08

Ryo Yonamine
on behalf of all the people contributed to the beam test

I'll report preliminary results from the data which were taken with DESY beamline on the basis of LC-TPC collaboration.

We checked padresponse & resolution with "temporary" analysis program in order to know if the data have been taken correctly or not.

ABOUT ANALYSIS PROGRAM

We used temporary analysis program(non Marlin-TPC).

This is composed of ...

- unpacker ------ To make ROOT files from raw data
- hitmaker ------ To reconstruct hit clusters for each rows
- trackmaker ------ To reconstruct tracks from hit clusters (including Kalman Filter which is based on ROOT)
- gui ------ Event display

So far we can analyze only a single module.

Data Summary

All data use Drift field 230V/cm, T2K gas

B = 0 T, 5GeV/c, Gain 0, shaper 0, VGEM=360V

Distance(cm)	10	15	20	25	30	35	40	45	50
Run#(k events)	6953(20)	6957(20)	6958(20)	6972(20)	6973(20)	6974(20)	6975(20)	6976(20)	6977(20) 7096(38)

B = 0 T, 5GeV/c, Gain 3, shaper 0, VGEM=350V

Distance(cm)	10	15	20	25	30	35	40	45	50
Run#(k events)	7074(40)		7076(25) 7079(20)		7080(40)		7083(40)		7089(16) 7094(25)

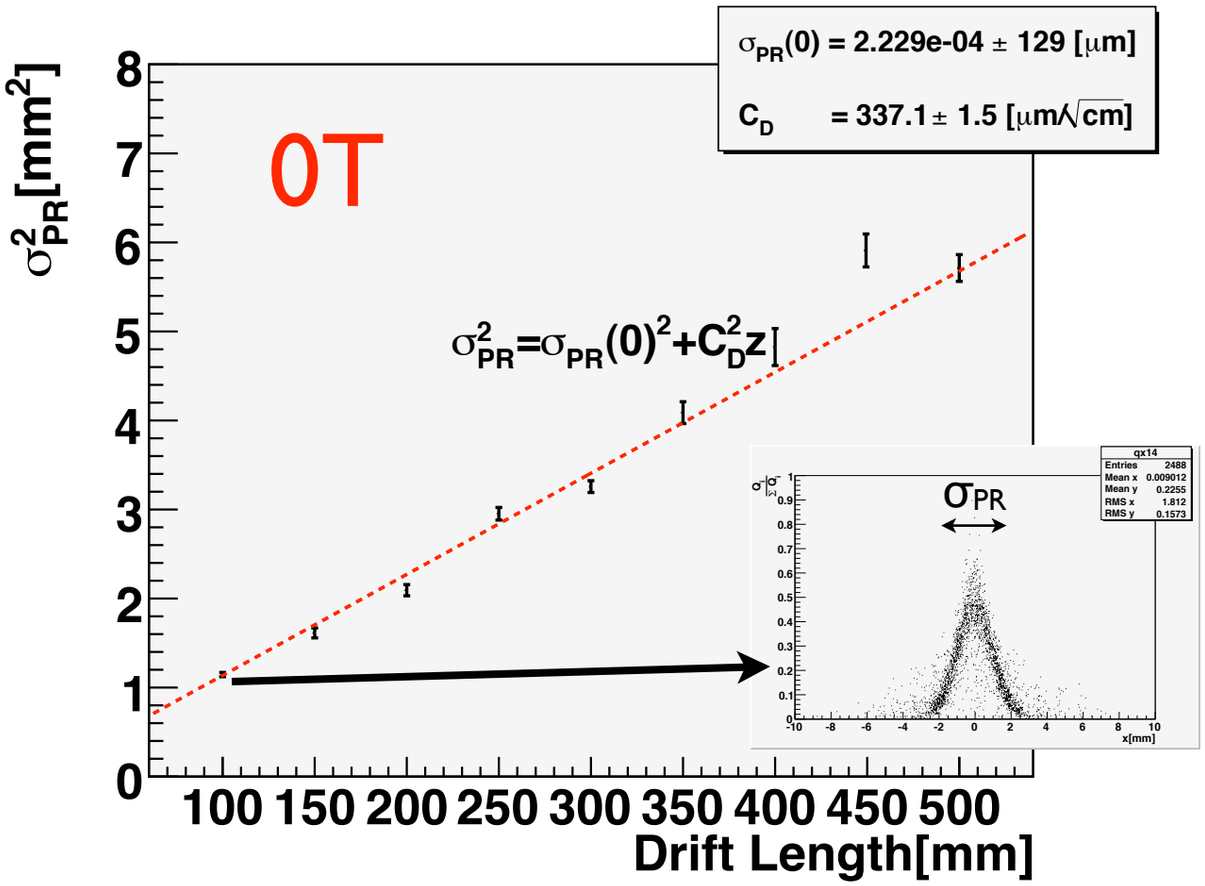
B = 1 T, Gain 0, shaper 0, VGEM=360V

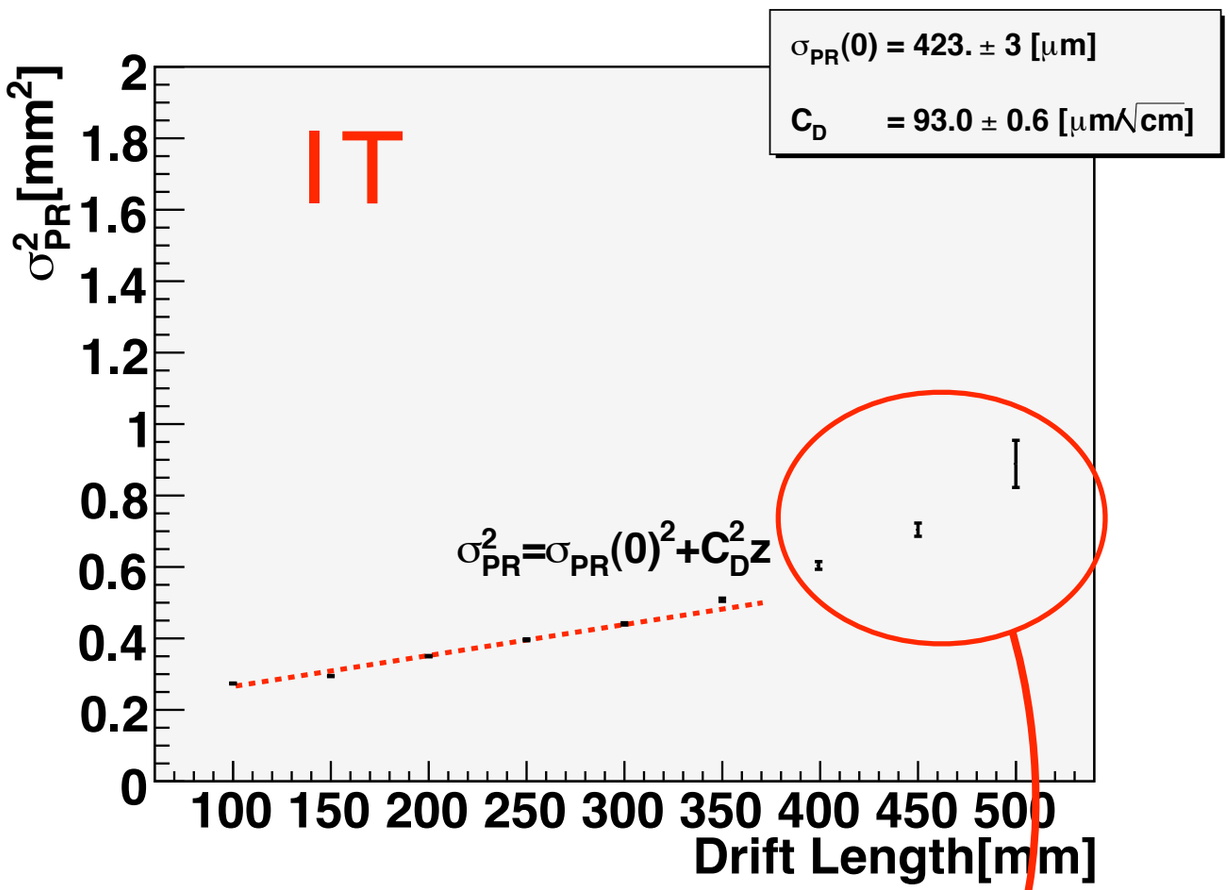
Distance	(cm)	10	15	20	25	30	35	40	45	50
Run# (k events)	5GeV/c	7049(20) 7050(20)	7046(20)	7051(40)	7053(40)	7006(10) 7055(25) 7059(20)	7010(20) 7061(20)	7011(20) 7065(20) 7066(20)	7012(20) 7015(10) 7020(20) 7021(20)	7023(40)
non-zero sup.	5GeV/c	7000(10)	7001(10)	7002(10)	7003(10)	7004(10)				
	3GeV/c	7041(80) 7043(80)	7040(80)	7039(80)	7038(80)	7037(80)	7034(80)	7033(80)	7031(40) 7032(40)	7028(20)

B = 0 T, 5GeV/c, Gain 0, shaper 0, VGEM=360V

phi(mrad)	-25	25	50	75	100
Run#(k events)	7101(13) 7103(10)	7116(20)	7105(11)	7114(20)	7109(20)

Pad Resoponse (~500 events) Layer 14

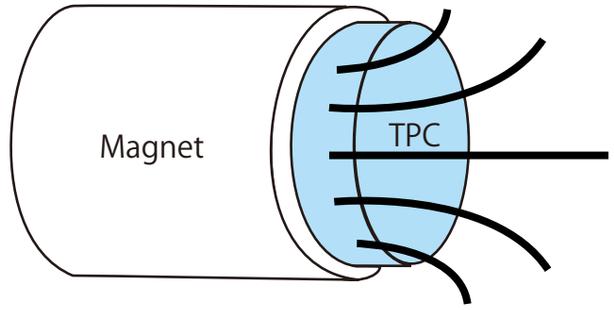




Magboltz C_D~100 for 1T

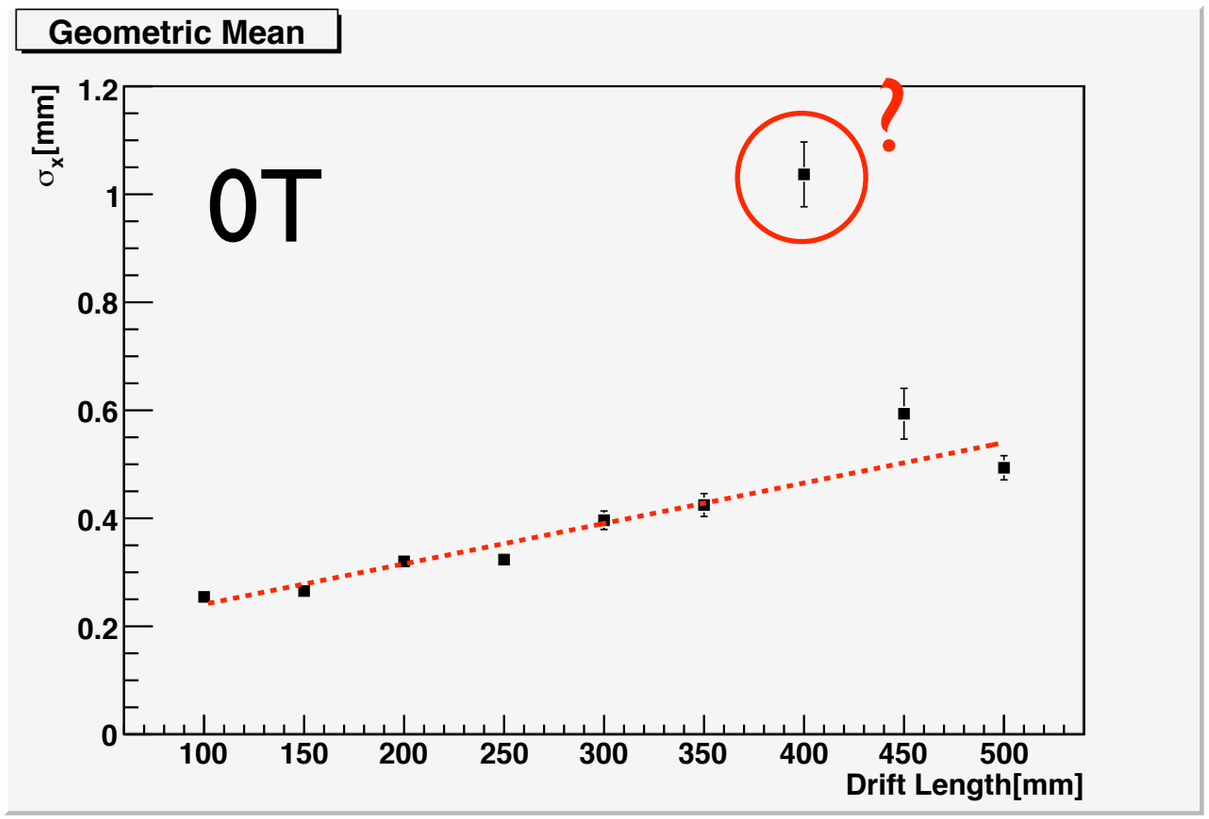
C_D~300 for 0T

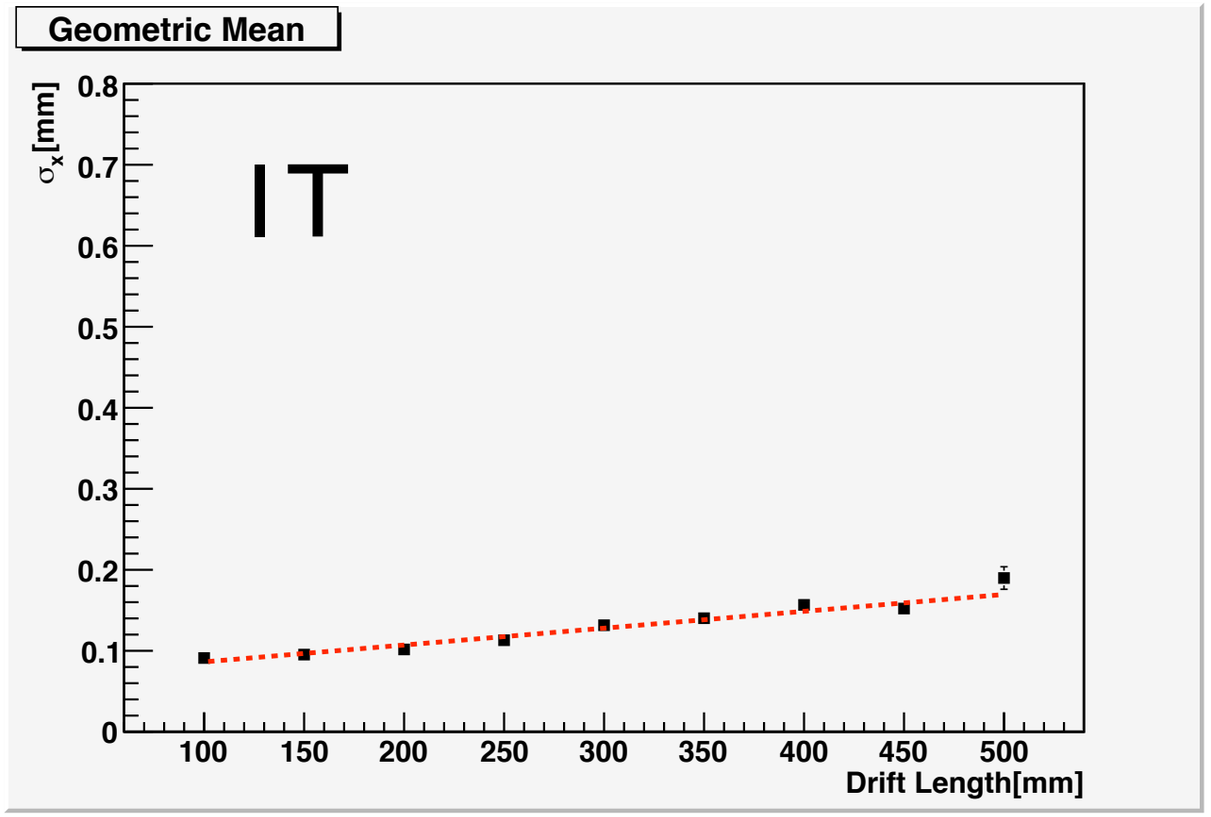
There is B-field nonuniformity at long drift length because TPC is partially moved out.
And we lost signals due to limited readout region.



Resolution (~500 events)

Layer 14





$$\sigma_x^2 = \sigma_0^2 + (C_D^2/N_{eff})z$$

CONCLUSION

The data seem to be O.K.

Preliminary results are consistent with GARFIELD simulation and small prototype results.

NEXT STEP

Analysis for multi modules

Development of Marlin-TPC-based analysis