

# Large Prototype Beam Test Micromegas analysis

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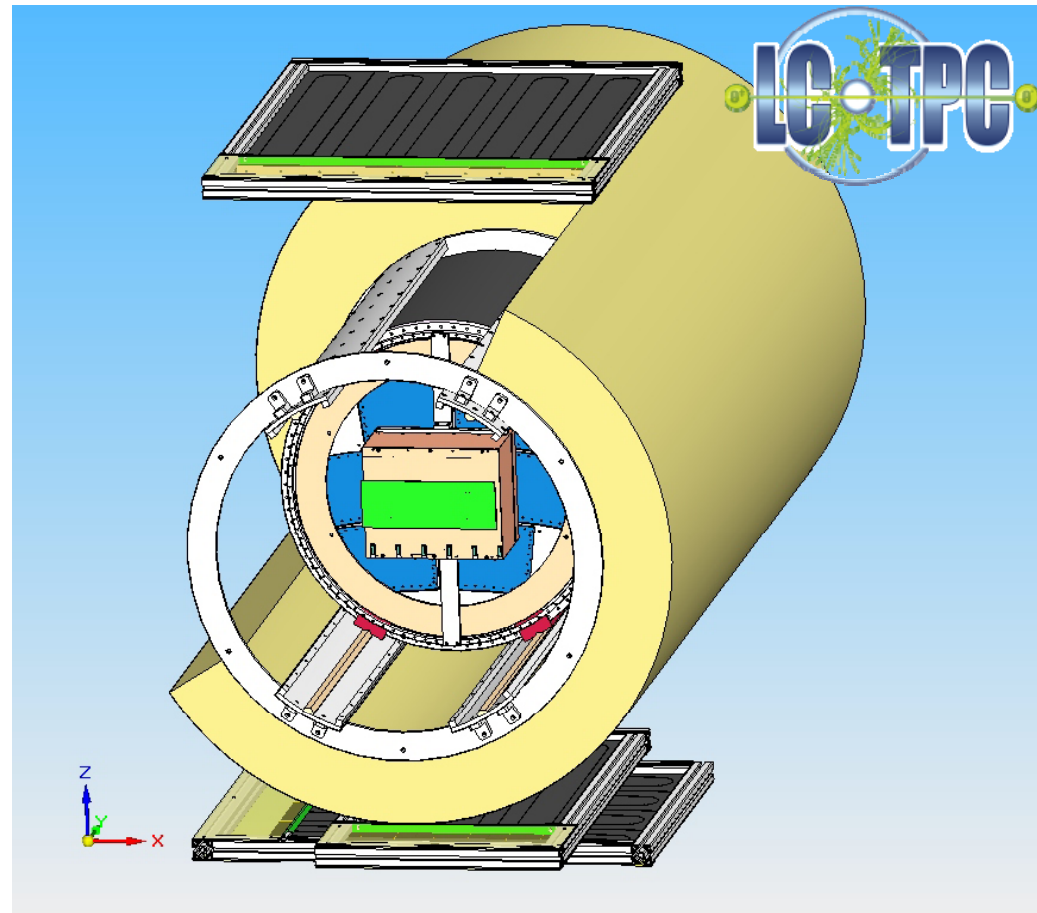


**B=0 resolution study**

**Drift velocity measurements**



# The Large Prototype

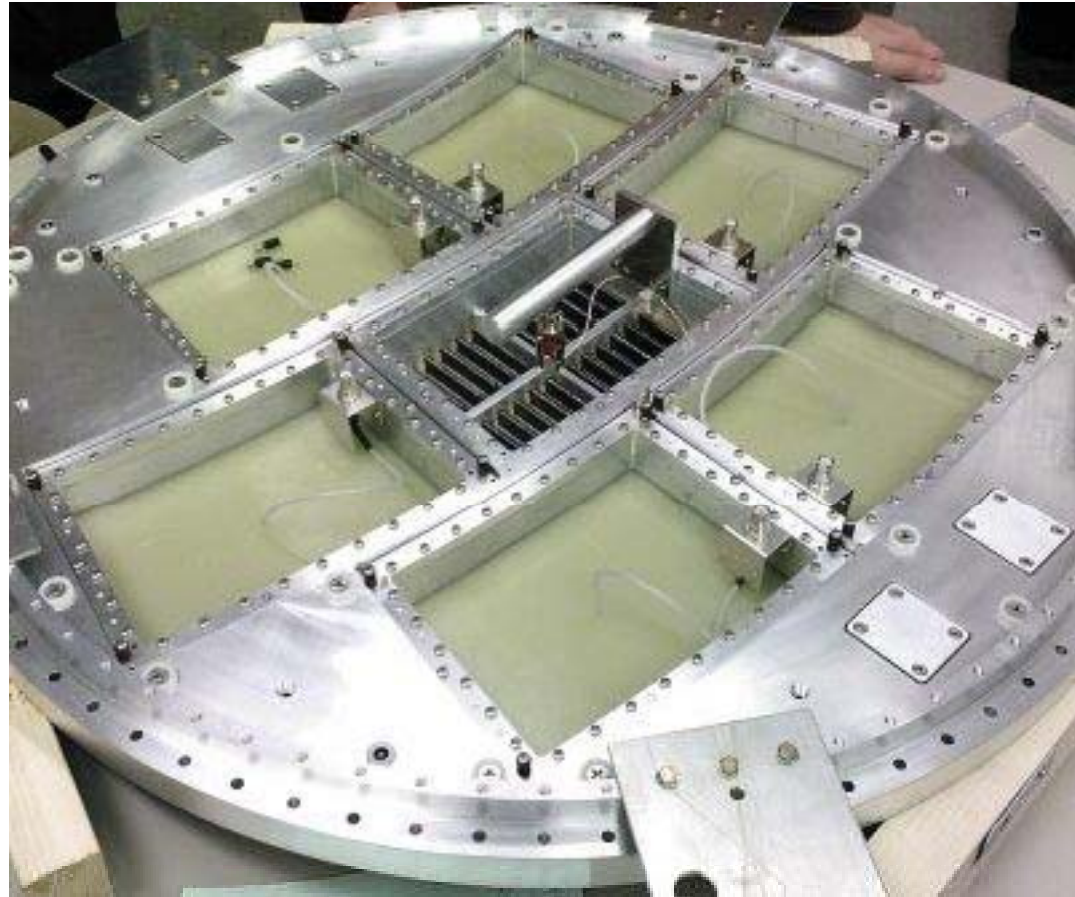


Panels: in 2008-2009: 1 panel at a time in the centre of the detector.

Start with standard pads

Continue (after a week November) with a resistive panel.

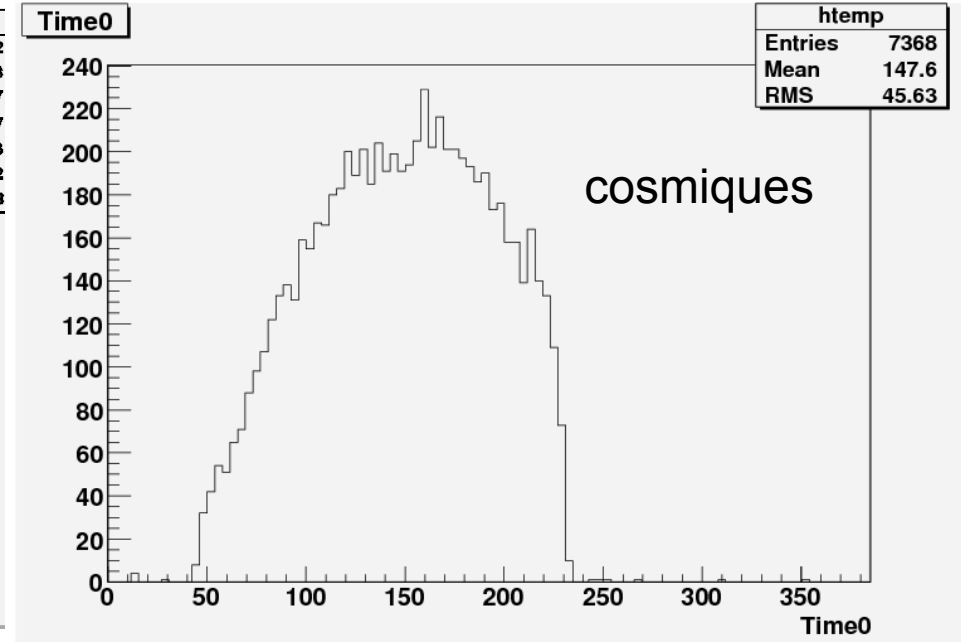
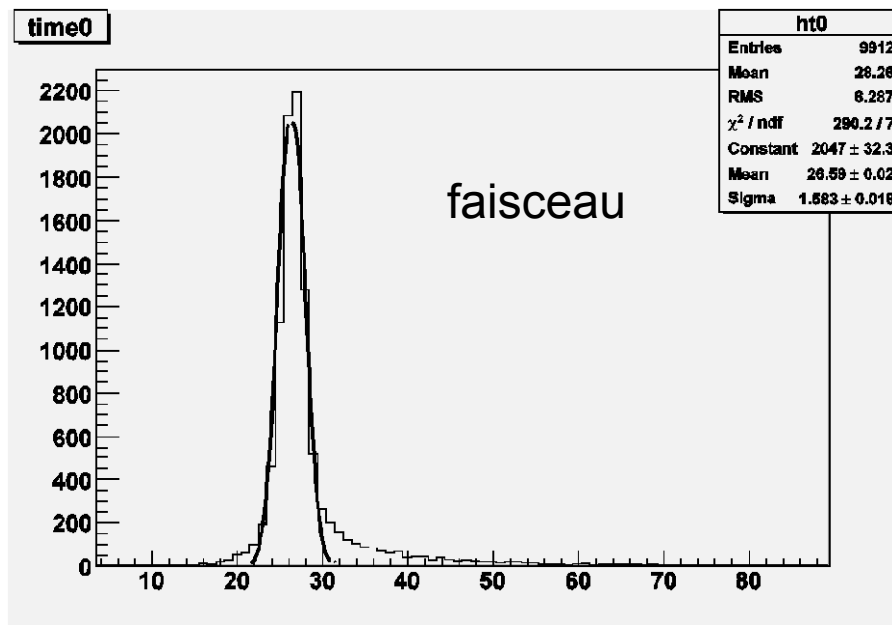
Others are dummy. Also plans for trying a multichip InGrid+TimePix panel in 2009



One panel successfully mounted week 44

# FIRST DATA





Beam width in x and in z: 3.9 mm

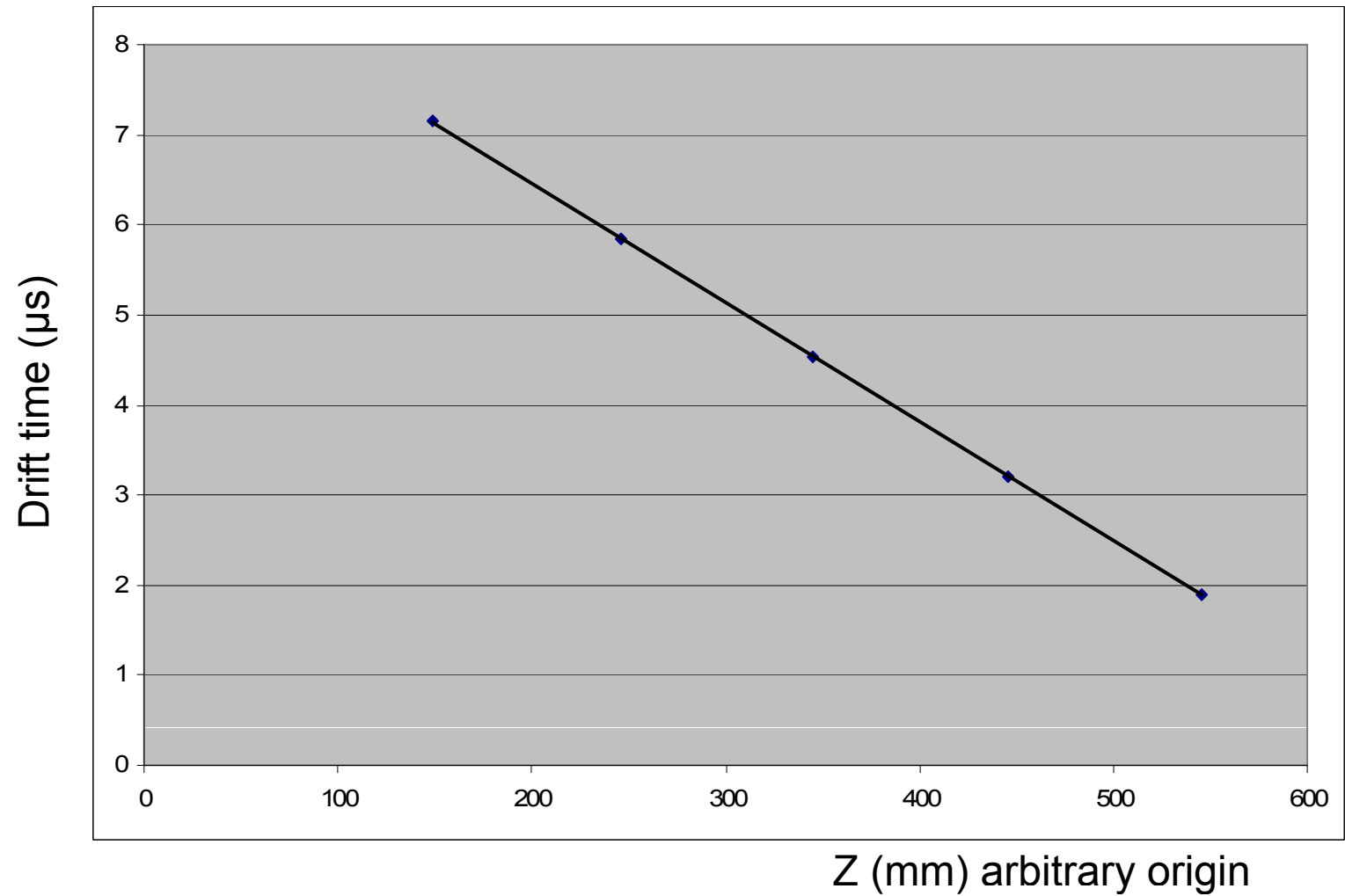
TPC drift length :

56.85 cm (measured with cosmic-rays)

56.937 cm (survey)

Measured drift velocity ( $E_{\text{drift}} = 230 \text{ V/cm}$ , 1002 mbar) :  $7.56 \pm 0.02 \text{ cm}/\mu\text{s}$

Magboltz :  $7.548 \pm 0.003$  pour Ar:CF4:isobutane:H2O/95:3:2:100ppm

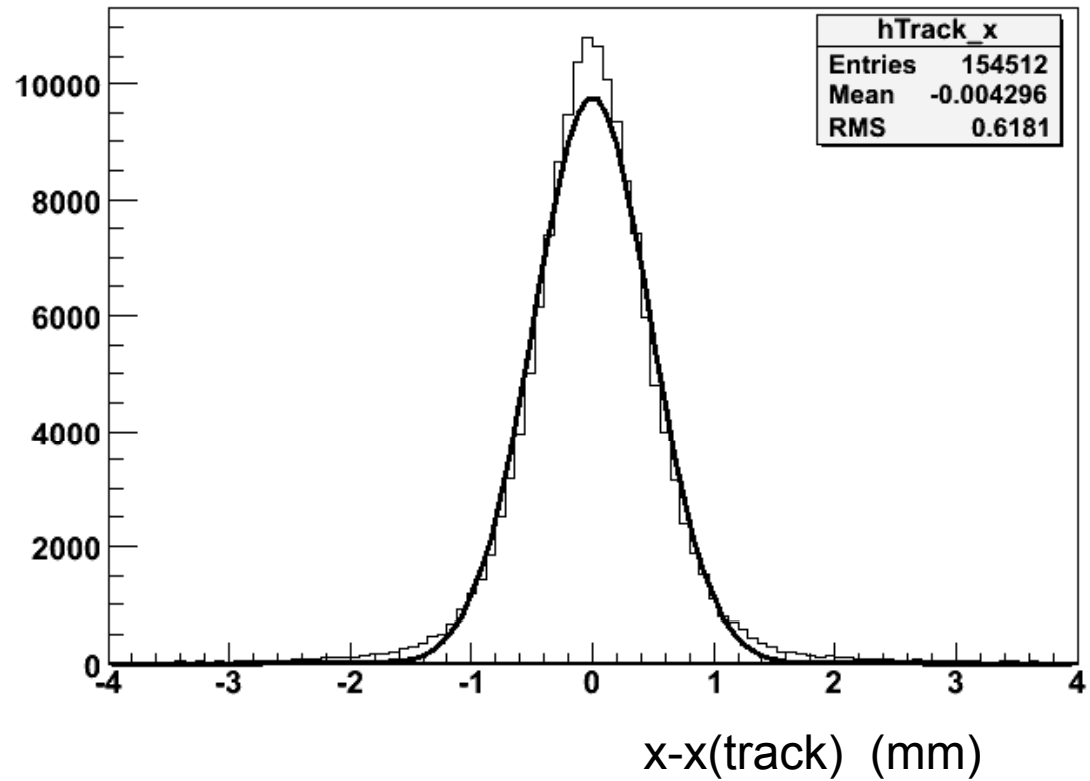


### Residuals

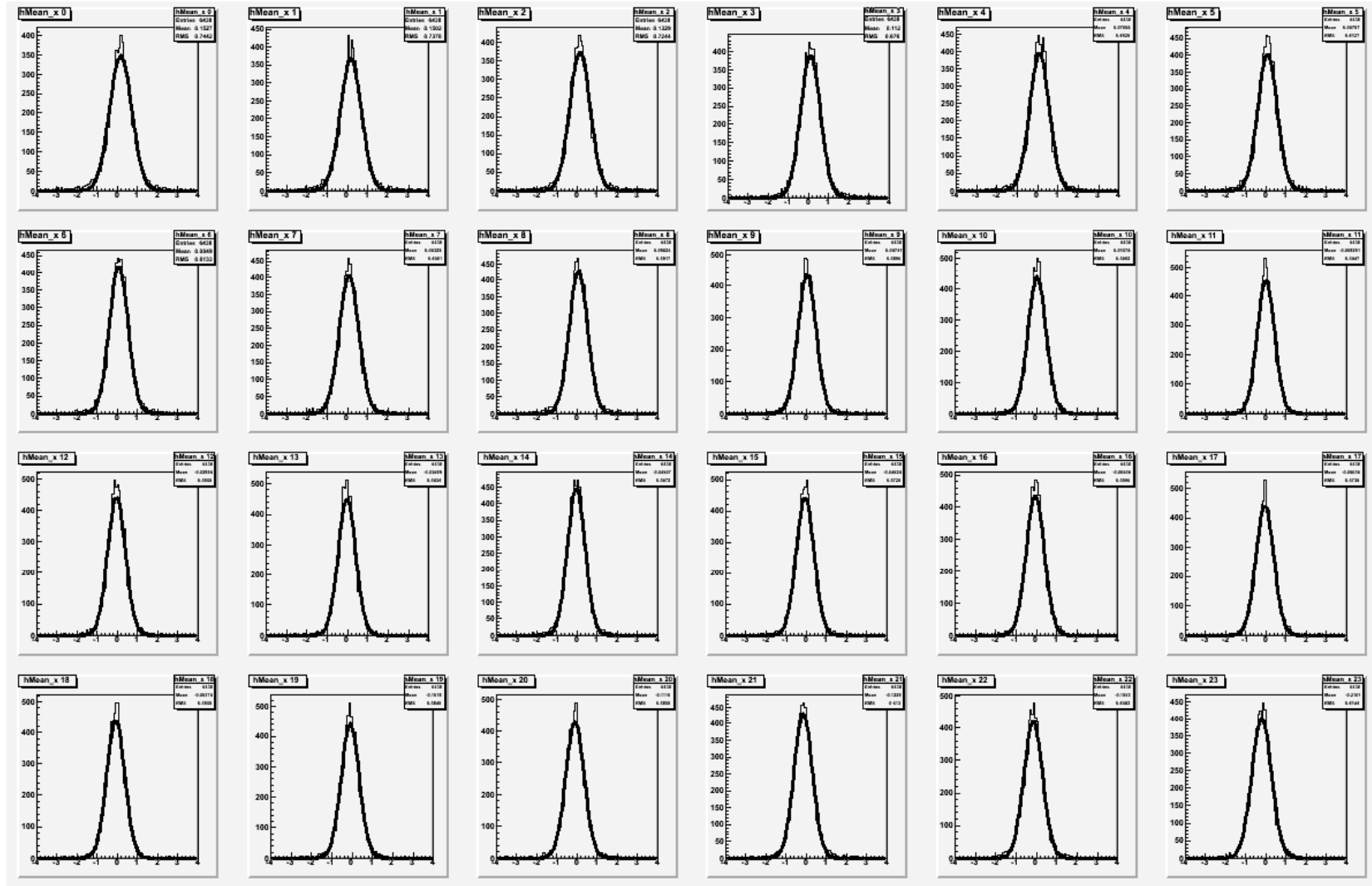
Résiduels from barycentre  
at 40 cm :  $\sigma=450 \mu$

(expected from diffusion:

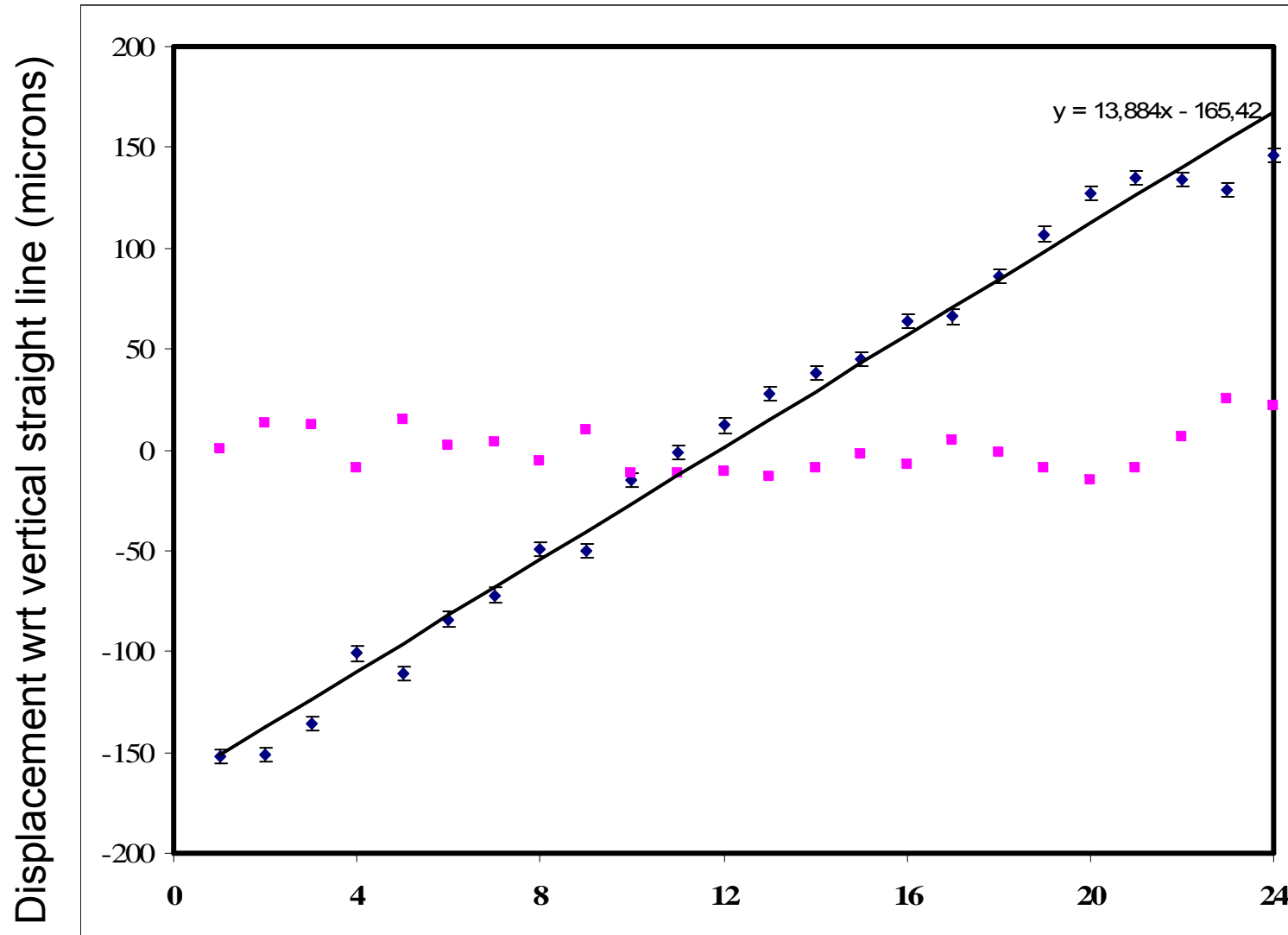
$315 \text{ microns} * \sqrt{40 \text{ cm} / \sqrt{22} = 400}$ )



# distortions: residuals line by line



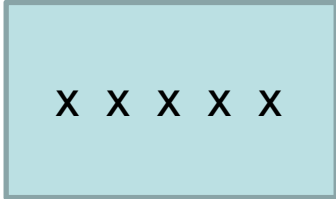




Rms displacement: 9 microns

Pad line number

Drift velocity measurement (using B=1T data) : shoot the beam at 5 different points (by sliding the TPC in the magnet) and measure relative times

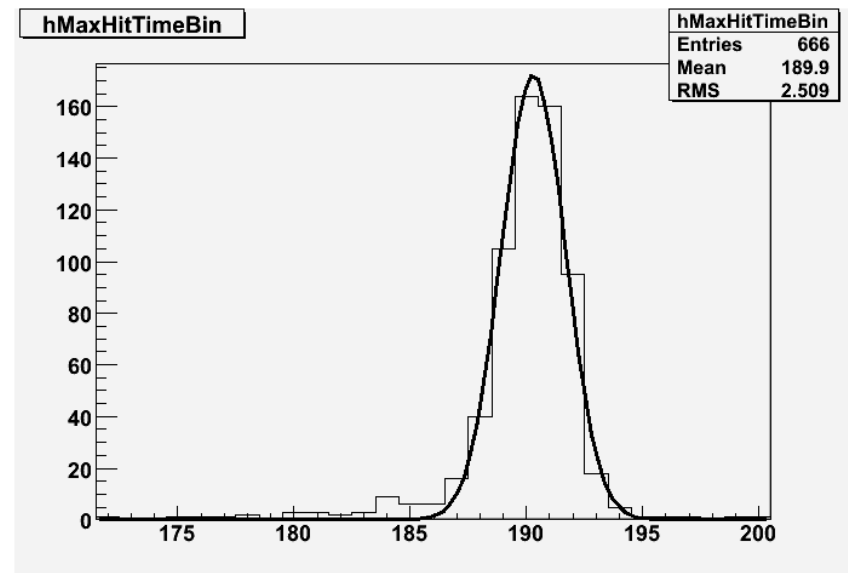
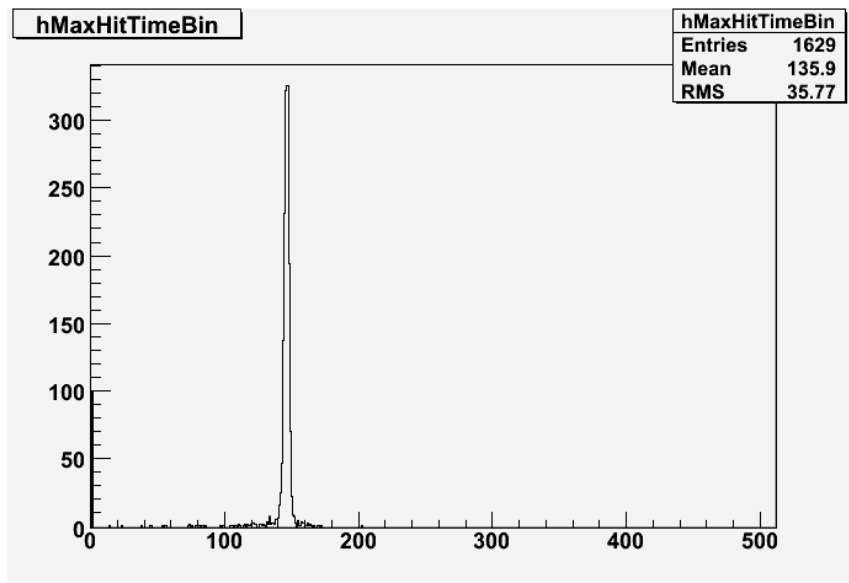


Runs used (100 ns shaping time)

E, z	10	20	30	40	50
100V/cm			331		327
140V/cm	419	363	330	385	326
230V/cm	407,418	353	329	373	322

Time of highest charge hit in time bins (40 ns)

E, z	10	20	30	40	50
100V/cm			191.1		>511
140V/cm	60.5	103.6	146.2	189.3	230.6
230V/cm	50.8	83.5	116.2	158.4	190.4



## Results:

Vdrift (140 V/cm) =  $5.82 \pm 0.02$  cm/ $\mu$ s  
 (Magboltz pure T2K 5.94 – with 120 ppm H<sub>2</sub>O 5.87)

Vdrift (230 V/cm) =  $7.68 \pm 0.03$  cm/ $\mu$ s  
 (Magboltz pure T2K 7.71 – with 120 ppm water 7.59)

Note that for longer shaping times, the measured time just adds the shaping. Example : at 500 ns shaping time, just add 10 time bins.

# Conclusion



Still a lot of work and not much time...

But very beautiful data!

Get some results for TIPP09 and  
forthcoming conferences

Take new data with new electronics (by-  
passed shaping) and an additional panel  
(resistive ink)

