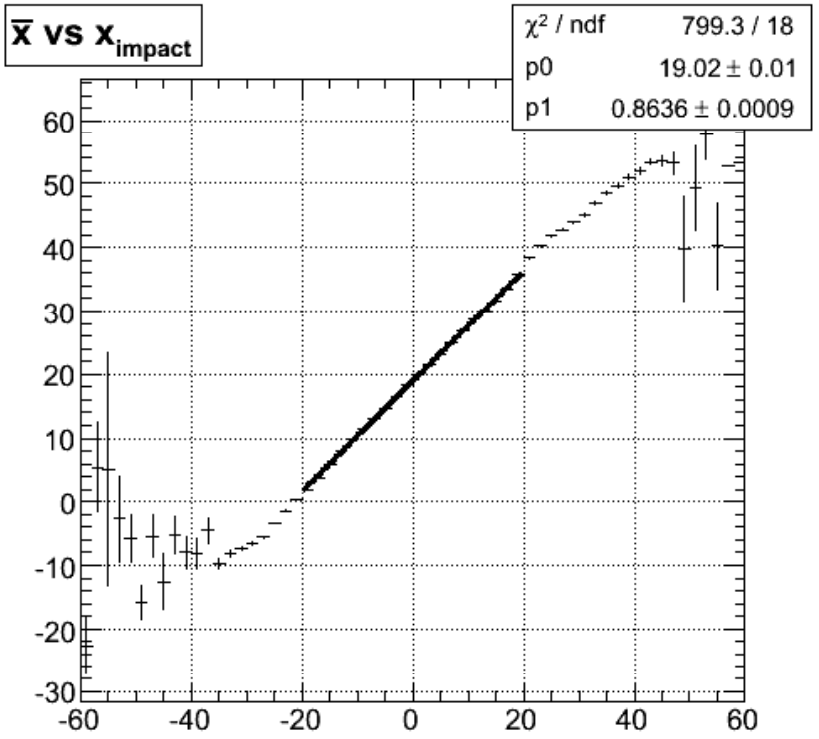
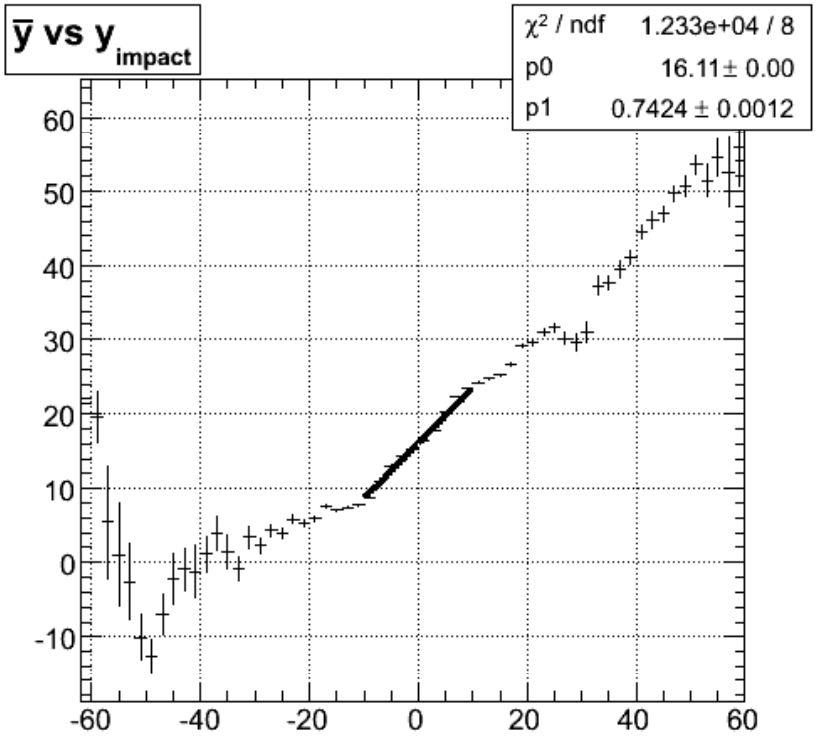
ECAL alignment update

David Ward

- A few thoughts about ECAL alignment
- And related issue of the drift velocity of the tracking
- Reminder of what was shown in last meeting...
- and follow up on ideas shown on 9 February

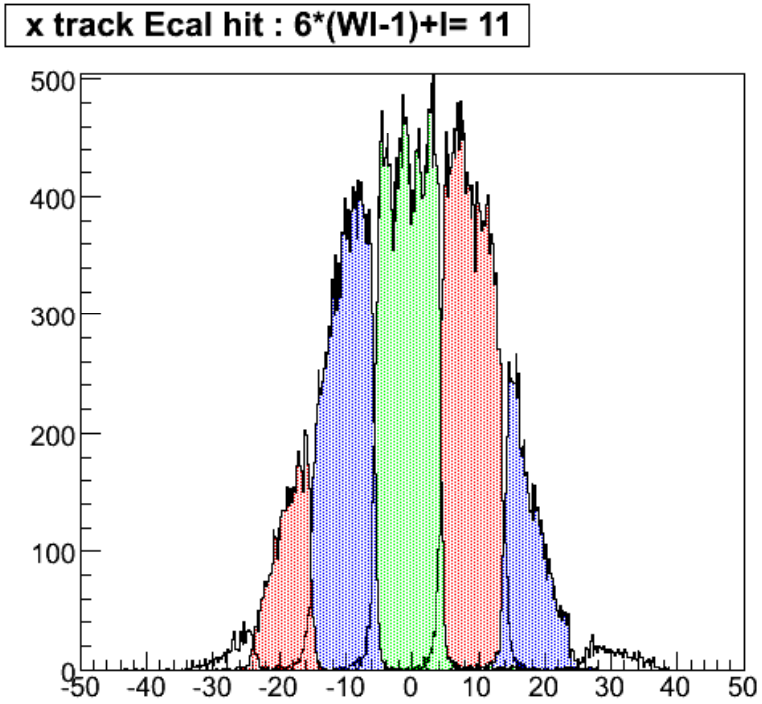
2006 approach

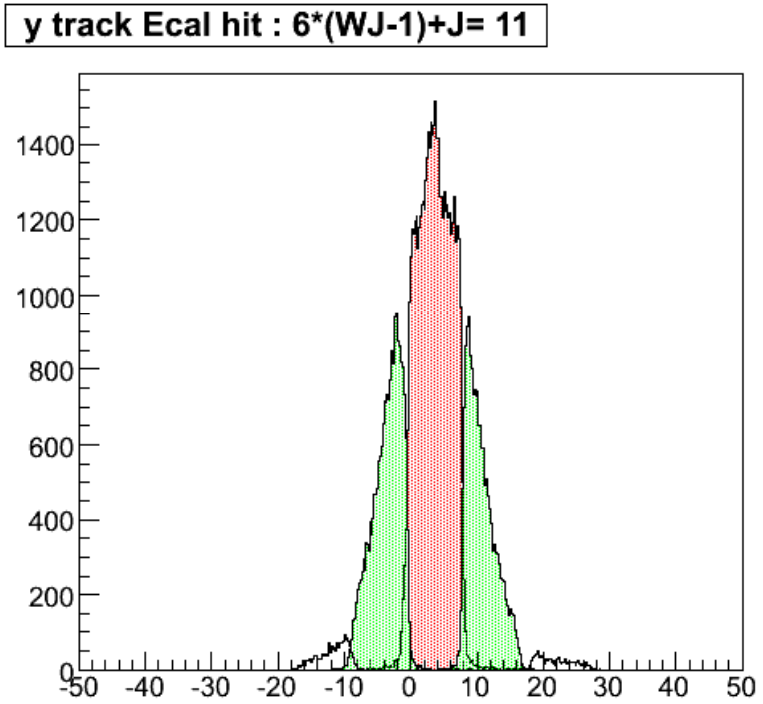




- Apply to 2007 data (run 300428; 50 GeV e^-)
- Intercept at x(track)=0 gives ECAL offset
- Gradient gives correction to drift velocity (assuming 1cm pitch of ECAL is accurate)
- But shape in y is not simply linear, so procedure unreliable?

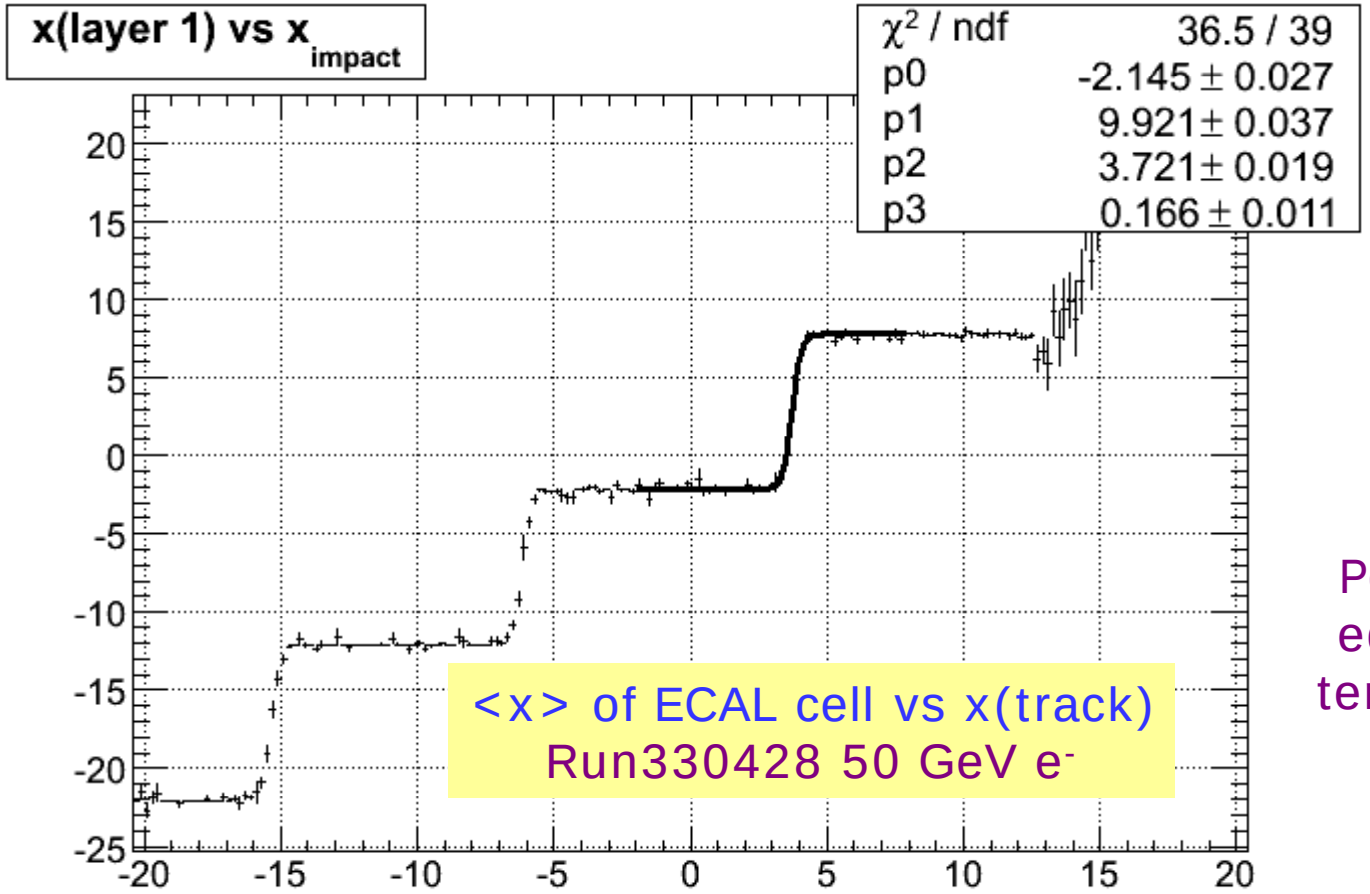
Track position vs pad index in layer 1





- Consider events with just a single hit in first layer
- For each cell index in x (or y) plot x (y) of extrapolated track
- Identify coordinates of cell edges
- Plots shown for Run331298 (30 GeV π^+)

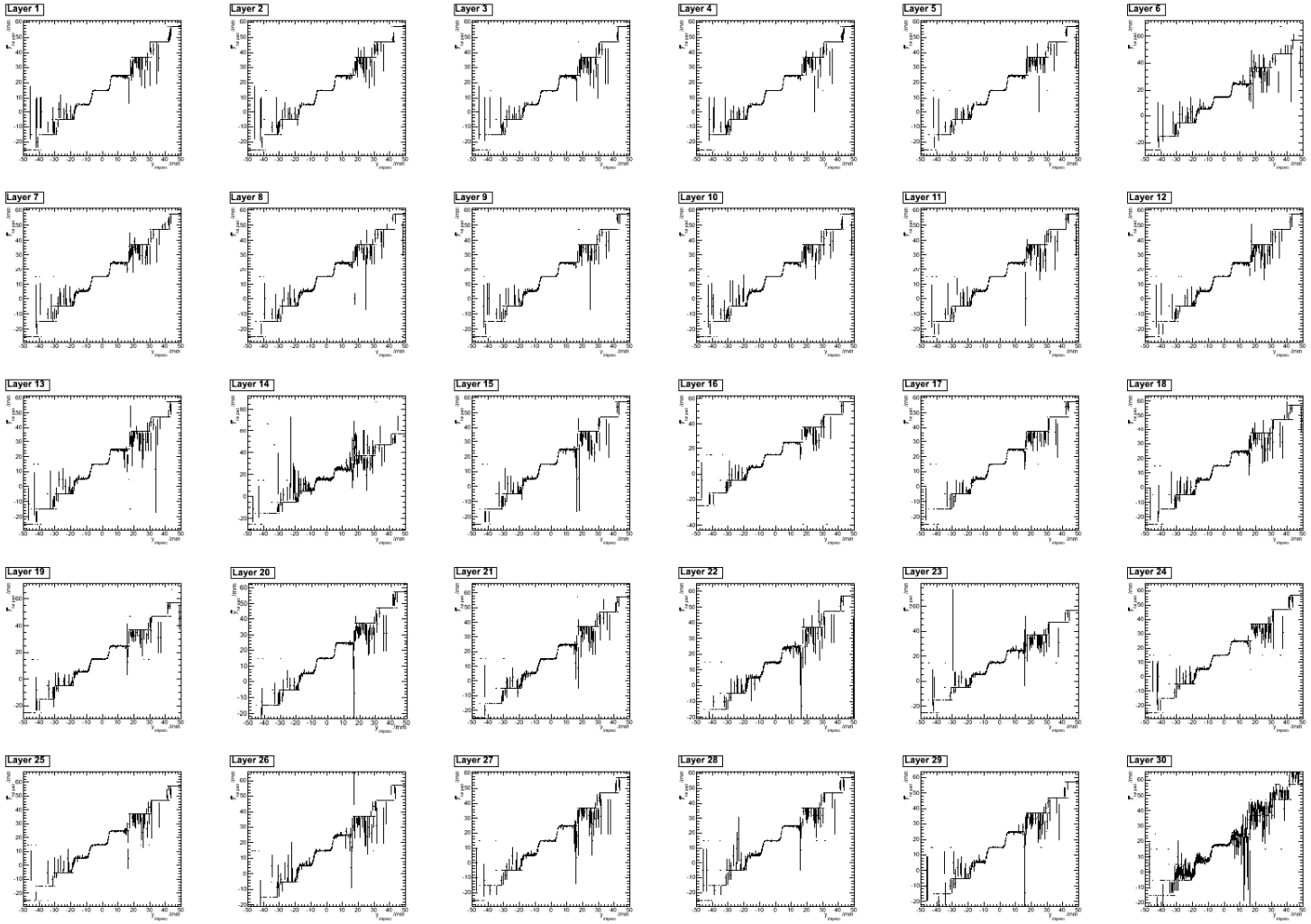
Fit Fermi function to extract parameters



Cell width
Edge position

Potential to fix edges to a few tens of microns?

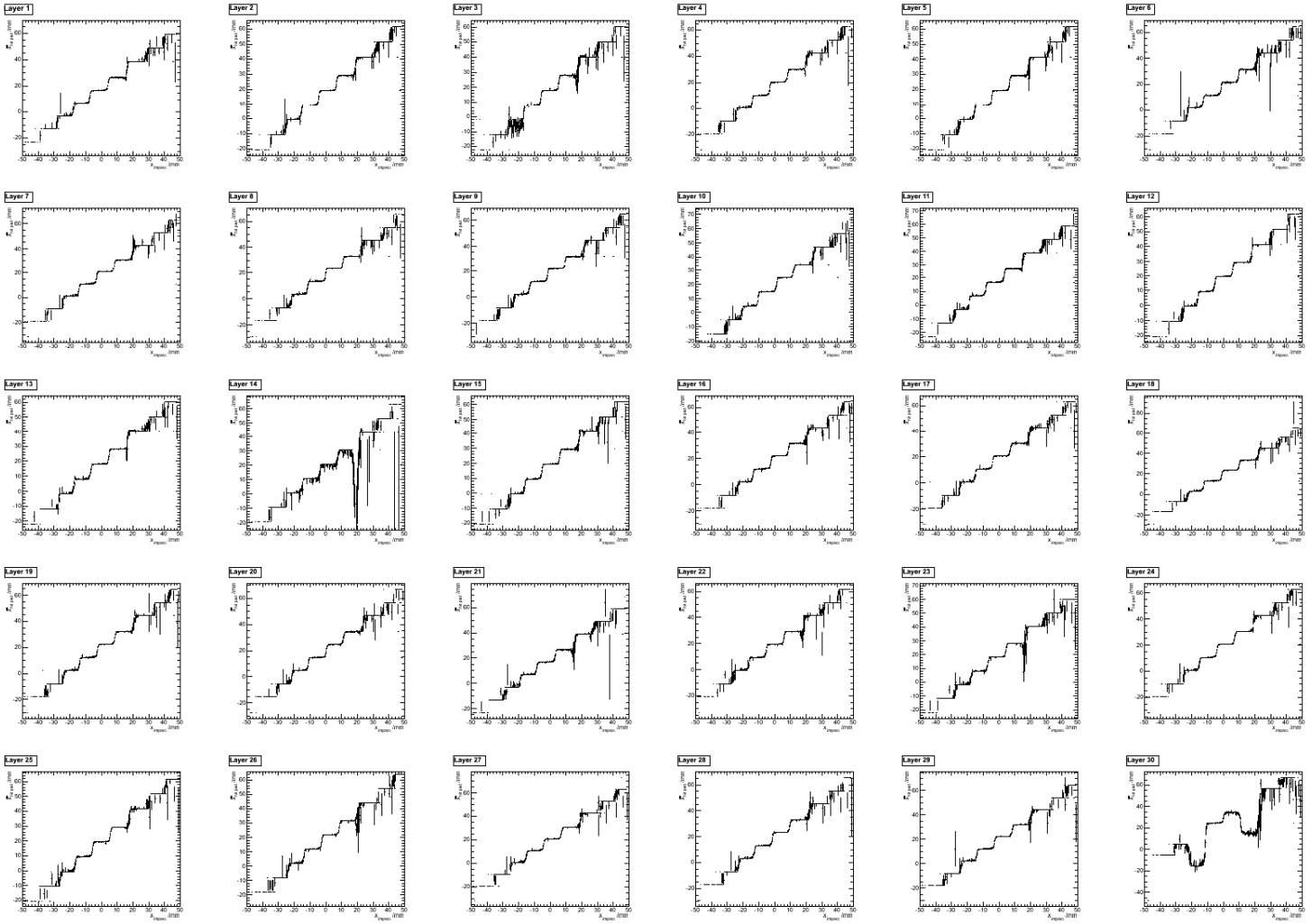
Run 330436 – select non-interacting π^-



- All 30 layers shown.
- Could use more statistics.
- But ∃ one pad with both edges clear.

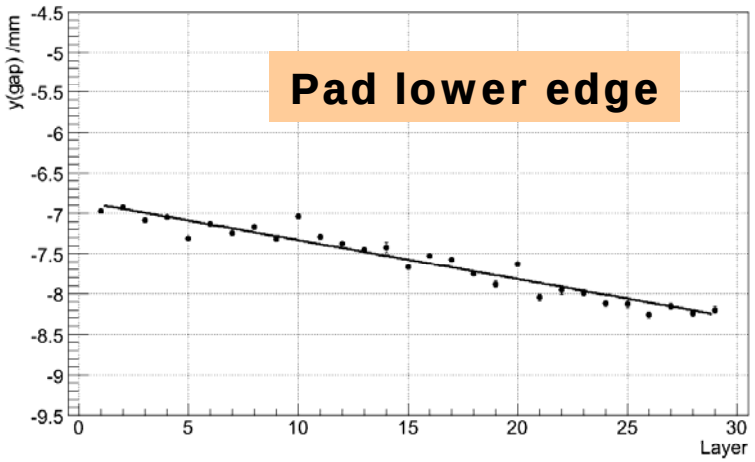
Run 330436 – select non-interacting π^-

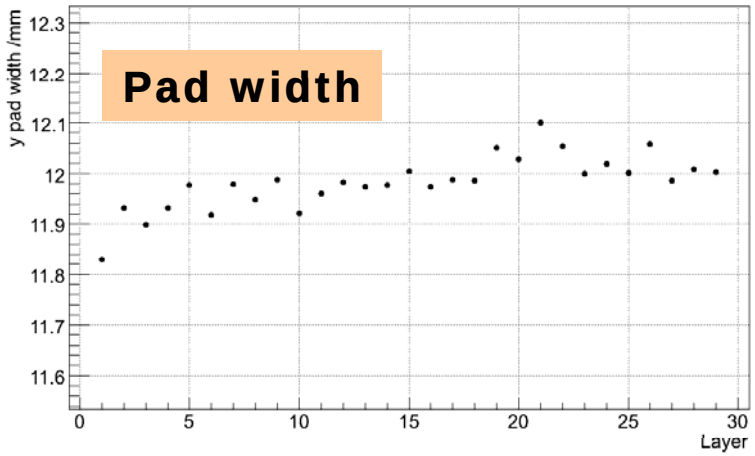
x

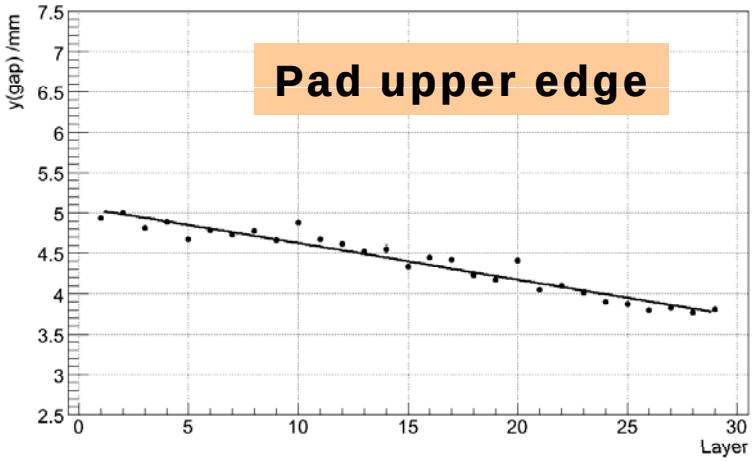


Layer 30 Mapping error?

Measure “cell width” in y

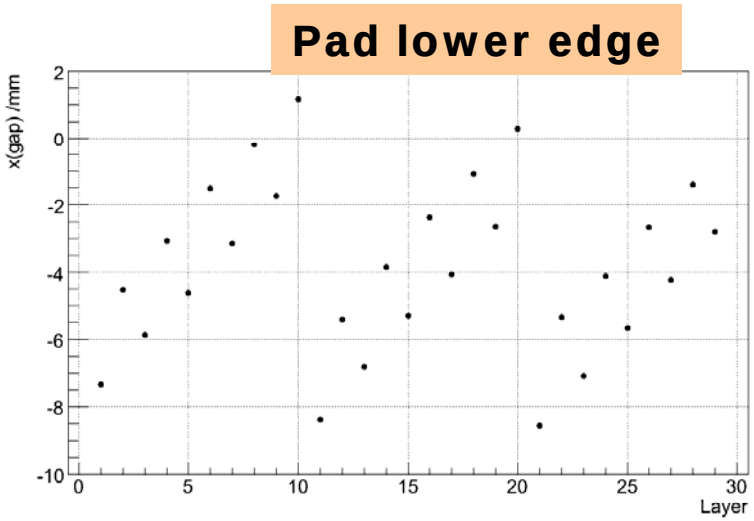


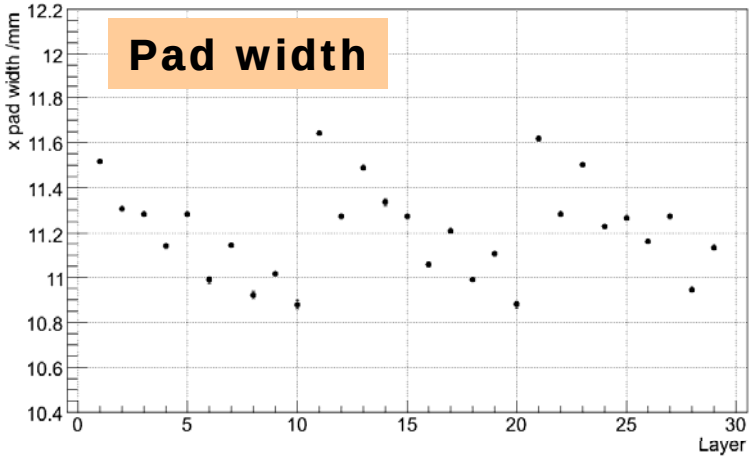


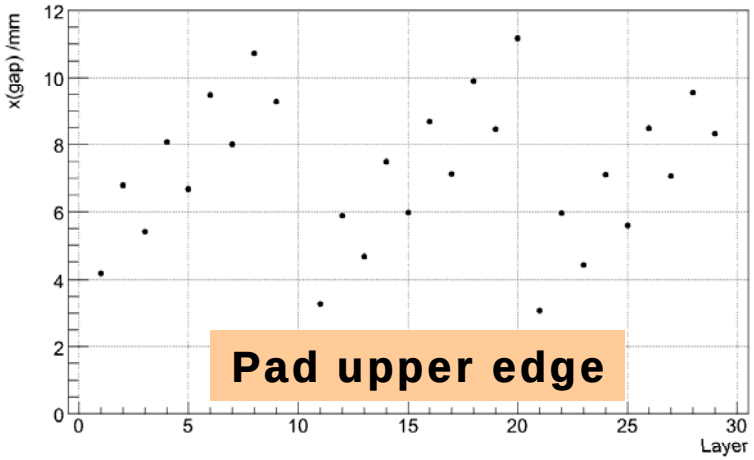


- Tilt of ECAL w.r.t. beam coordinates clearly discernible. ~6 mrad.
- Apparent pad width is reasonably constant to ± 1%, though possibly some structure.
- i.e. drift velocity correction in y should be ~1.20±0.01.

Likewise measure “cell width” in x

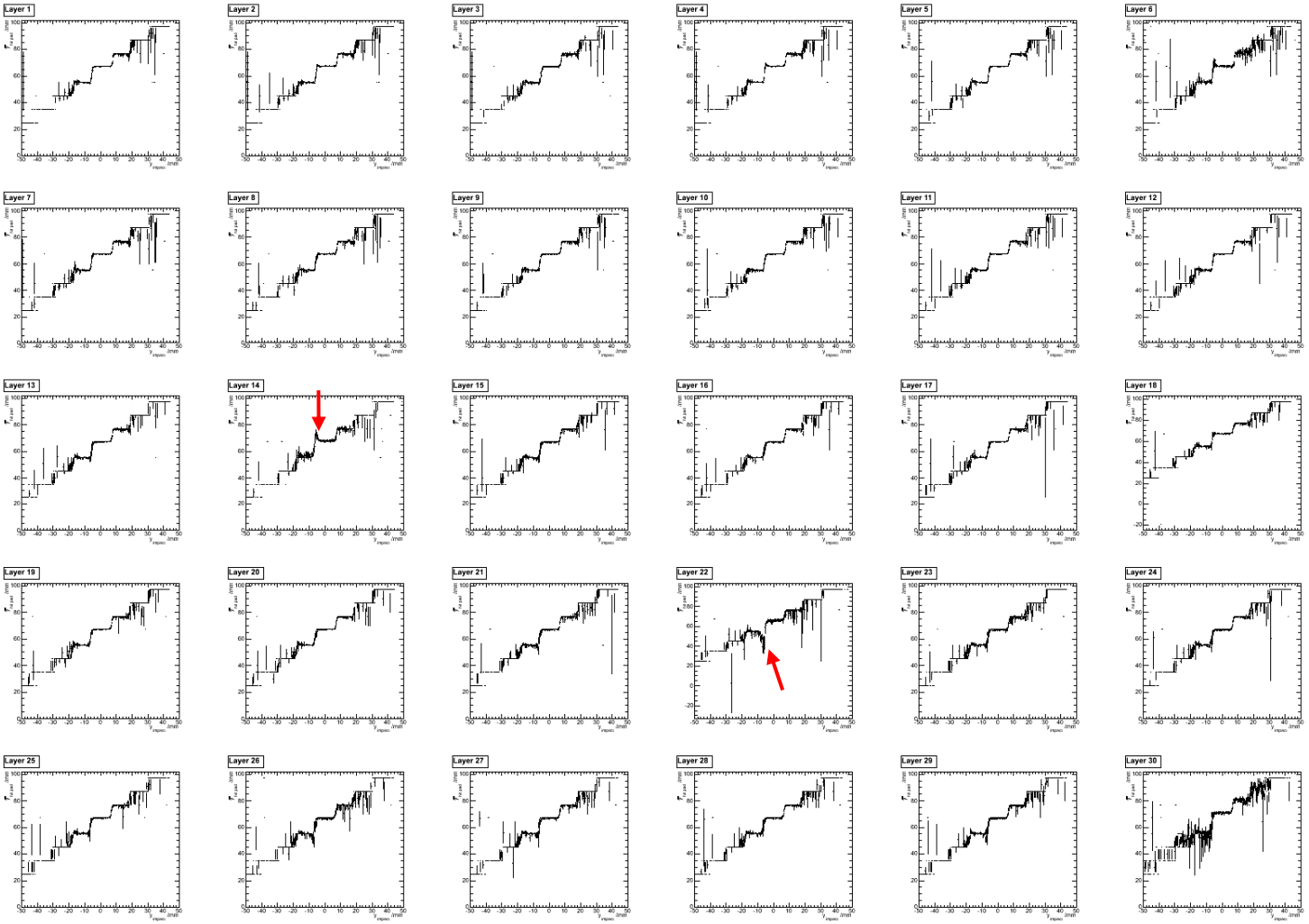






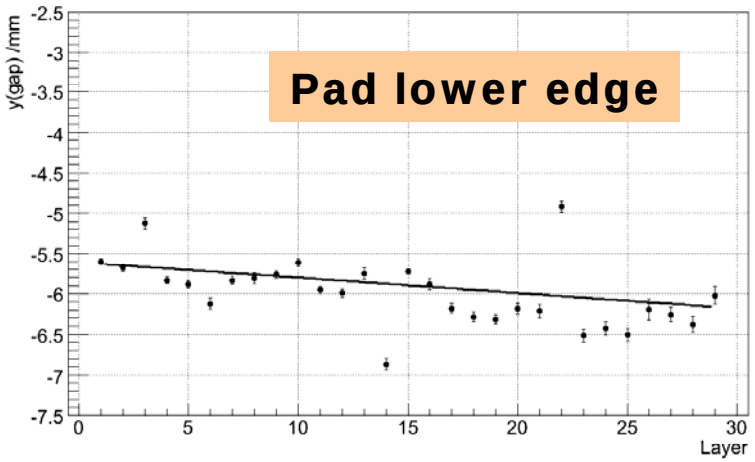
- Stagger of wafers in x is clearly seen
- Tilt of ECAL (or displacement of stacks) is seen. ~ 5-10 mrad?
- Apparent pad width shows imprint of the stagger structure. So less clear how to use this information.
- Probably drift velocity correction in x should be ~1.12±0.02. Consistent with old method.

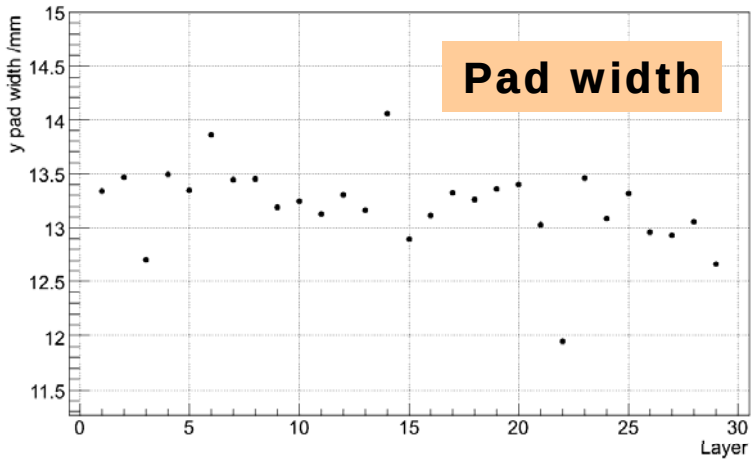
Run 330467 “(0,+3)” nominal

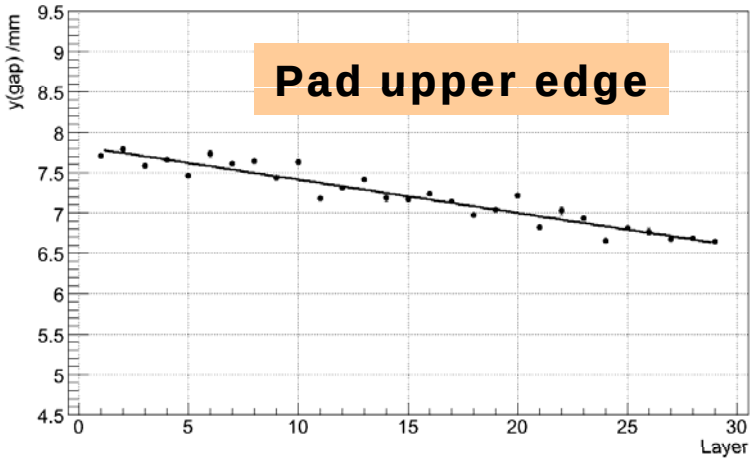


One well populated pad - adjoins interwafer gap; hence effective pad width not known.

330467 y







- Fits are less stable. Reflect ununderstood structures seen in previous page
- Apparent pad width ~13.3 mm (compared to ~12 mm for 330436).
- But what should it be? How well are inter-wafer gaps controlled anyway?
- Probably need to study high statistics muon runs.