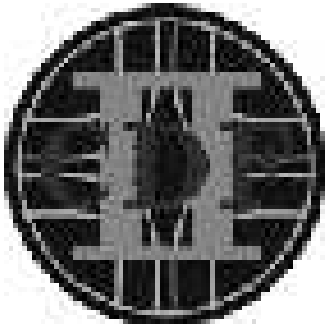


L00 Alignment and Resolution

Tracking Meeting

7th Nov '02

R.McNulty, T.Shears,

University of Liverpool

Procedure

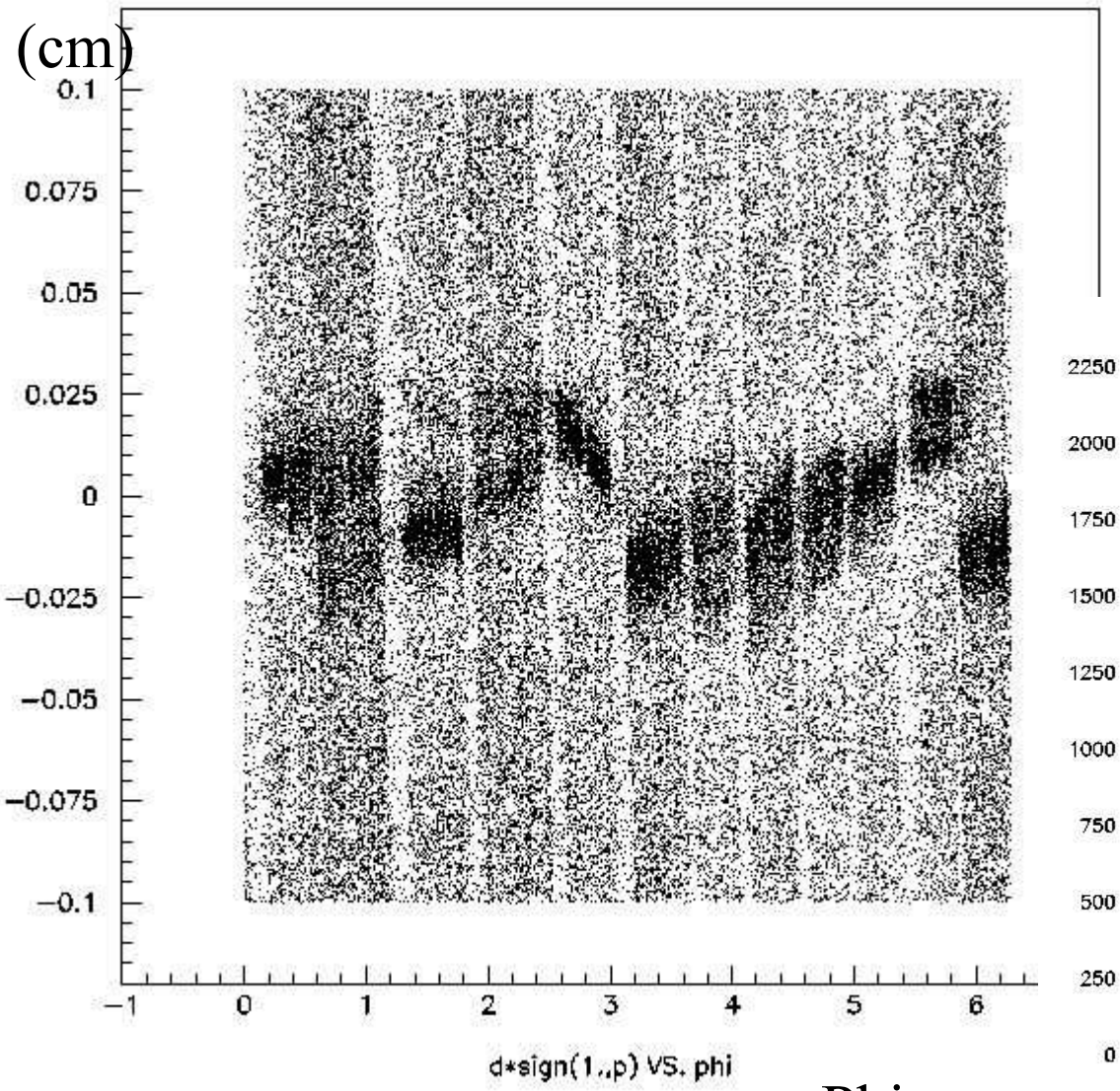
- Data BhMu08 4.8.0
- Runs ~144670, ~151800
- Only clusters with no bad(dead/hot) strips
- Alignment 27_19 (unbiased by COT)
- Karlsruhe Out-In Rphi
- Require L00 hit is isolated by 300um from neighbour
- Exclude L00 from pattern recognition

- Compare all L00 hits to track

- Global Alignment
- Local Alignment

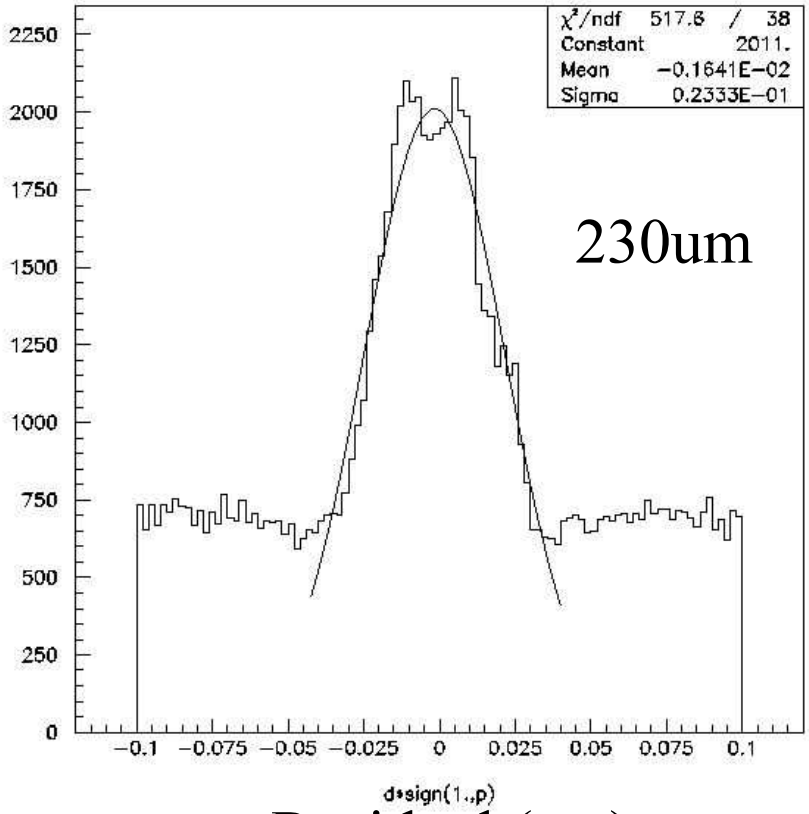
Global Alignment

Residual (cm)



Phi

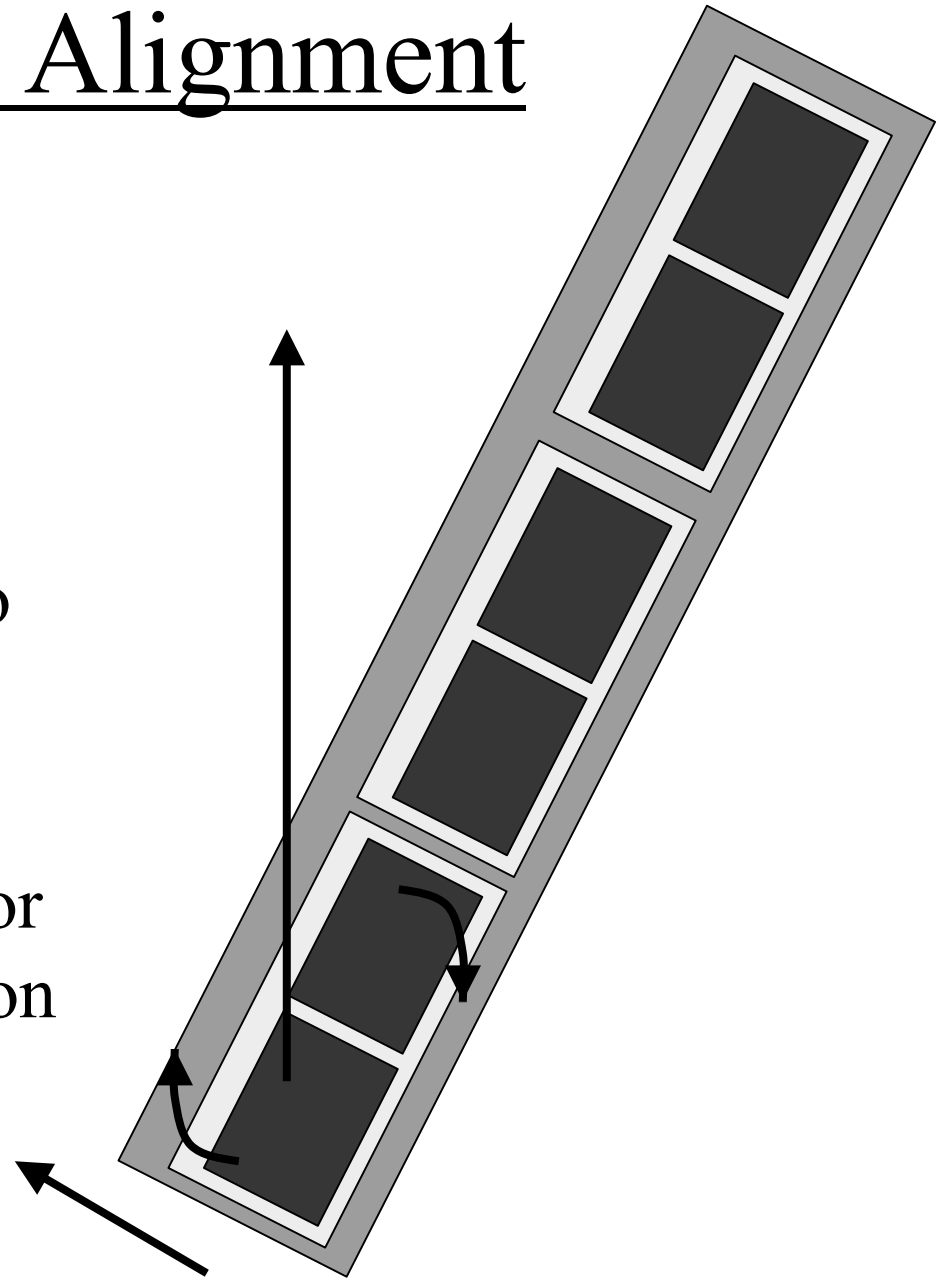
Move default position
x:1300um y:1500um
ϕ:+/-20mrad



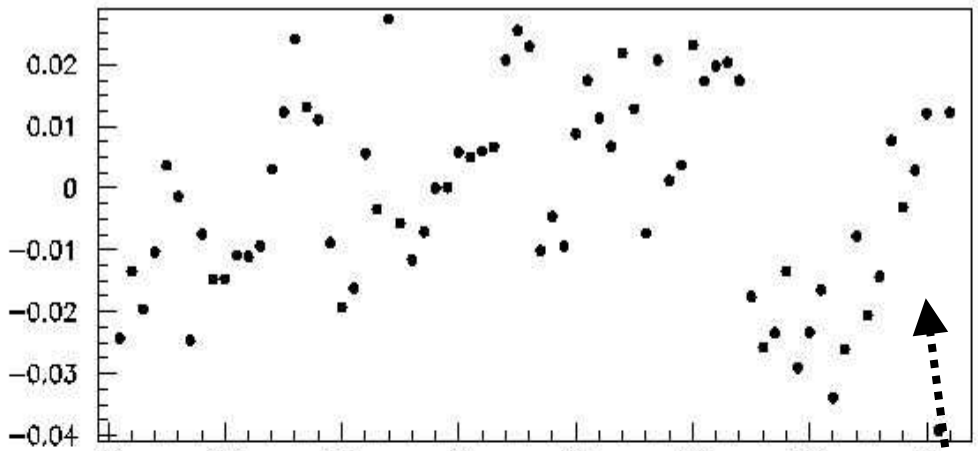
Residual (cm)

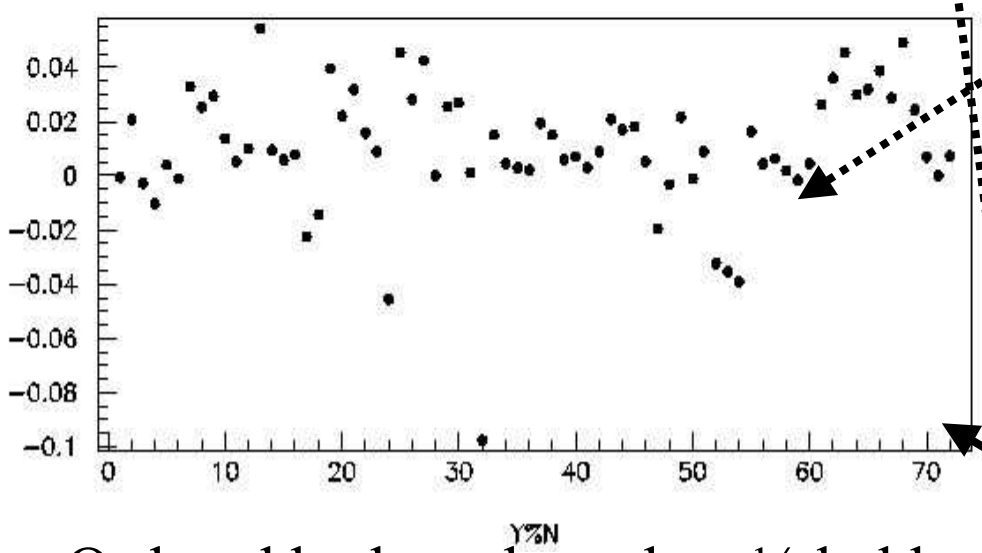
Local Alignment

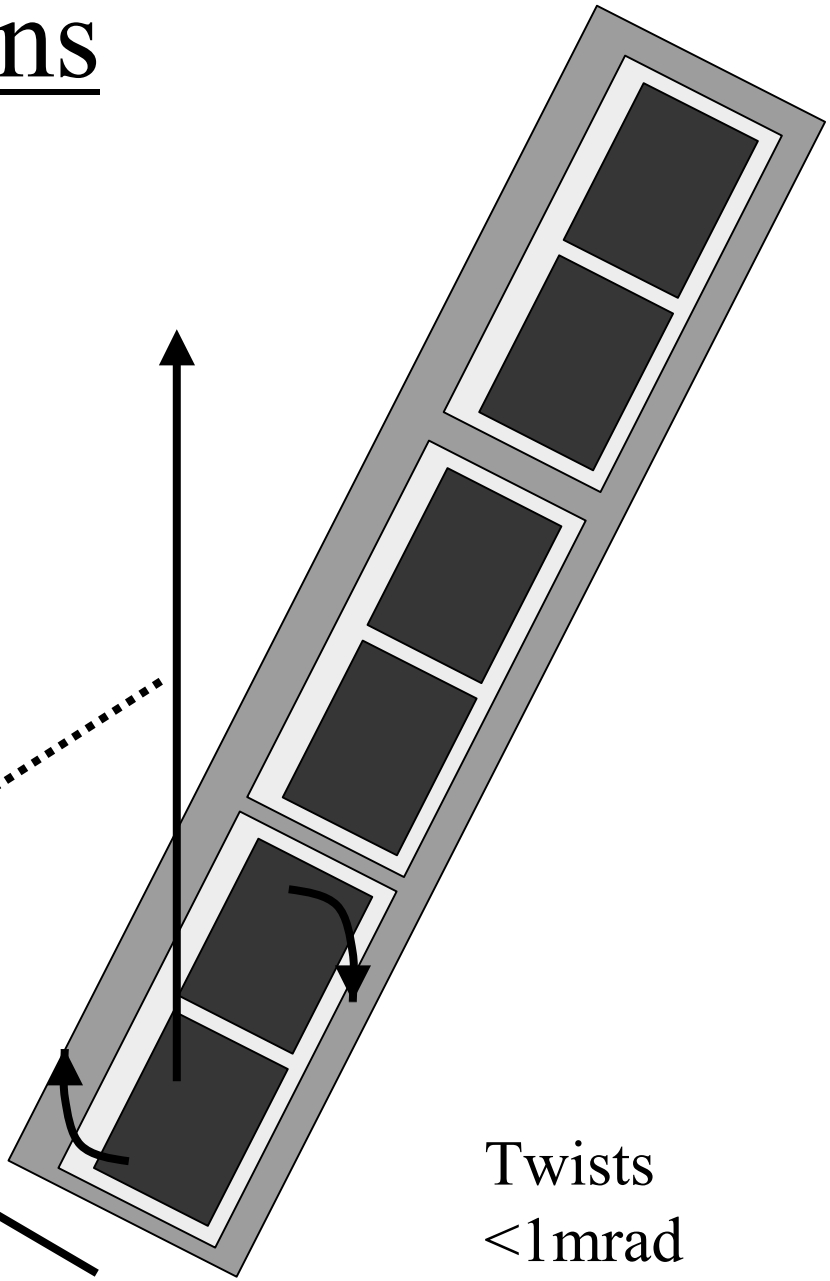
- Consider three motions for each readout section (two physical wafers)
- No bow correction or wafer level correction



Motions







Twists
<1mrad

Ordered by barrel, wedge, ½ ladder

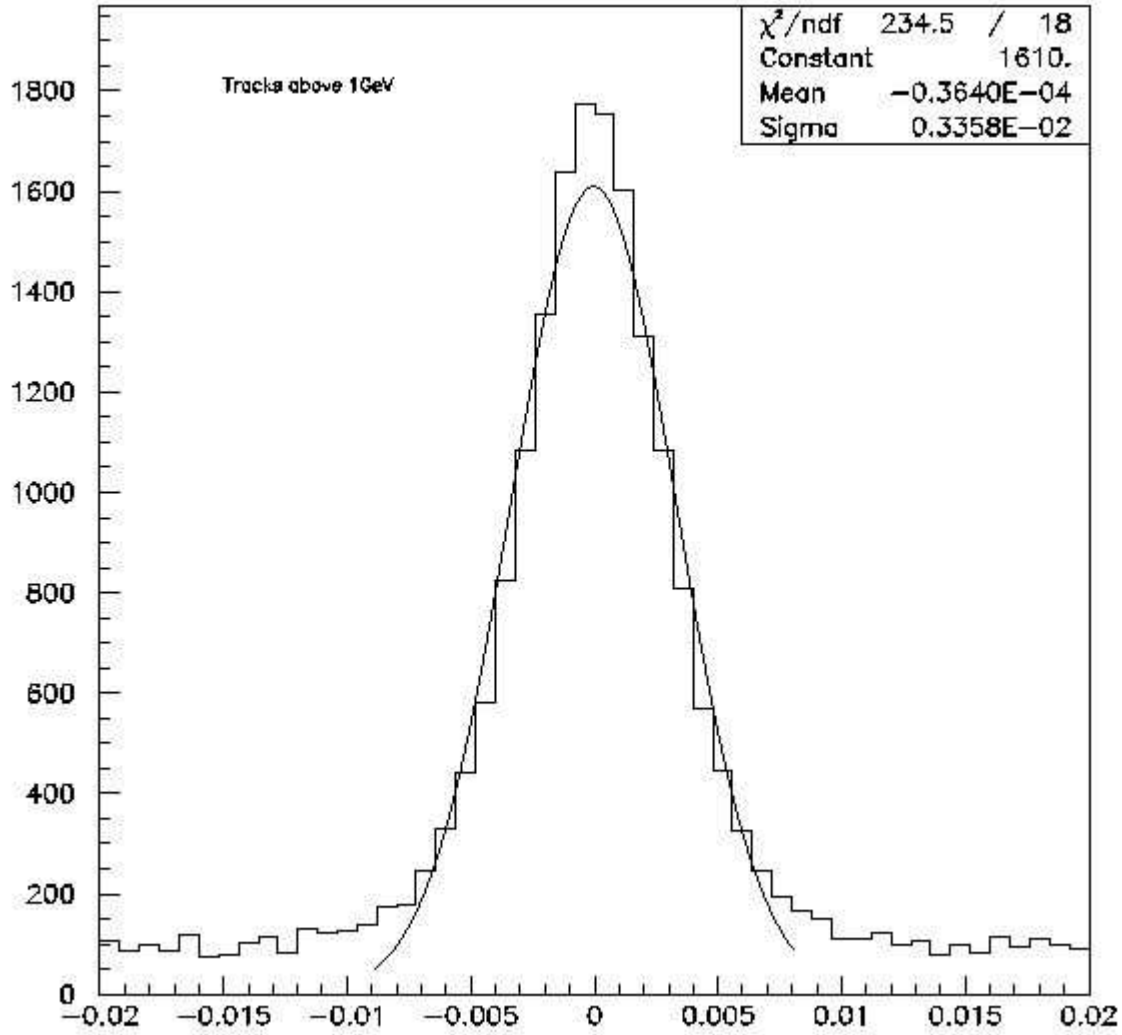
Resolution

All tracks over 1GeV

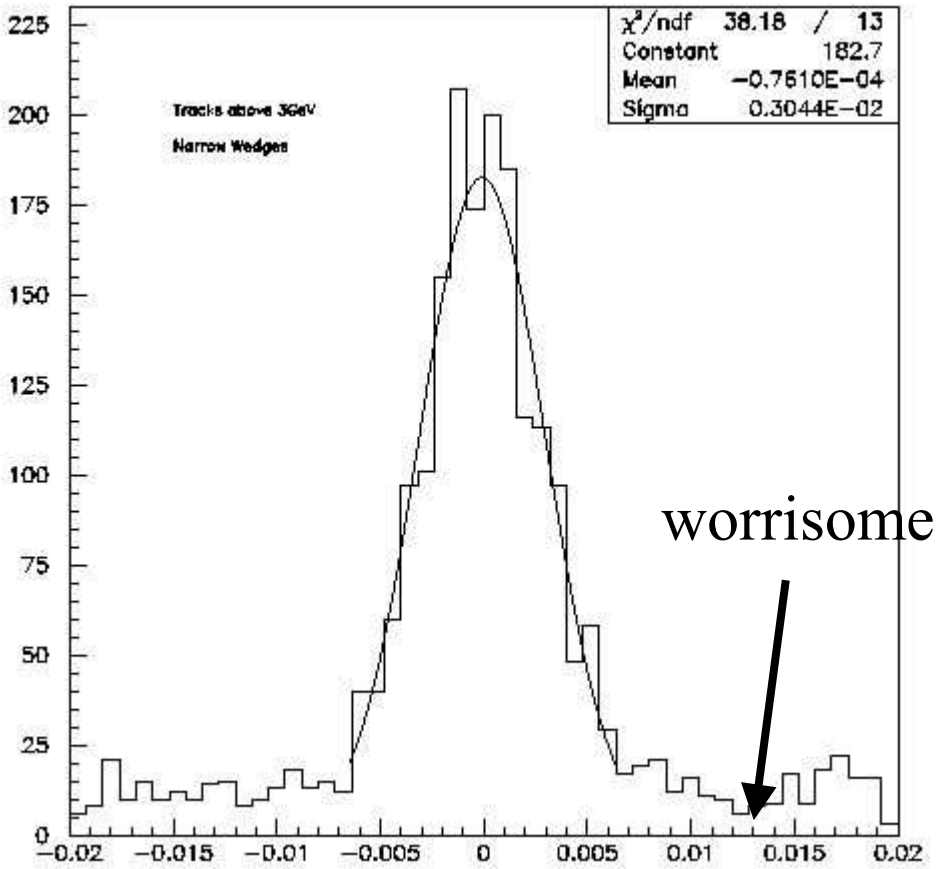
Resolution over full detector: 34um

(includes intrinsic L00, extrapolation error, mult.scat.)

…. cut a little harder on momentum



Resolution



Narrow Sensors (SGS)

Resolution 30um (pt>3GeV)

Narrow Sensors (Micron)

Resolution 28um (pt>3GeV)

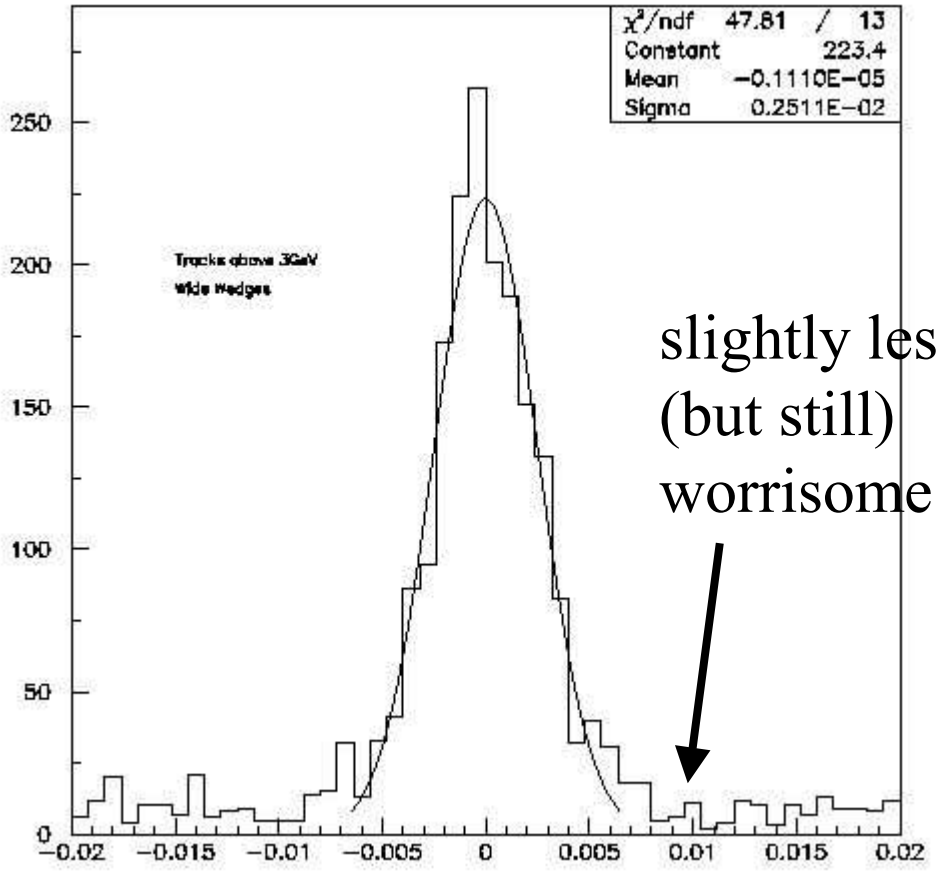
Residuals

Wide Sensors

(Hamamatsu)

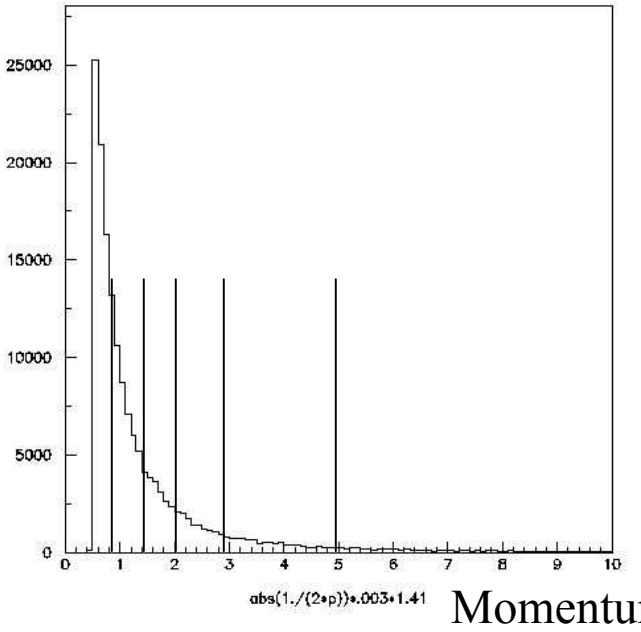
Resolution 25um

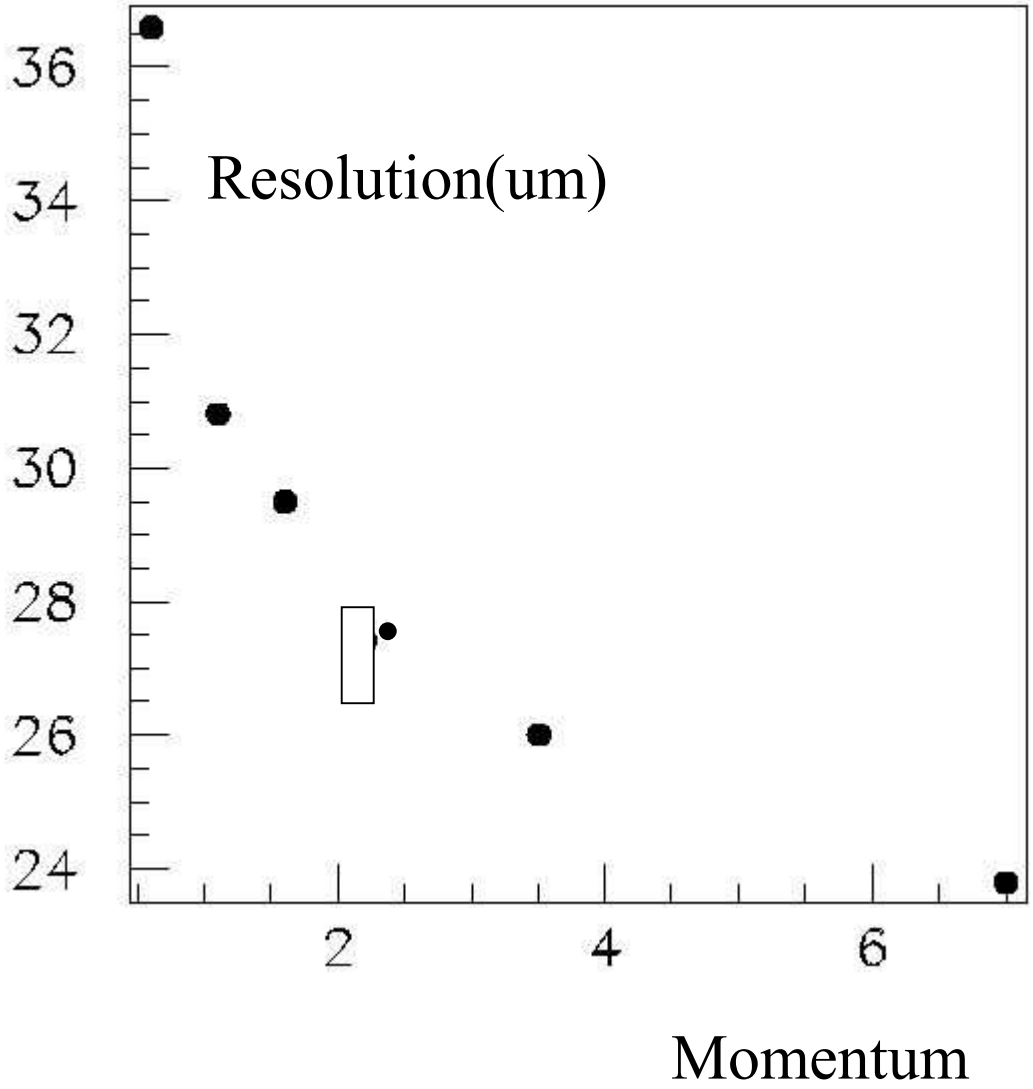
for pt>3GeV



slightly less (but still) worrisome

Intrinsic Resolution (Wides)





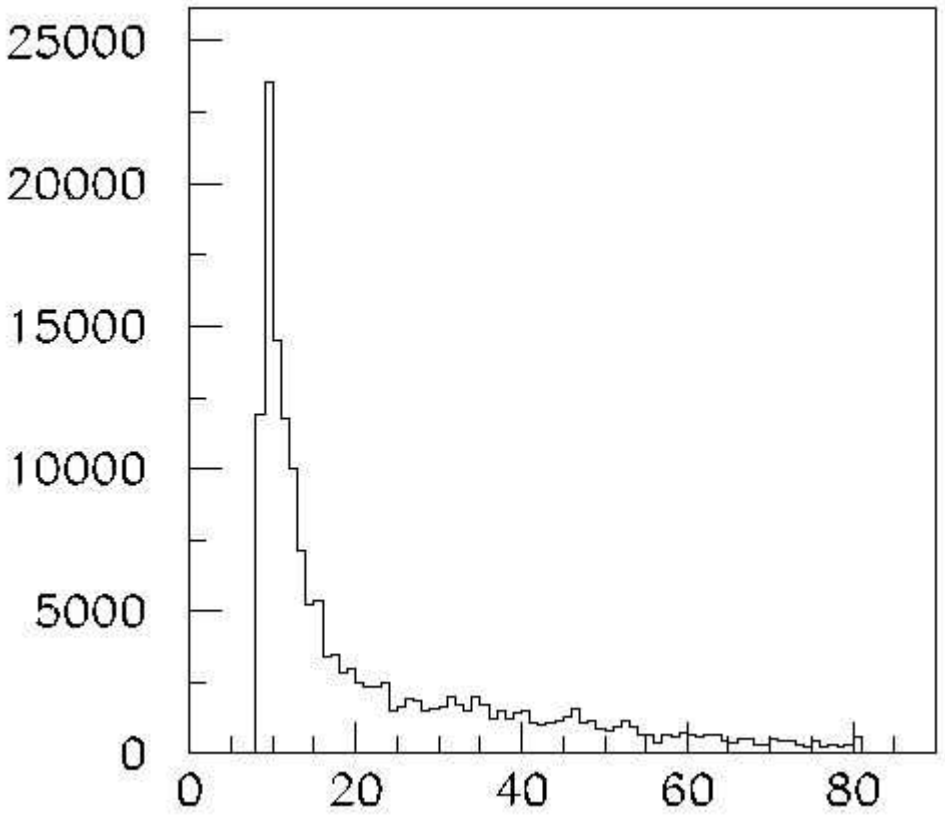
Total Resolution 23.5um

Xtrap ~ 15um

=>Silicon Resolution 18um

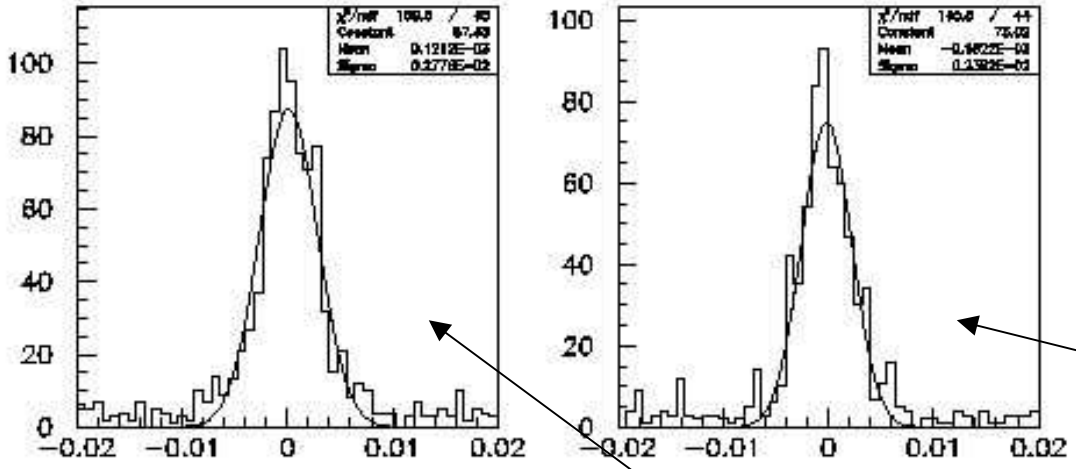
Pitch/Root(12) = 14.5um

Pitch / Root(12) ?

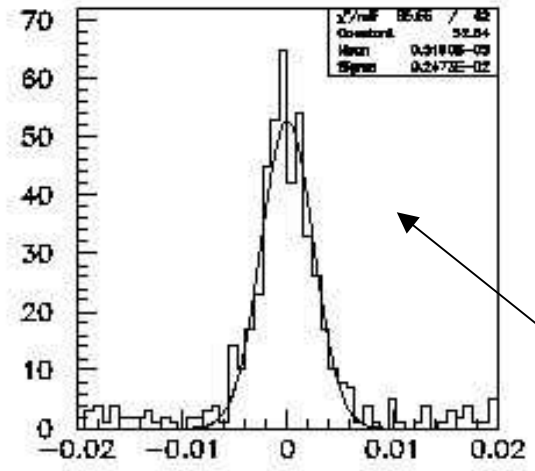


Noise in ADC counts

Resolution v Number of Strips



2 strip cluster: 24um

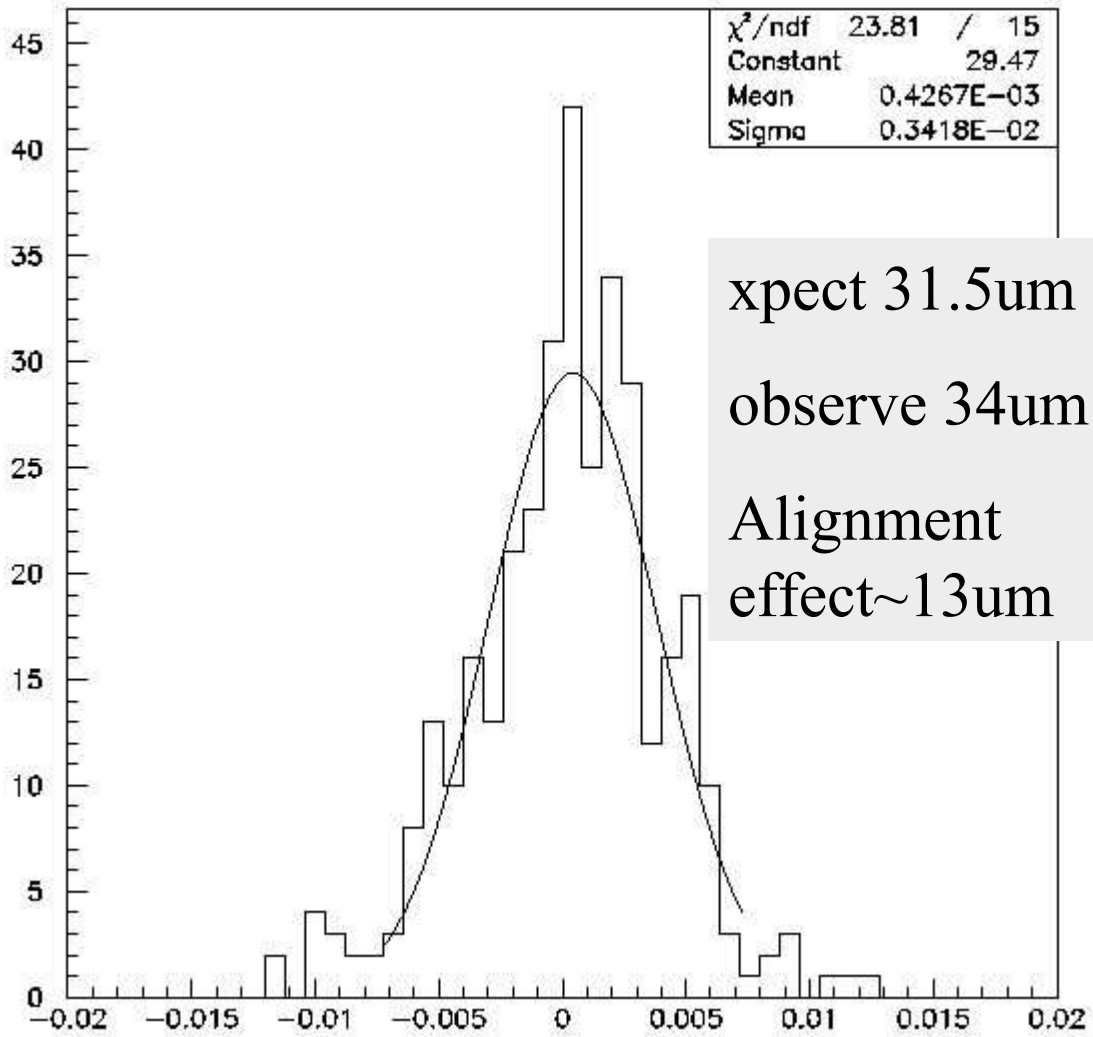


1 strip cluster: 28um

3 strip cluster: 25um

Somewhat as expected. More study (and more stats) req'd

Overlaps



xpect 31.5um

observe 34um

Alignment effect~13um

Overlaps not explicitly in alignment.

Plot is crosscheck

Wide+Narrow

34um/root(2)

24um on average

….Consistent

Conclusions

- Reasonable internal and external alignment of L00.
- Close to usable for physics???
- Resolution ~ O(pitch/root(12))
- Wides look better than narrow
- More stats/studies req'd to pin down that which is intrinsic, extrap, and alignment.