

Our first look at 2006/2007 SiW analysis

Daniel Jeans & Julia Duras

LLR - Ecole Polytechnique

- learning how to do SiW analysis

(with lots of help from Marcel & Cristina)

Look at data from 2006 and 2007

Try to reproduce 2006 results from SiW paper: Linearity, energy resolution

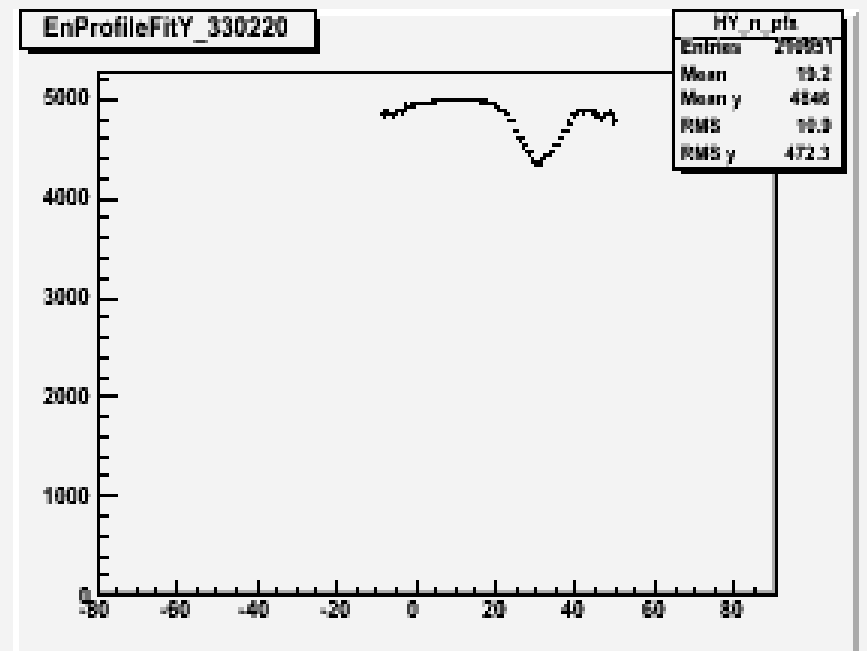
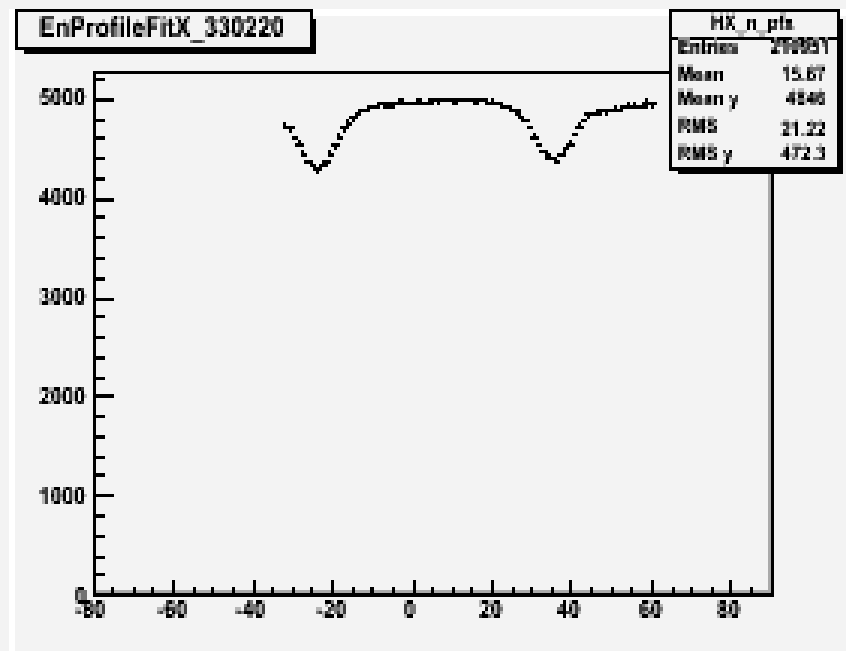
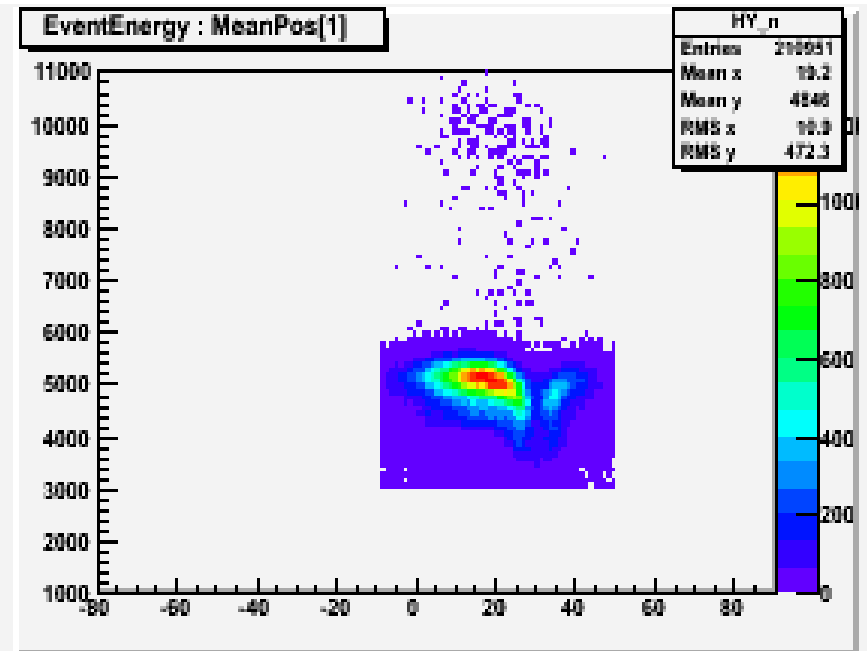
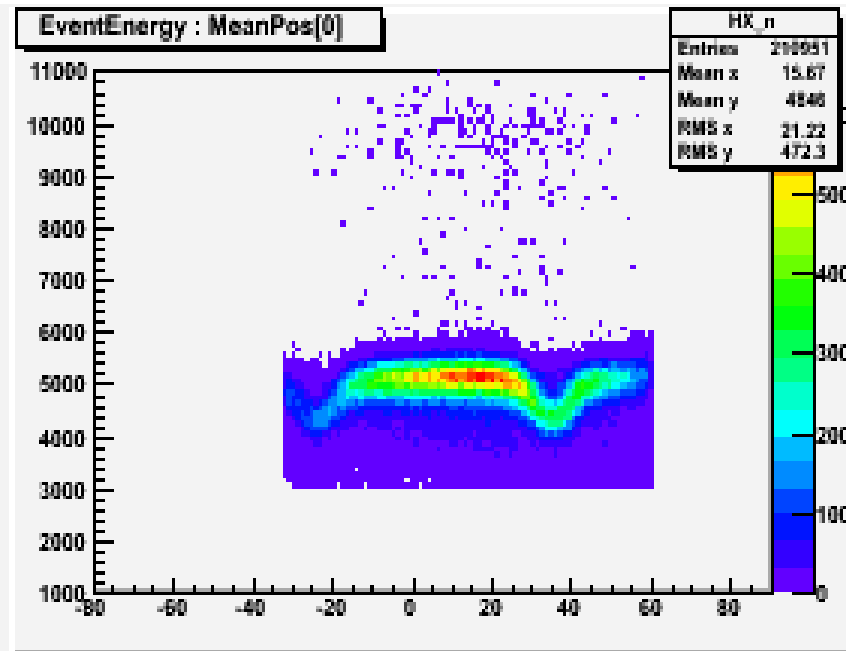
Apply same procedure to 2007 data

Used v0406 reconstructed data, and following runs:

BeamP GeV/c	2006	2007	
6	300670		
10	300200 300221 300222 300383 310054 310056 300672	330664	Electron event selection (copied from '06 paper)
12	300673 310052 310055		Reconstructed energy Cerenkov (when functional in '06)
15	300202 300223 300238 300674 310047 310048 310053 310063		Layer with max recons energy Beam halo cut
20	300205 300220 300236 300379 310046 310062 310064	330658 330215 330218	Distance from edge of detector Distance from inter-wafer gaps Shower shape cut "TMax"
30	300197 300207	331265	
40	300235	330224 330429	
45	300195 300208 300225 300377 300384		
50		330228	

Look at interwafer gaps: shower energy vs. shower barycentre for a 30 GeV 2007 run

Reconstructed energy [MIPs]



Shower barycentre (X) [mm]

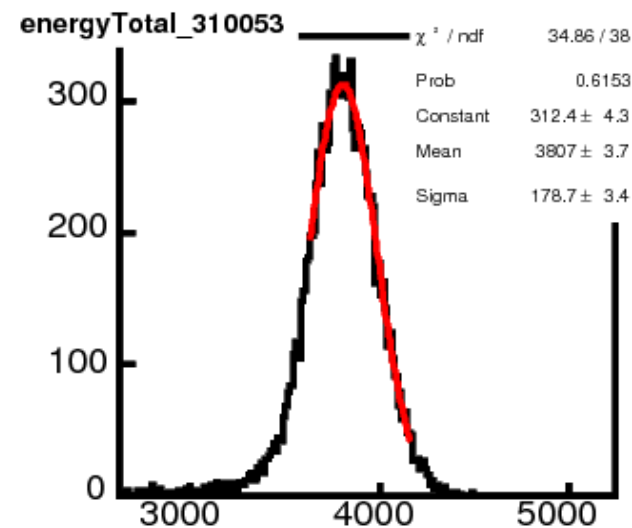
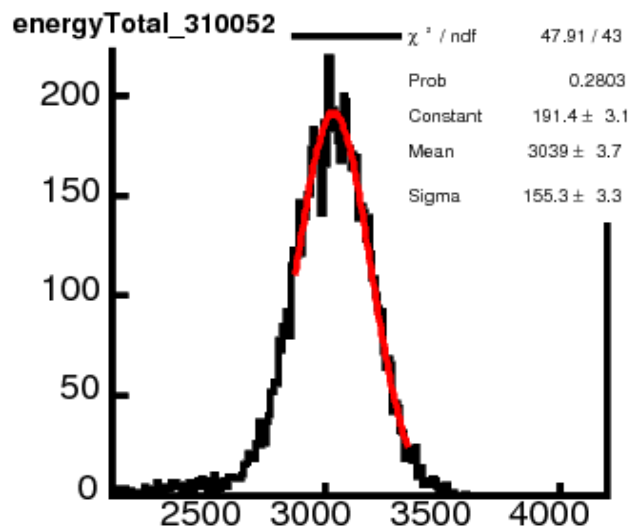
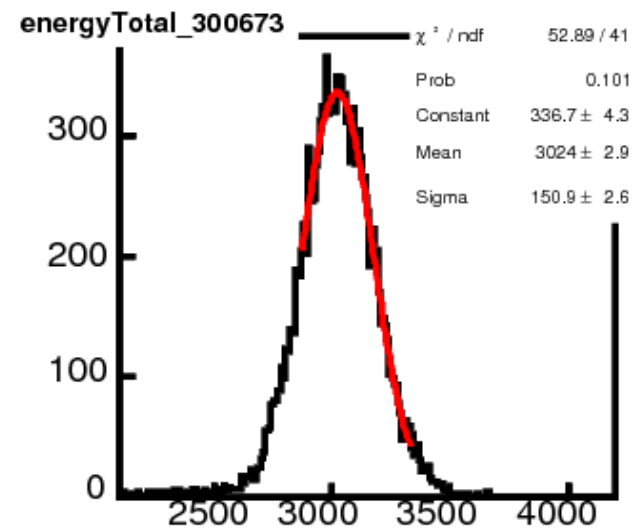
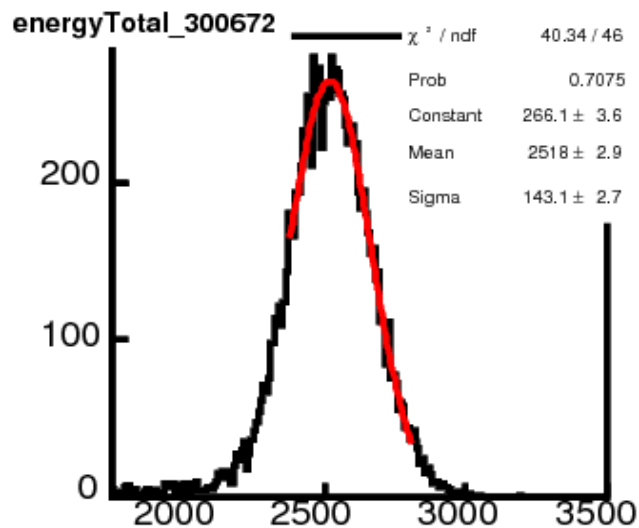
shower barycentre (Y) [mm]

Plot reconstructed energy for selected events

- No correction for odd/even layers

Fit to gaussian in range -1 -> +2 sigma

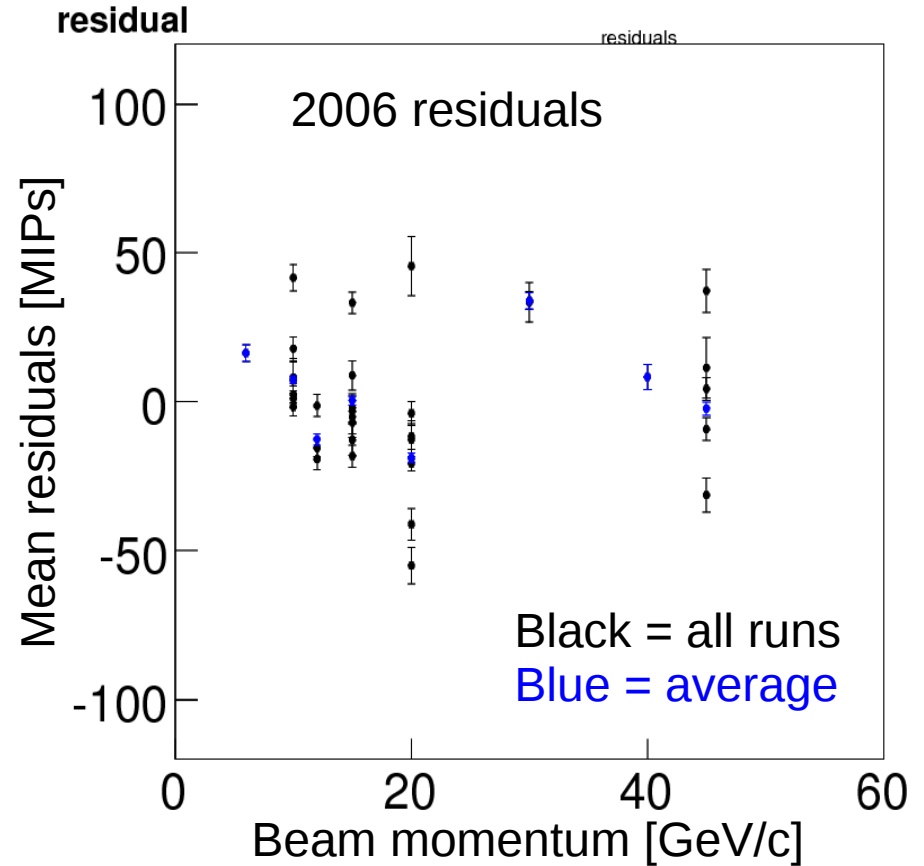
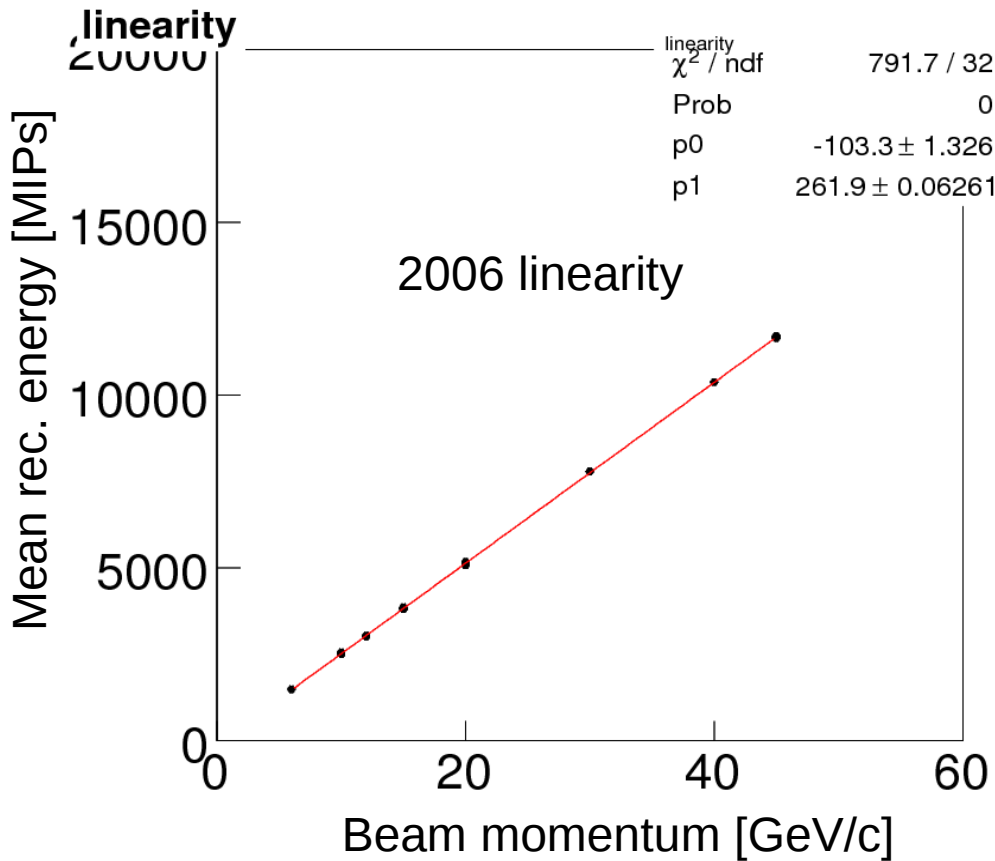
Reconstructed energy for some 2006 runs, with fits



Plot mean of distribution as function of energy

Include energy on beam energy uncertainty $dE/E = (0.12/E) \oplus 0.001$

Look at residuals to linearity



The error bars on my points look much smaller than those in paper:

- need to fold in beam energy & fit uncertainties...

Extract zero offset of linearity curve, use to correct mean response

linearity

20000

15000

10000

5000

0

0

20

40

2007 linearity fit

linearity
 χ^2 / ndf 2262 / 6
Prob 0
p0 -32.83 ± 2.165
p1 259.2 ± 0.08745

For 2007 data, use large fictional uncertainty on the beam energy

Residuals for 2007 data

residual

100

50

0

-50

-100

0

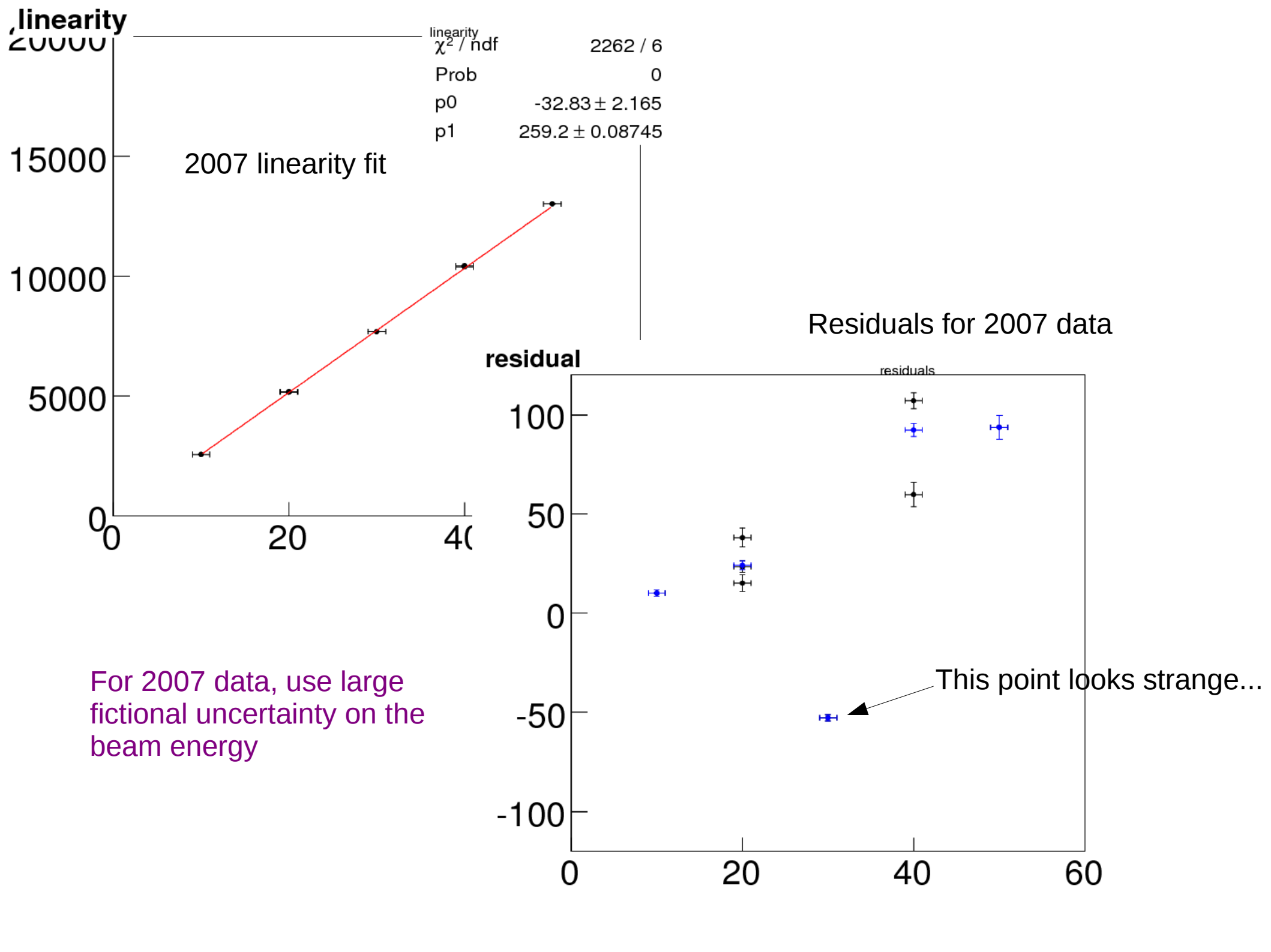
20

40

60

residuals

This point looks strange...

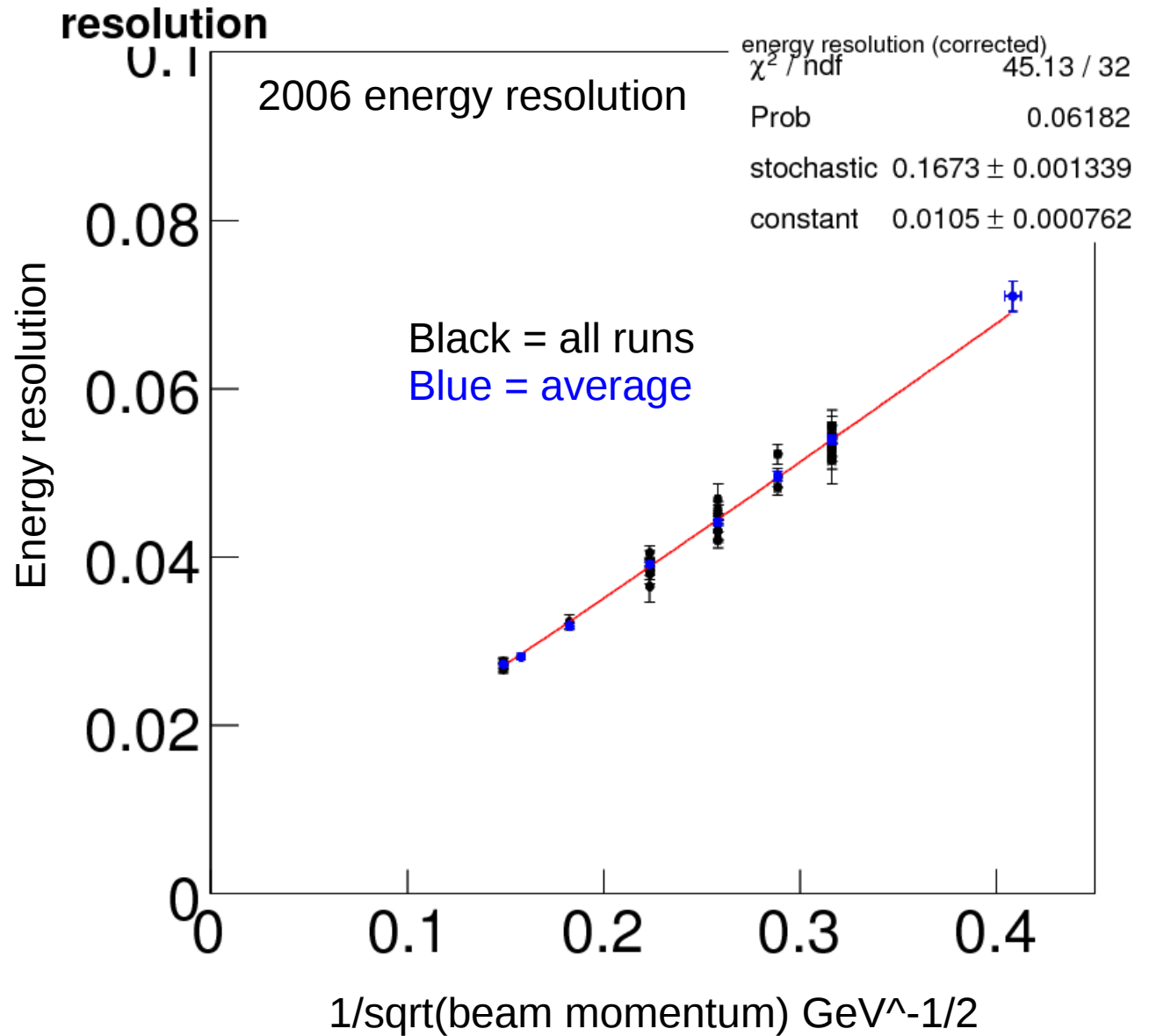


Extract energy resolution for each run

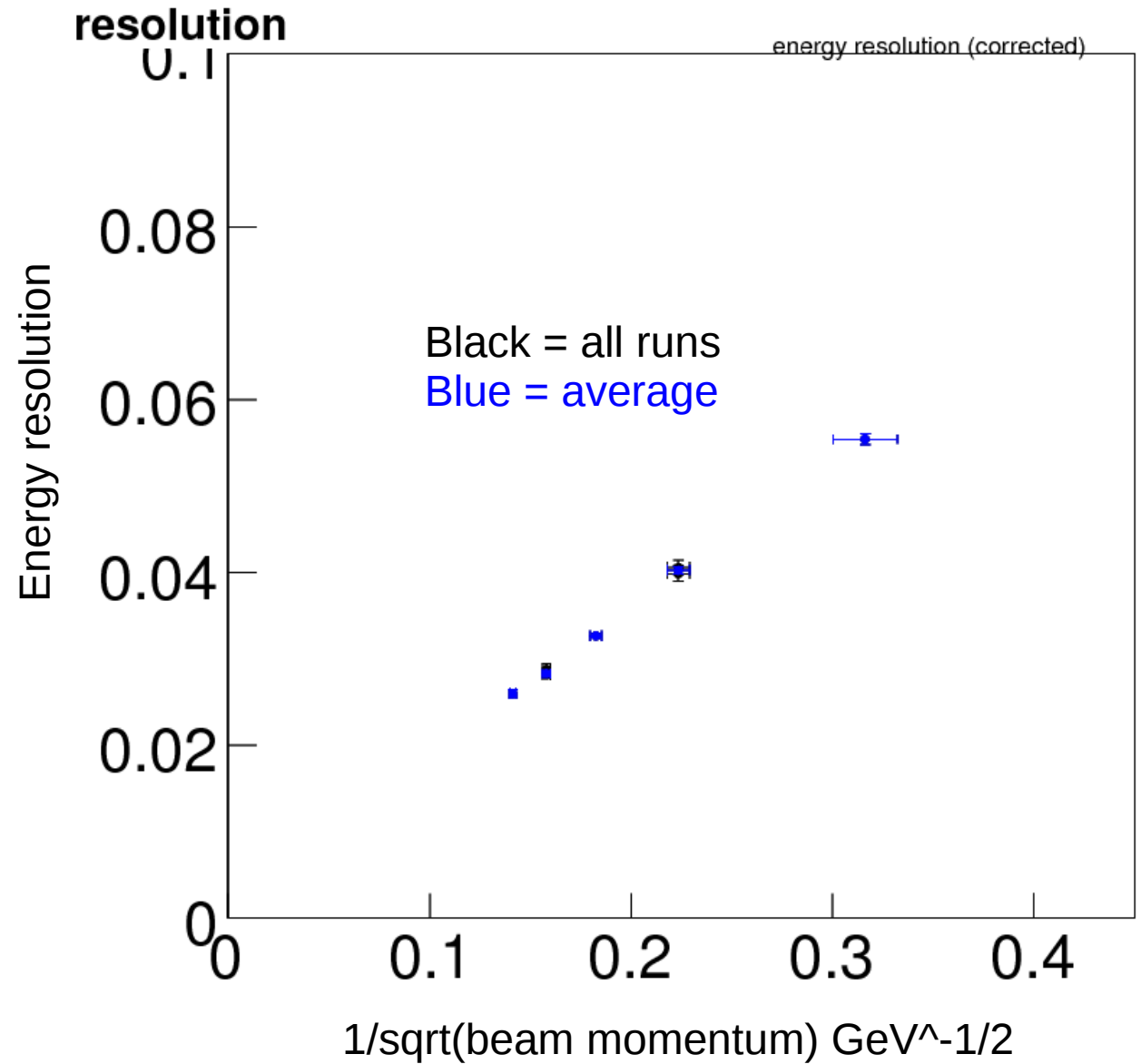
subtract off beam momentum spread run-by-run (so far 2006 only)

Fit to stochastic \oplus constant term

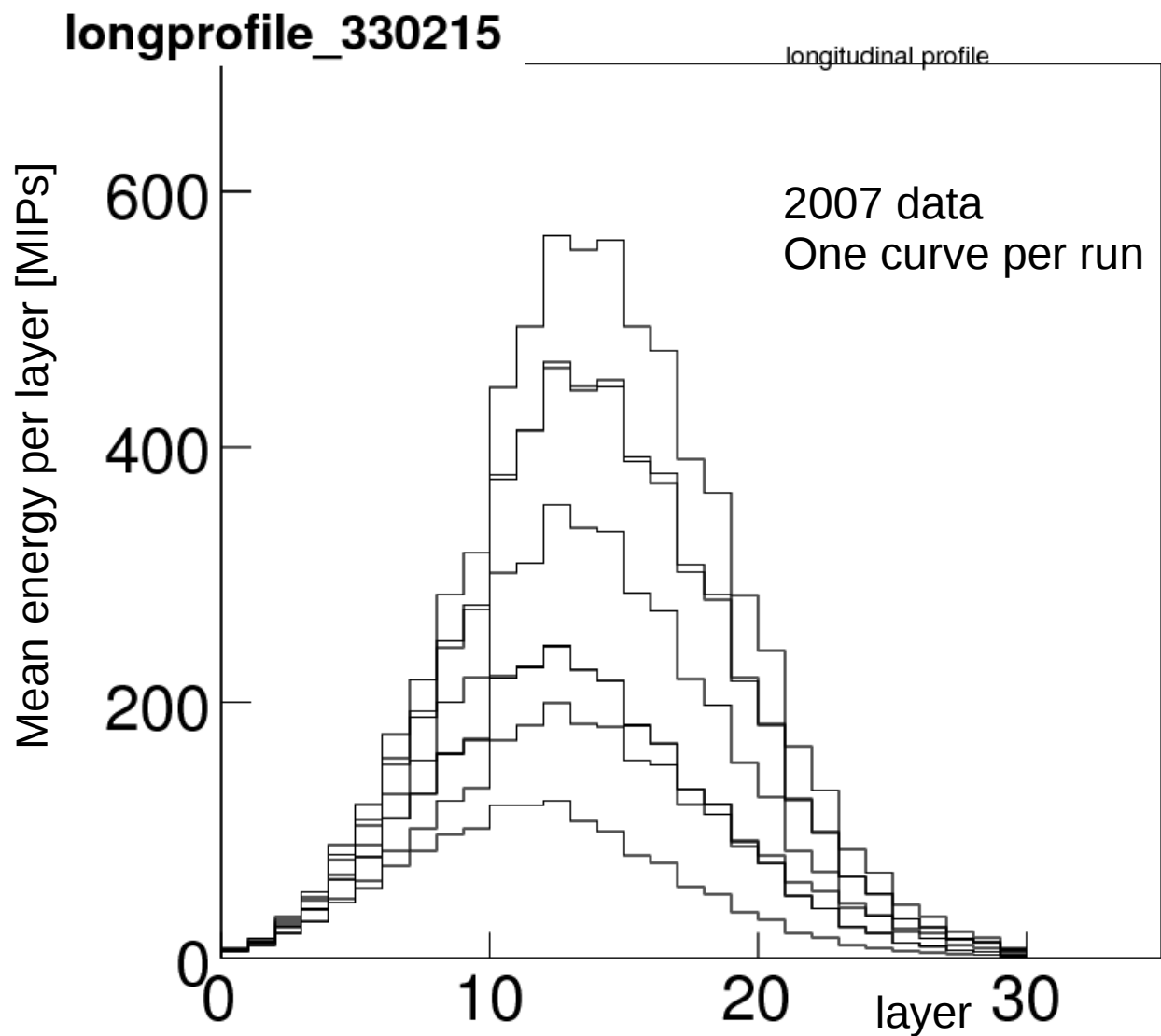
Combine runs of same nominal energy



2007 energy resolution: I don't fit since I have no meaningful estimate of uncertainty on beam energy



Glance at longitudinal profiles for selected events
n.b. No correction for odd/even layers



Summary / plans

- started looking at data from 06/07
- more-or-less reproduce published energy linearity & resolution results from '06 data
- compare to simulation
- continue to look at 2007 electron data, start looking at '08
- look at tracking for '08 data (with help from Paul Dauncey)
- measurement of ECAL position and angular resolution