

Tagger calibration

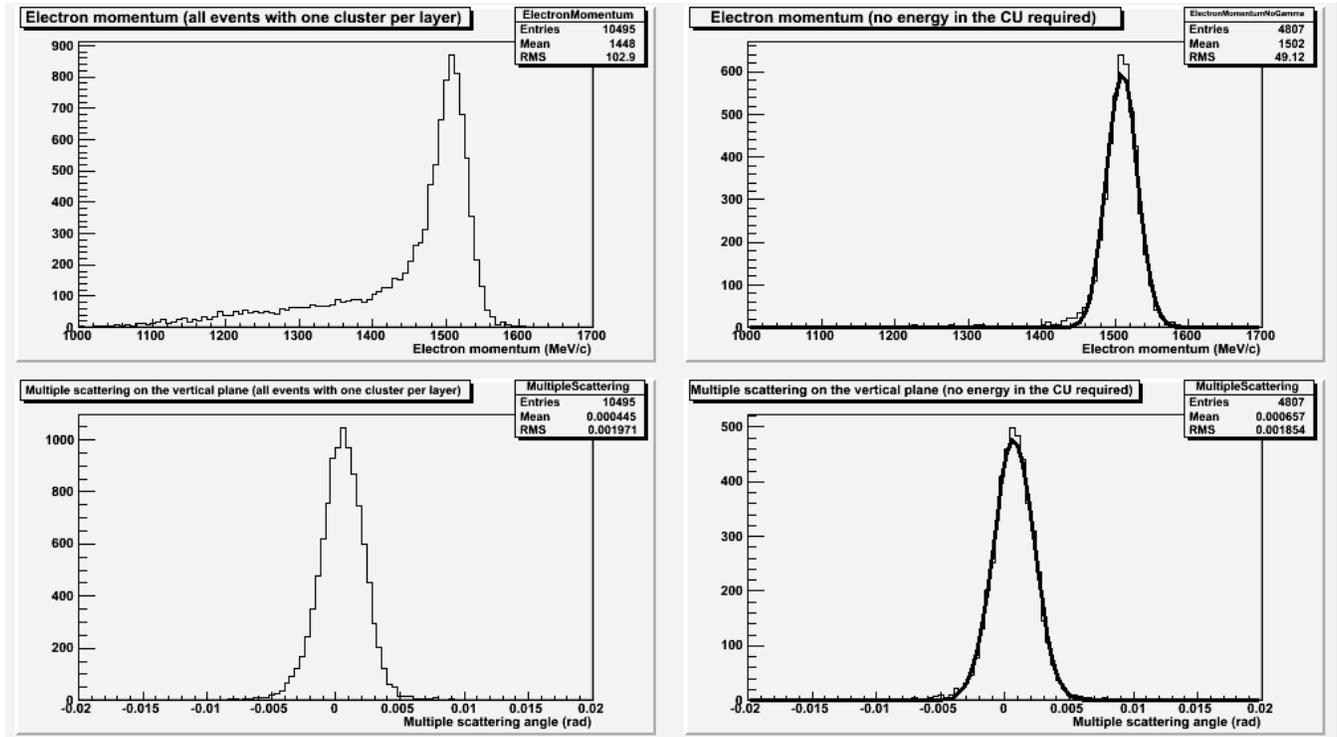
Tagger Momentum resolution

The tagger calibration runs have been taken with the beam passing through the four chambers.

For each run the reconstructed electron momentum (4 cluster algorithm) has been fitted with a gaussian function after requiring no energy in the CU: the fit gives the offset in momentum reconstruction and the resolution.

For the same runs the clusters position in the vertical (non bent) plane have been used to calculate the angle difference between the incoming and outgoing direction of the beam and therefore the multiple scattering

The picture below shows an example of this analysis with the 1.5 GeV beam.



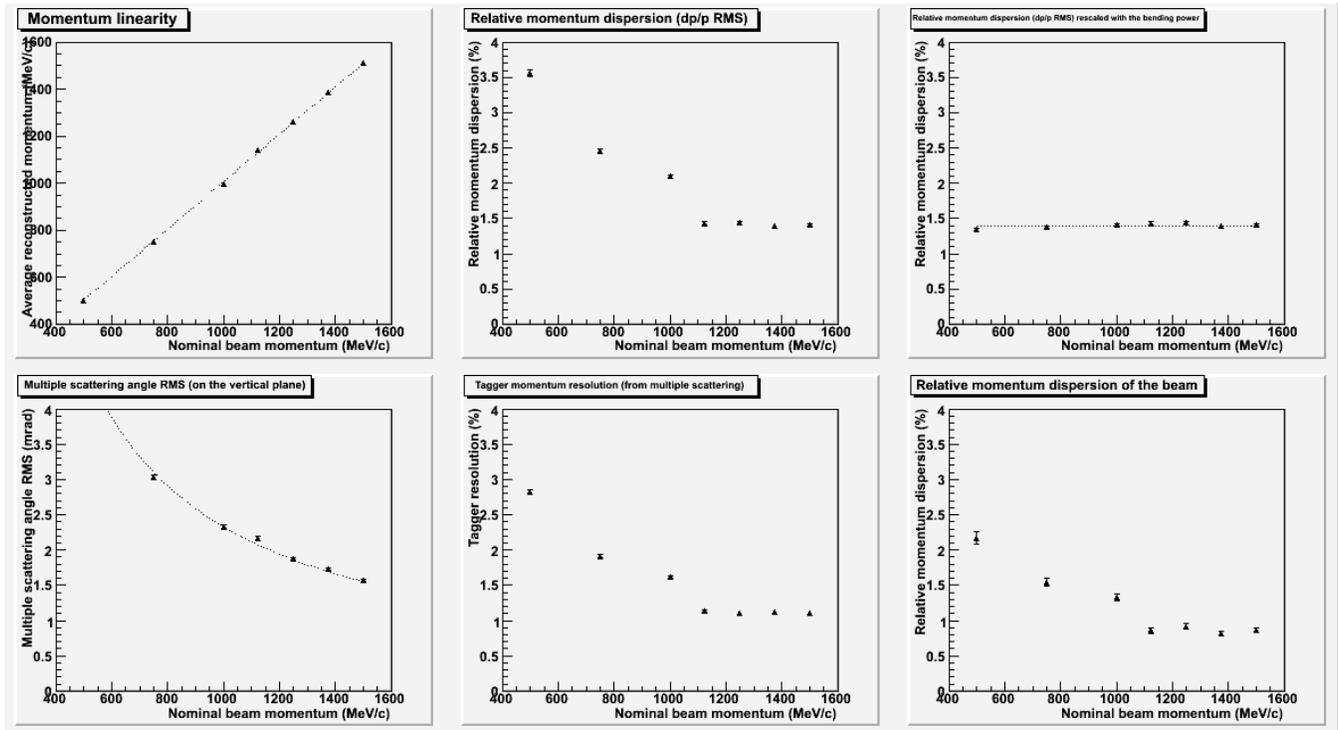
All the result from the calibration runs have been summarized in the following picture.

The tagger energy linearity plot has a slope of 1.004 ± 0.005

The multiple scattering plot fit gives: $x/x_0 = 2.94 \pm 0.03$

Notice that some of the runs have a different magnet current (this is necessary if we don't change the geometry), so a rescaling to the same bending power is needed.

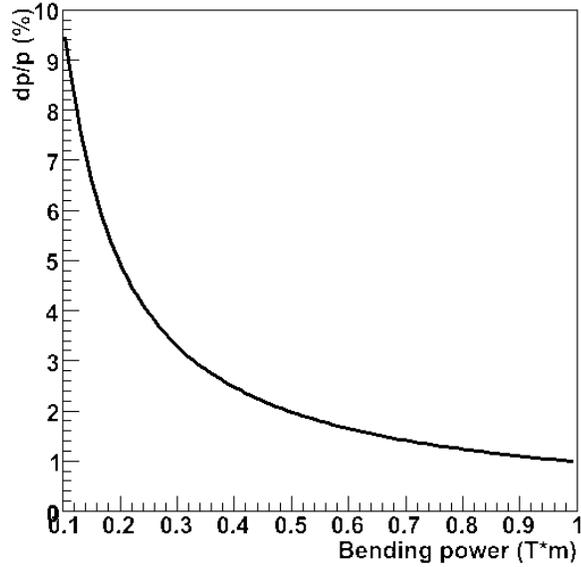
The (rescaled) momentum resolution fit gives a constant value: $c = (1.395 \pm 0.007)\%$



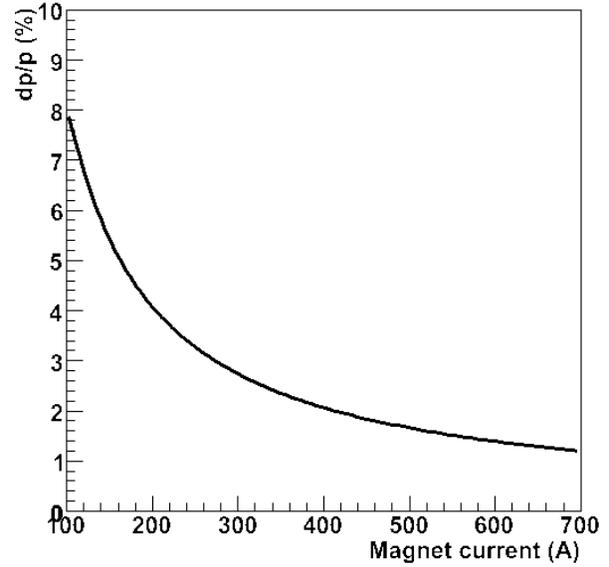
The momentum resolution, at different bending power, can be evaluated with:

$$dp/p (\%) = c \cdot BL_{max} / BL = 1.395 \cdot 0.7089 / BL$$

Momentum resolution vs. bending power (tagger + beam)



Momentum resolution vs. magnet current (tagger + beam)



Here is a table of calculated tagger resolution for particular current settings:

Current (A)	dp/p (%)
100	8.1092

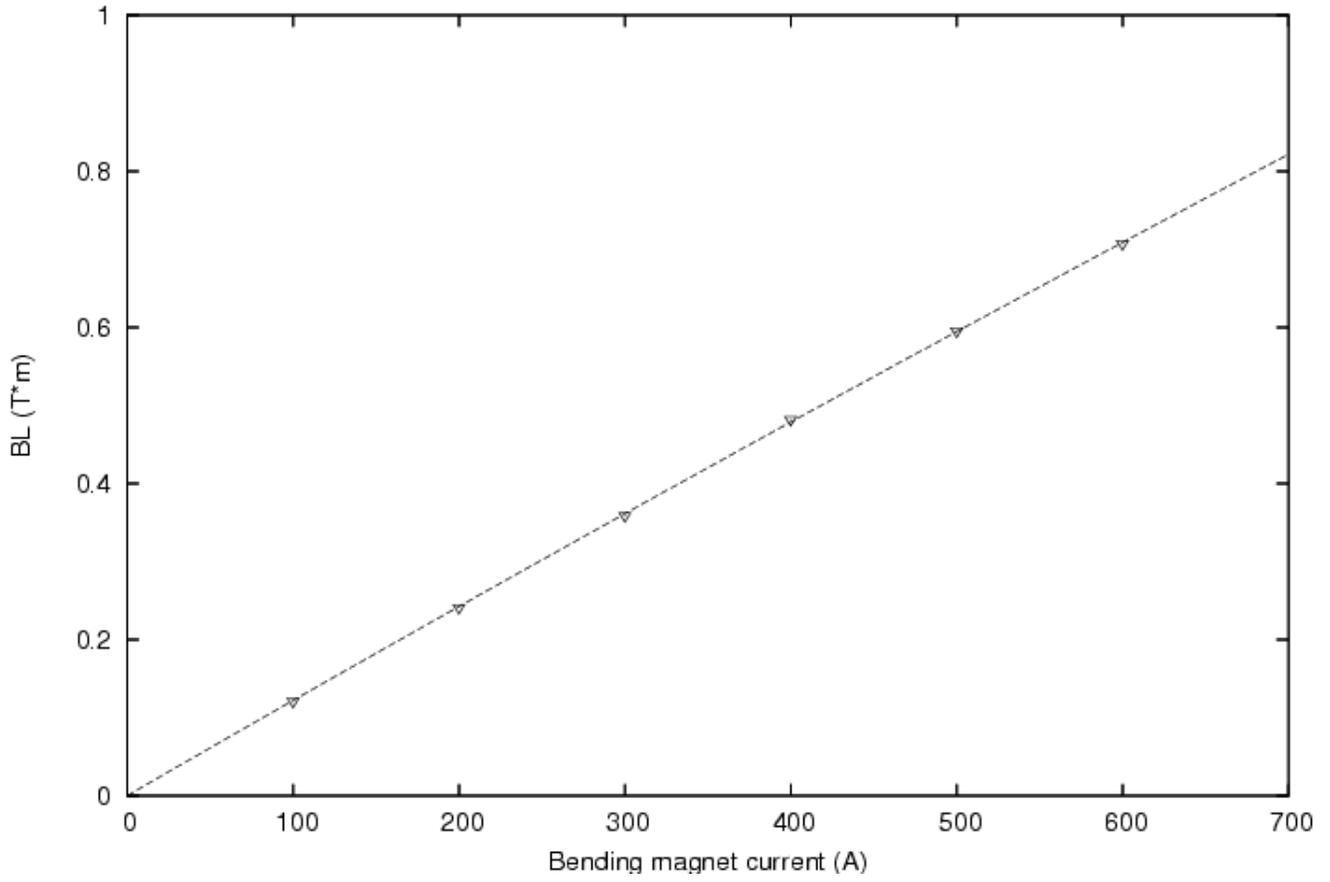
120	6.7661
150	5.42303
180	4.52769
200	4.08003
220	3.71378
240	3.40858
250	3.27429
300	2.73719
350	2.35359
360	2.28966
400	2.06593
420	1.97006
450	1.84223
500	1.66331
550	1.51695
600	1.39501
650	1.29186
700	1.20346

Calibration of the bending magnet

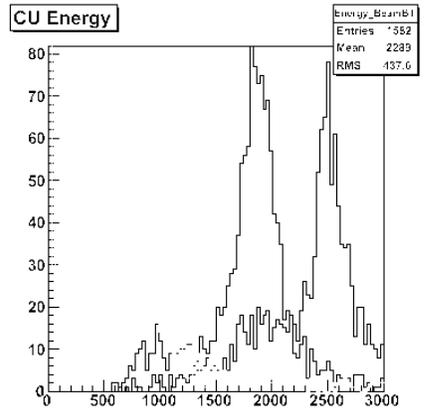
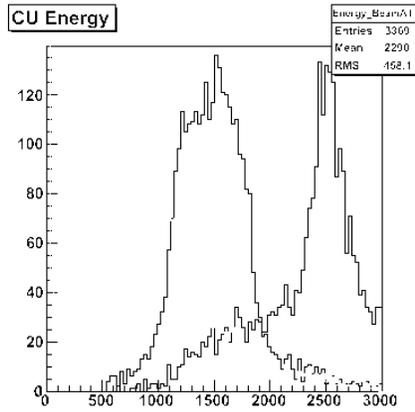
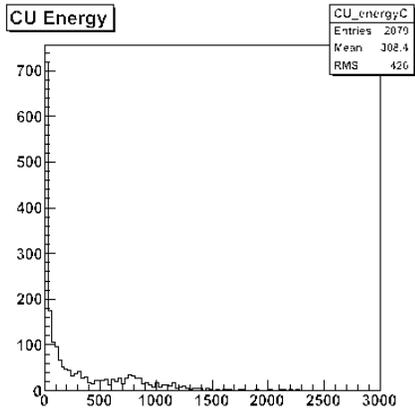
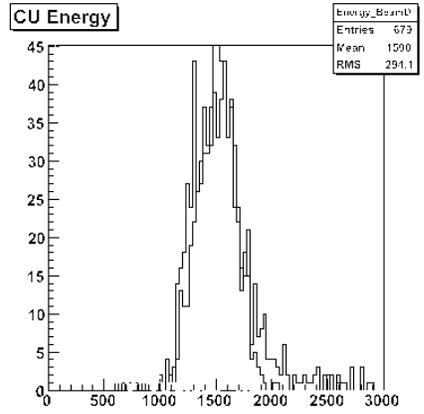
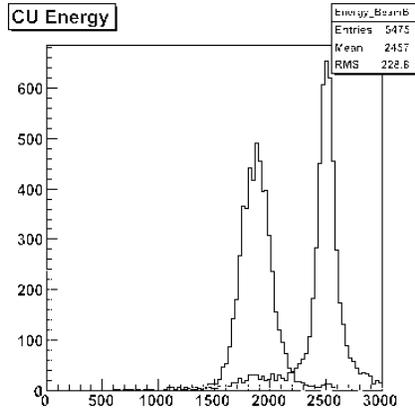
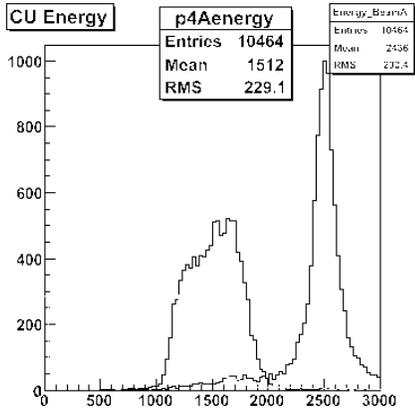
The bending magnet data have been fitted with a quadratic polynomial:

$$B \cdot L \text{ (T} \cdot \text{m)} = 0.0012271 \cdot I \text{ (A)} - 7.60132 \text{e-}08 \cdot I^2 \text{ (A}^2\text{)}$$

Tagger bending magnet calibration

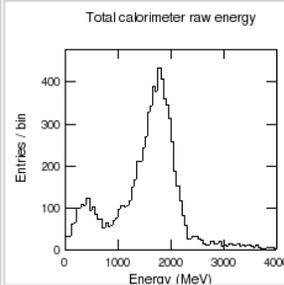
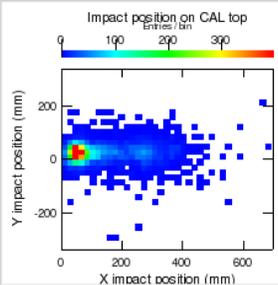
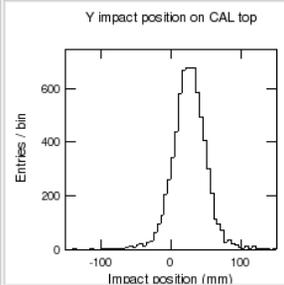
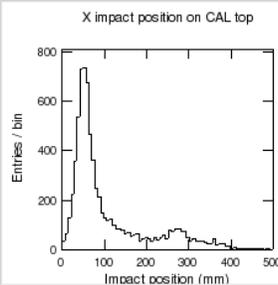
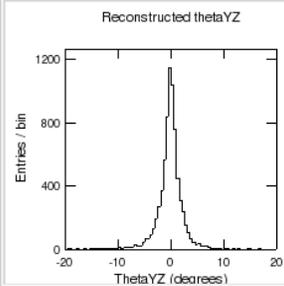
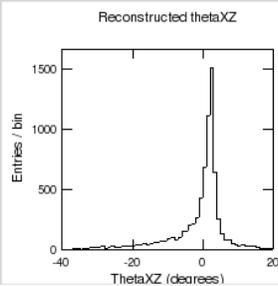


Angular reconstruction



Few screenshots from the tagger calibration runs.

Global ACD Ancillary Diagnostics Statistics



TEM selection (LAT top view)

- 12 13 14 15
- 8 9 10 11
- 4 5 6 7
- 0 1 2 3

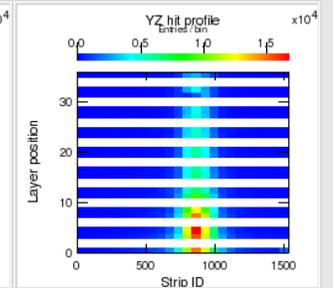
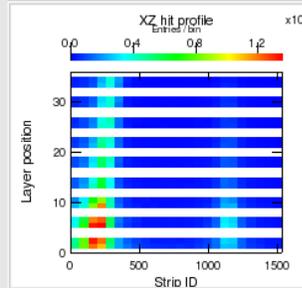
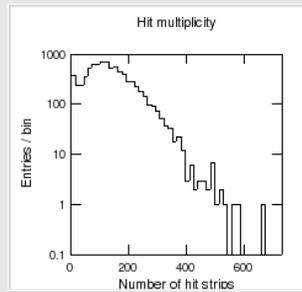
Synch

Number of events out of synch: 0

Summary

Parameter	Value
1 Beam angle (degrees)	-1.0197
2 Beam impact x (mm)	108.080
3 Beam impact y (mm)	25.3531
4 Beam raw energy (GeV)	1.52633

Tracker Calorimeter Statistics



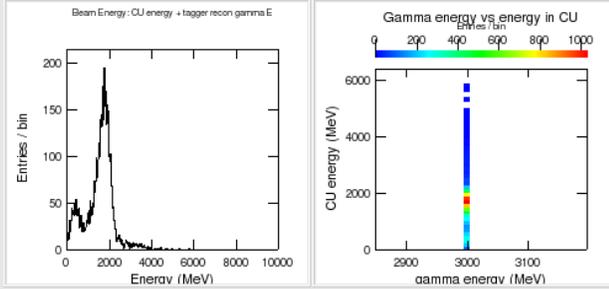
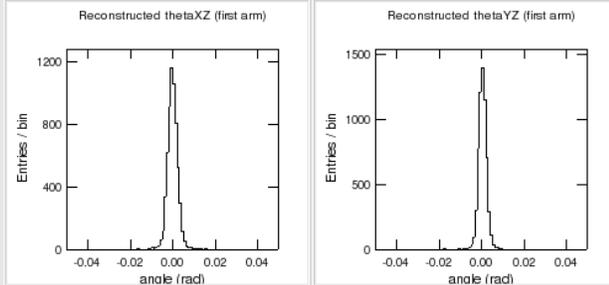
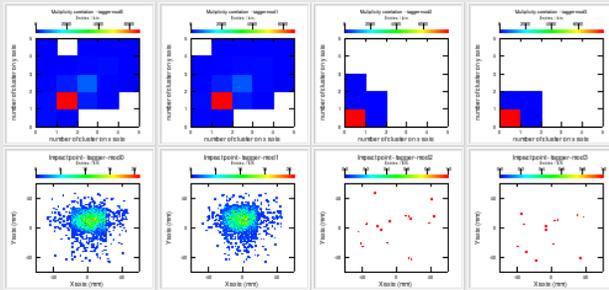
Utilities



Transport bar



Global ACD Ancillary Diagnostics Statistics



TEM selection (LAT top view)



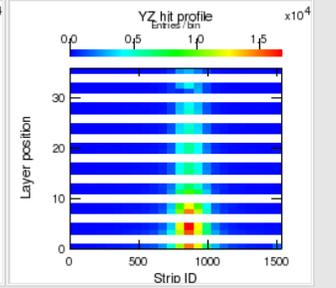
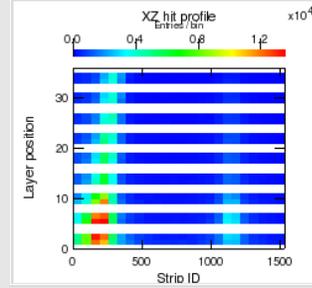
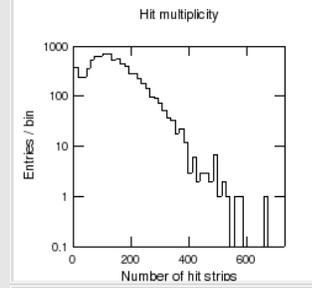
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