Data Monte Carlo Comparison in the CTB

Tancredi Carli
Stathes Paganis
Guillaume Unal

…a short summary of the meeting last week

for more info see presentation by S. Paganis 7 Feb. 06

see also: W. Lampl thesis (not shown here)

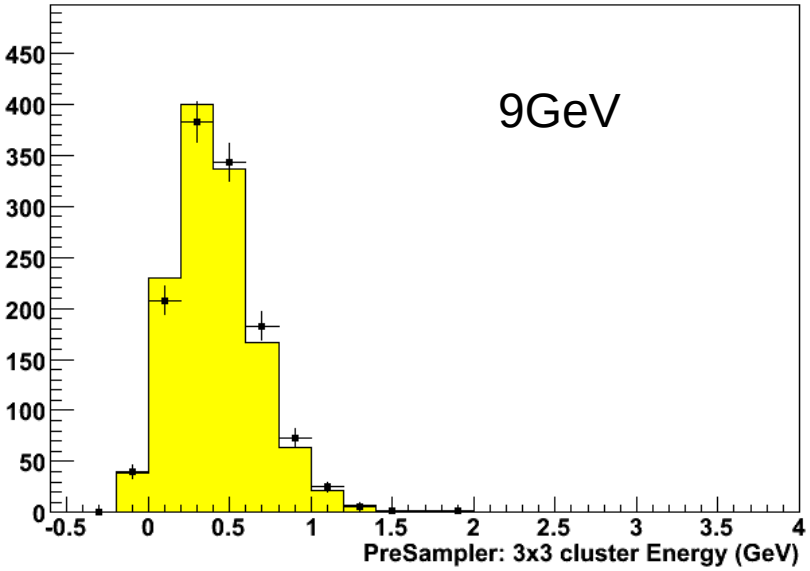
Reminders of MC-setup (periods 5+6)

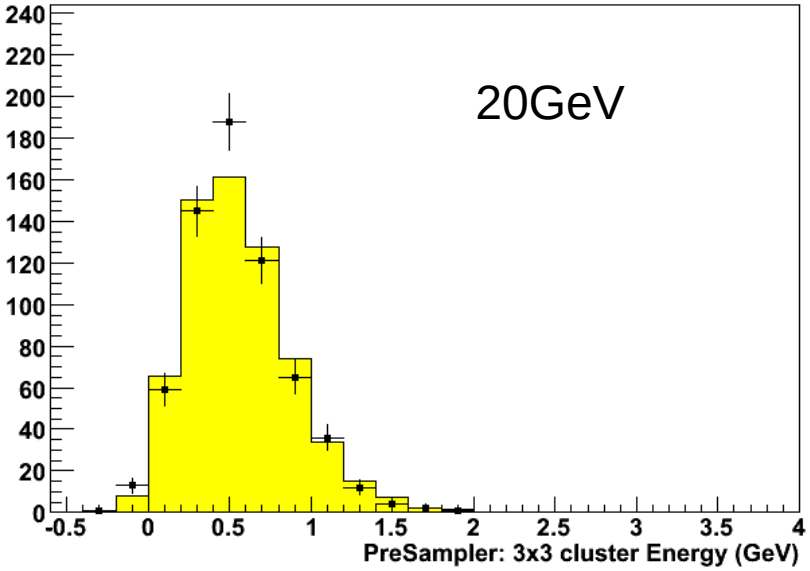
- Athena 10.5.0
  - LArG4TBBarrel-00-00-15
  - CTB-G4Sim-00-02-43
  - RecExTB-00-00-94
- Several configurations in the MC:
  - 13.35mm of Aluminum far upstream +
    - 15mm of Aluminum in front of the calo
    - 0mm of Aluminum in front of the calo
  - Runs with/without charge corrections
  - 6 Energies: 9, 20, 50, 100, 180, 250 GeV

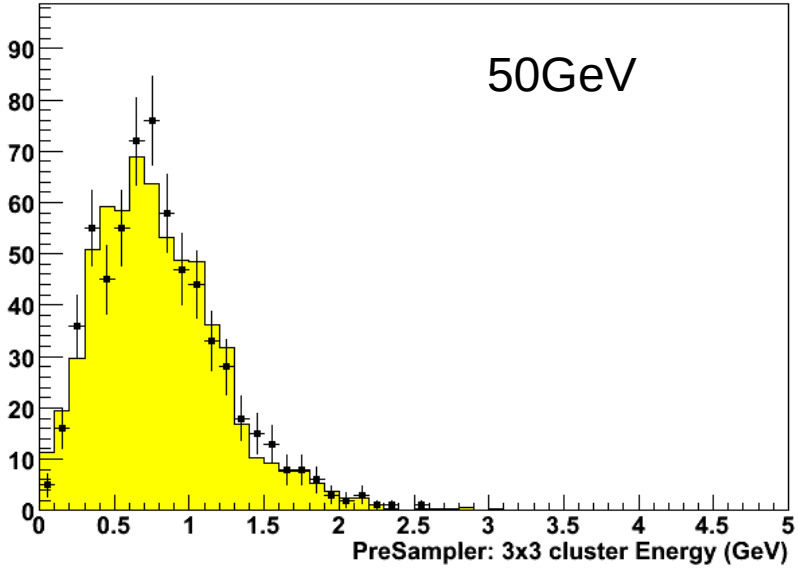
Throughout PS-energy is multiplied by 11/13
Problem: do not know cross-talk between strips -> strip normalisation ?

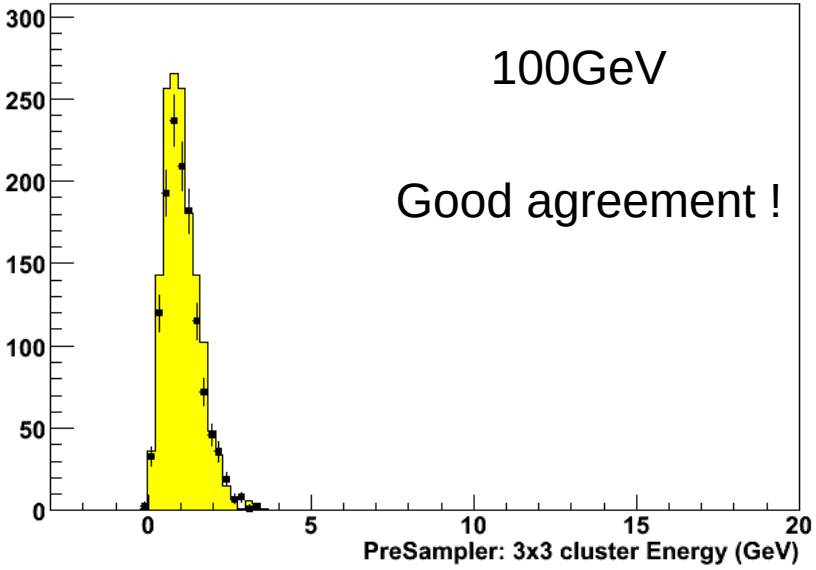
The PS

No material added (on top of 15mm „far“ Al)



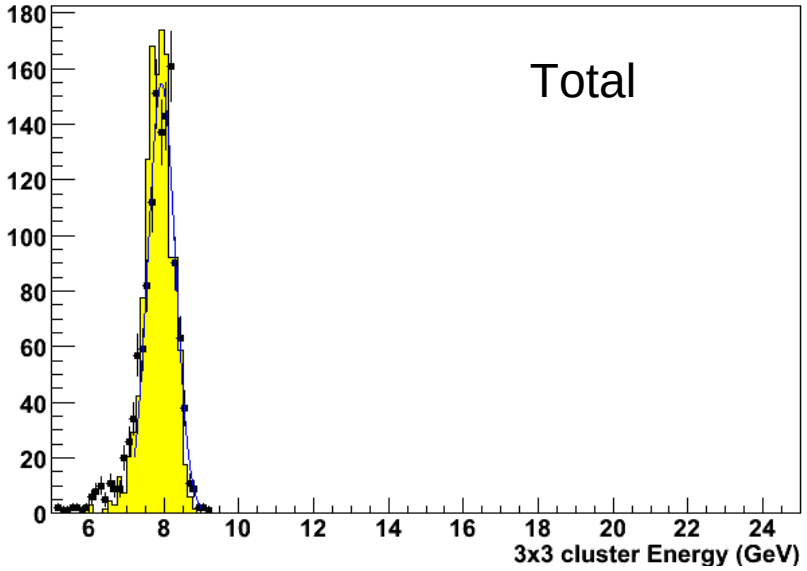


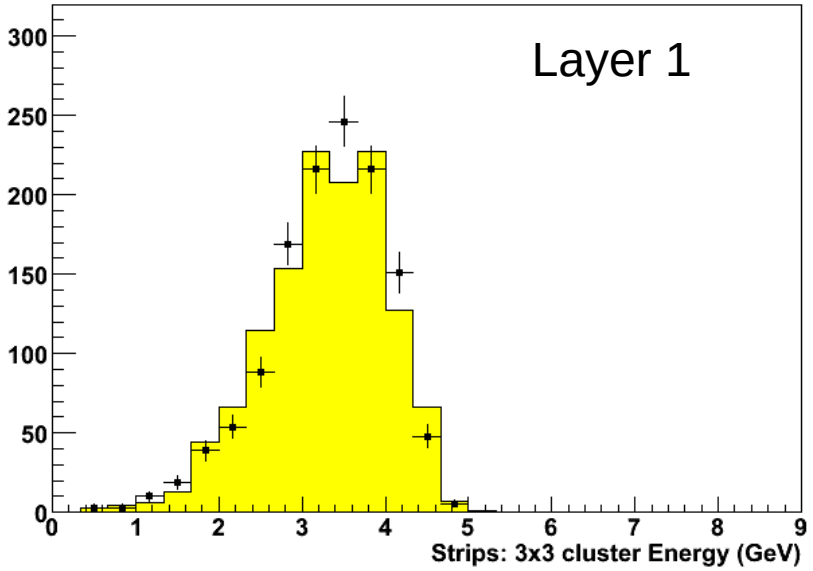


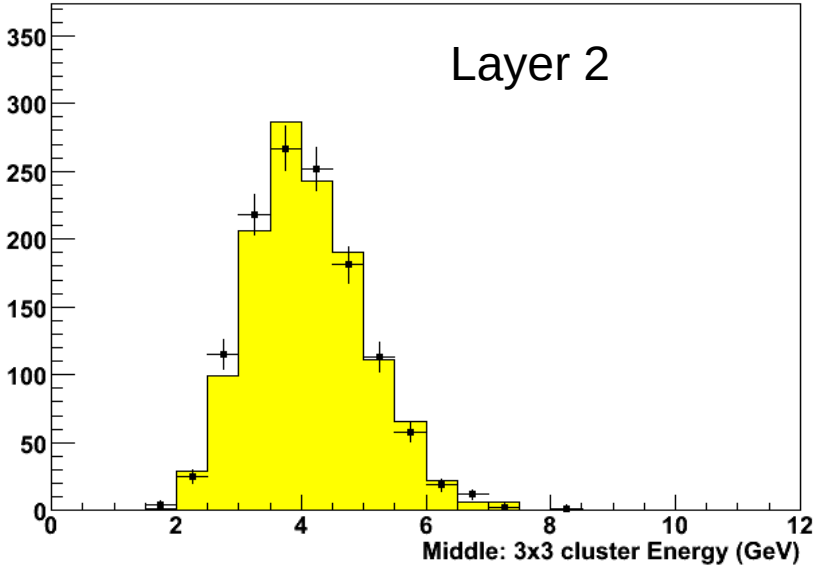


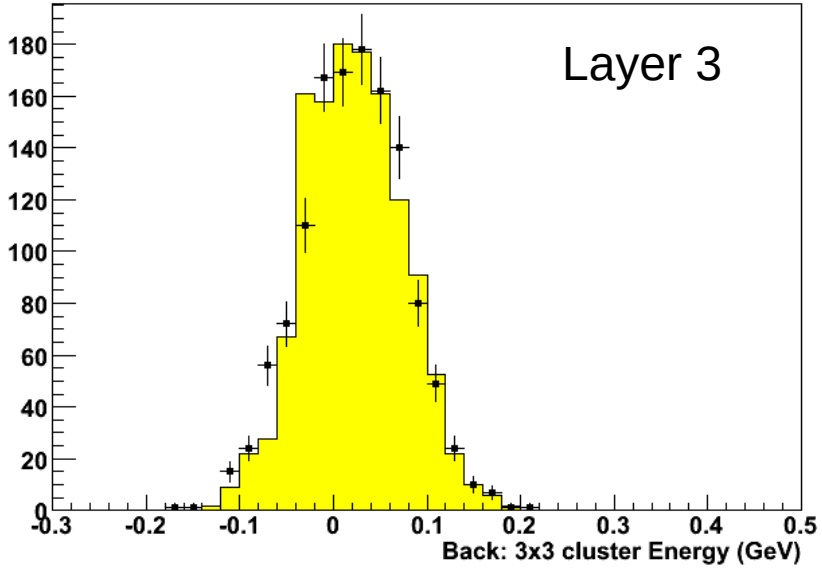
No material added (on top of 15mm „far“ Al)
In MC: E1 * 0.89
MC-scale: 0.957 (overall)

E=9 GeV



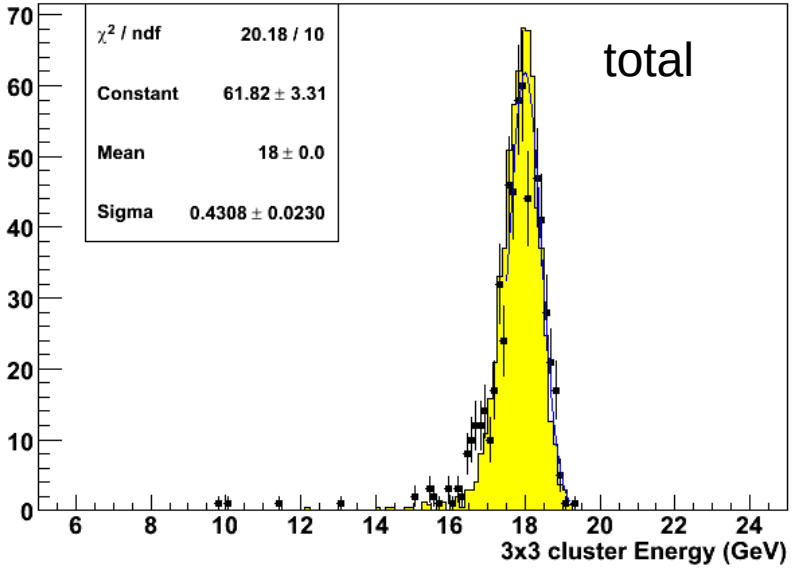


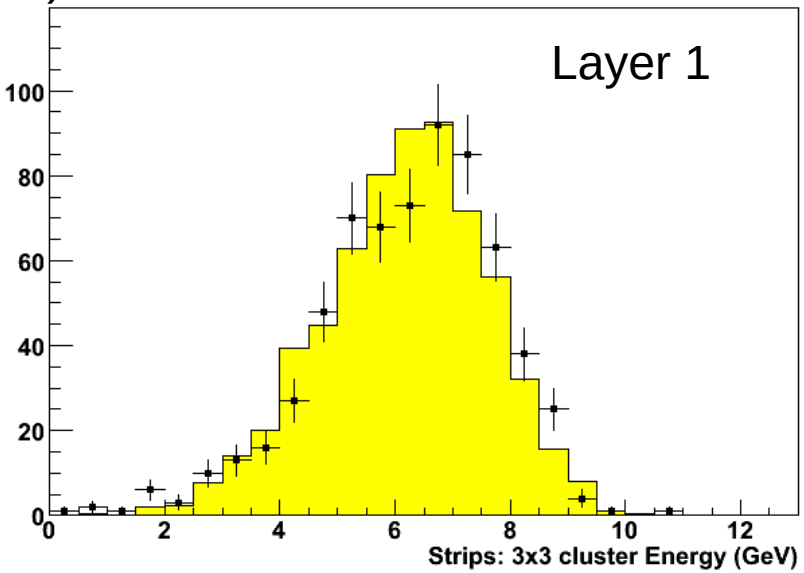


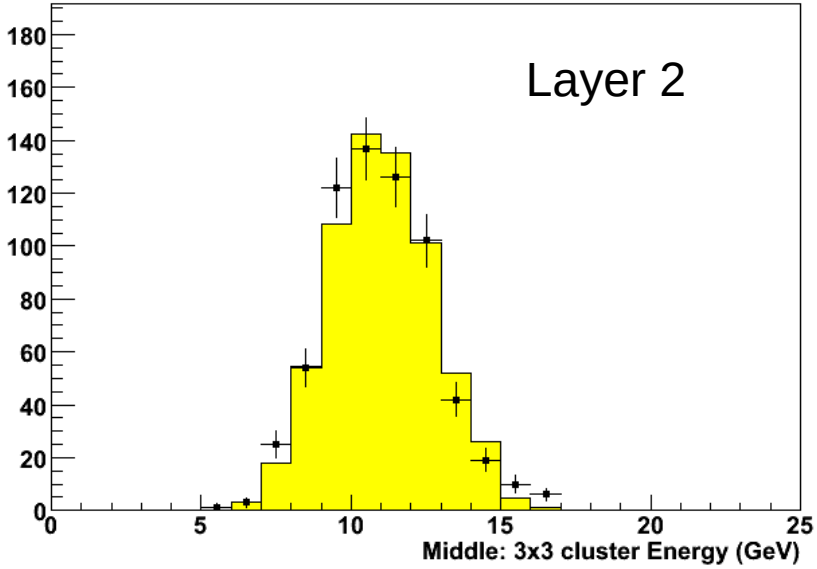


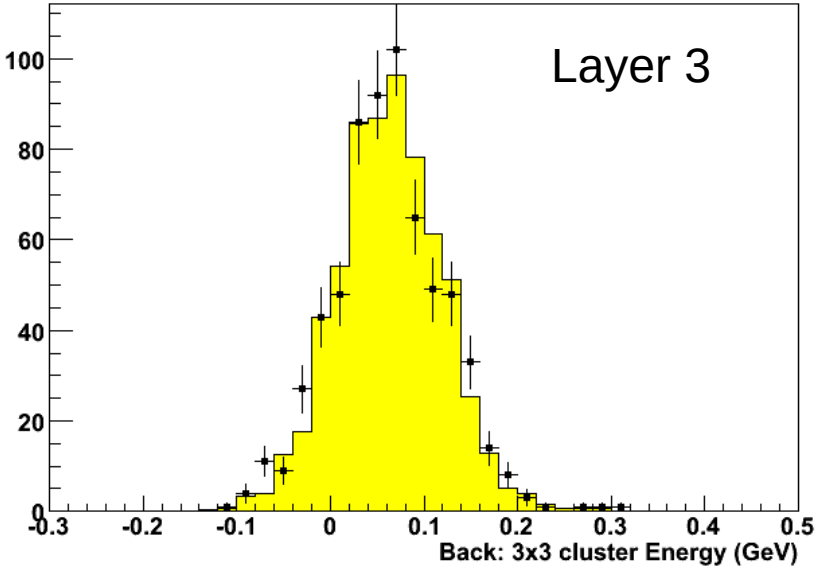
No material added (on top of 15mm „far“ Al)
In MC: E1 * 0.89
MC-scale: 0.957 (overall)

E=20 GeV



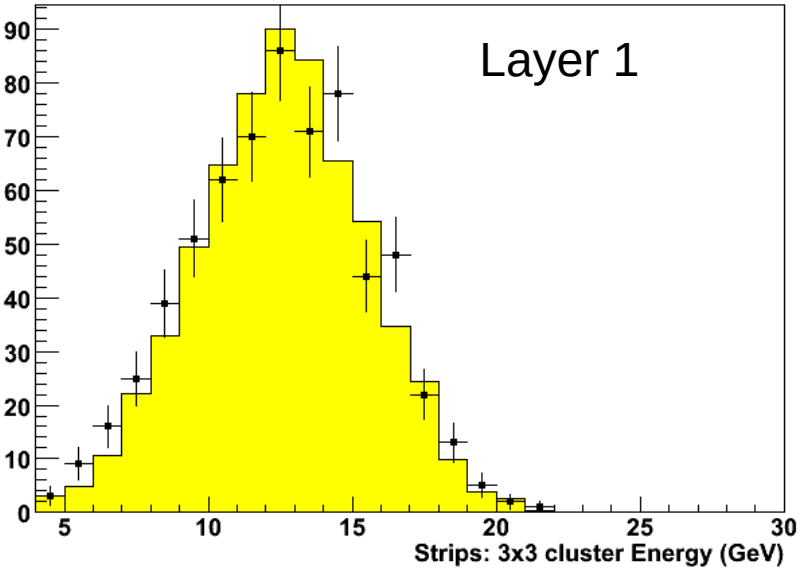




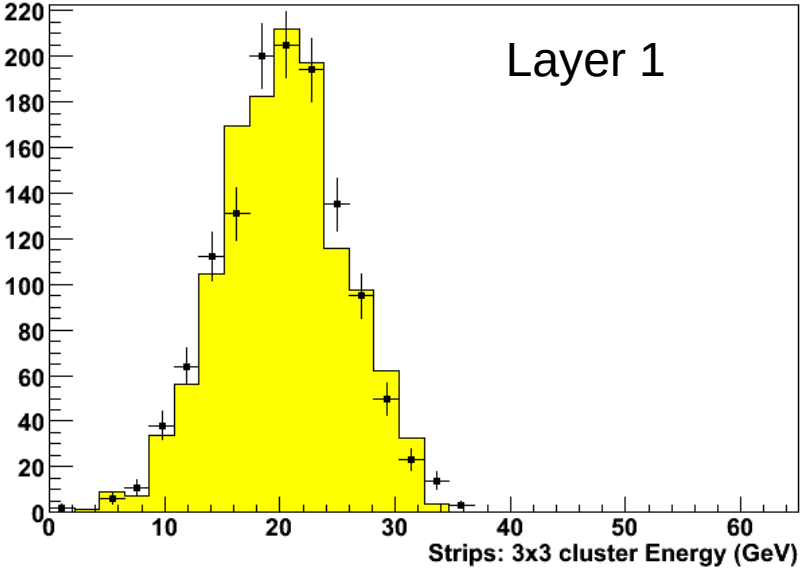


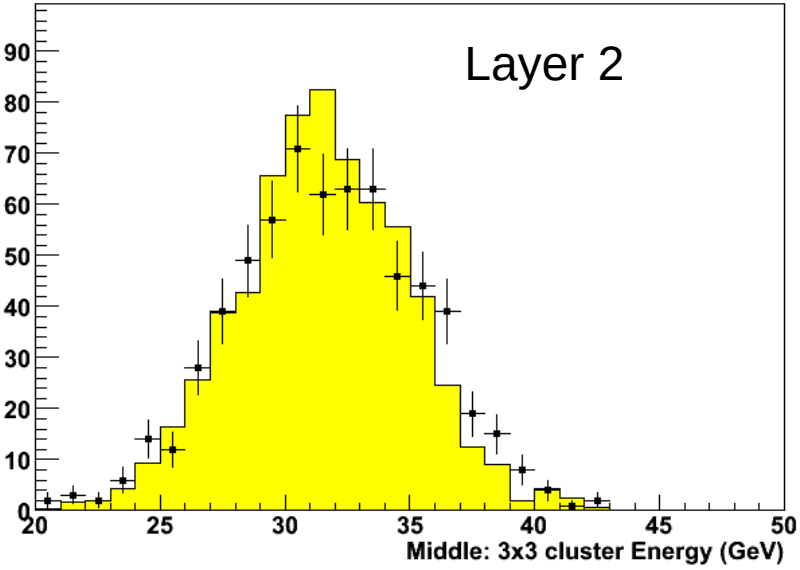
No material added (on top of 15mm „far“ Al)
In MC: E1 * 0.89
MC-scale: 0.957 (overall)

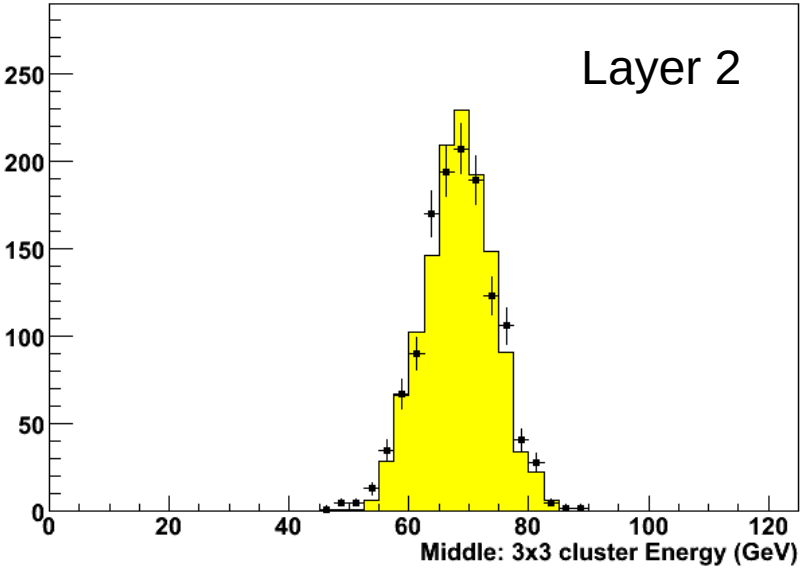
E=50 GeV



E=100 GeV







Edata/Emc without extra material

Assumption: $11/13 * E_{PS}$ $0.89 * E_1$ $E^{MC}_{tot} = 0.957 * E^{Data}_{tot}$

Edata/Emc :

Ebeam	PS	L1	L2	L3
10 GeV	1.03	0.98	0.99	0.97
20 GeV	0.97	1.00	1.00	0.98
50 GeV	1.06	1.00	1.00	0.96
100 GeV	1.04	0.99	1.00	0.98
180 GeV	0.91	1.10	0.99	0.95
250 GeV	0.90	1.05	1.00	1.00

E=180/250 GeV has phi impact point close to Phi=0 (PS-module crack)

To get agreement need 10% cross-talk…too much ?

Edata/Emc with (1.5cm Ar) extra material in front of PS

Assumption: $11/13 * E_{PS}$ $0.935 * E_1$ $E_{tot}^{MC} = 0.98 * E_{tot}^{Data}$

Edata/Emc :

Ebeam	PS	L1	L2	L3
10 GeV	0.87	1.00	1.00	1.00
20 GeV	0.81	1.00	1.00	1.02
50 GeV	0.83	1.00	1.00	0.98
100 GeV	0.81	0.96	1.00	1.00
180 GeV	0.65	1.00	1.00	1.00
250 GeV	0.71	1.01	0.99	1.00

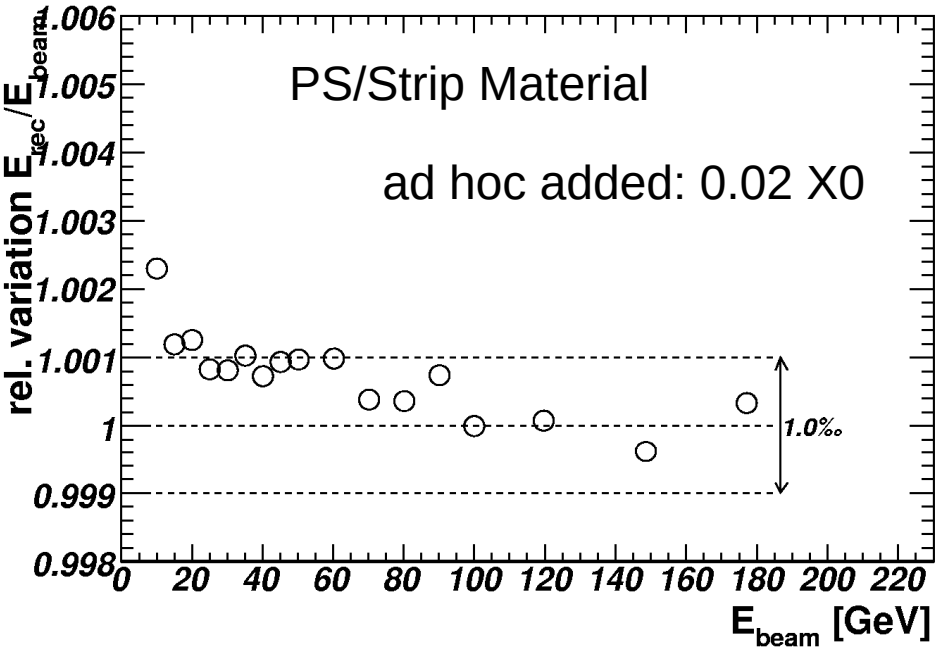
cross-talk more resonable…L1/L2 better, but PS off ?

May be material between PS/Strips ?

TB02 Linearity study:

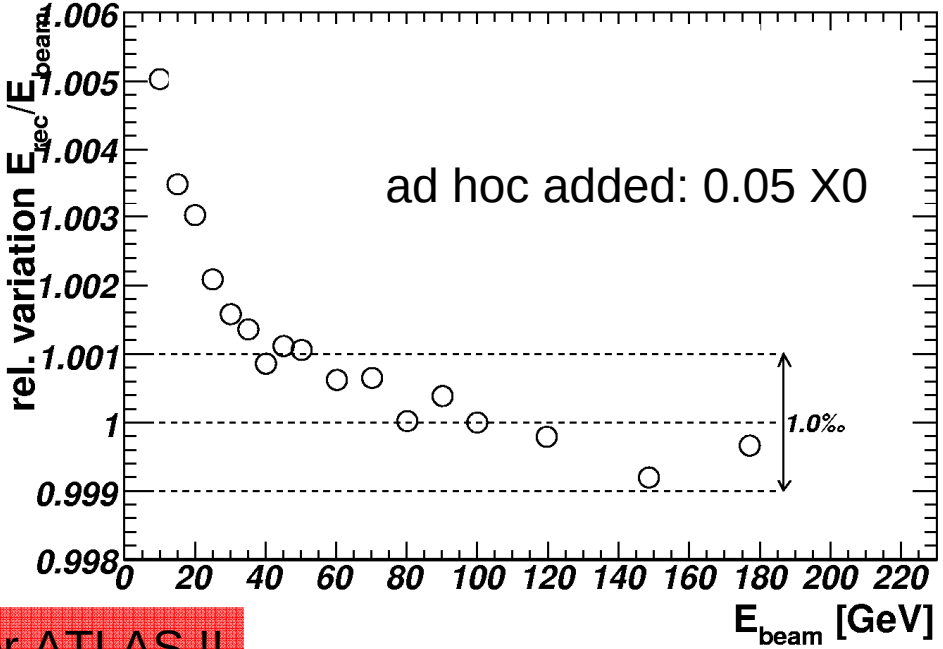
Study sensitivity to material
Between the PS and the Accordion

1) Add ad hoc some material in MC
2) Calculate calibration constants
   from changed MC
3) Apply this calibration constants
   to data



A small change introduces
a big change in data linearity

0.05X0 can be rejected by looking
at the strip/middle energy sharing
BUT: need to control a lot of effects
that could also influence this.



→ Control of PS/strip material critial for ATLAS !!

Summary

MC/Data comparison not too bad (much better than some time ago…),
but convincing solution not yet found

Adding extra material gives better description of L1/L2/L3,
but PS normalisation and energy dependence a bit off

Current hypothesis:
Some material missing between PS/strips ??
(TB02 taken at Phi=11, CTB at phi=0 more difficult region)
-> study energy response vs phi to make progress