**Gamma-ray Large Area Space Telescope**

Data/MC comparison for electron runs (PS+SPS)

Philippe Bruel

# Event selection for data/MC comparison

- Fiducial cuts in order to be insensitive to differences in beam simulation (divergence and impact point)
  - Tkr1ZDir and impact point coordinates cuts
- Fiducial cuts in order to reject impact points between two crystals
  - Along y direction for all runs
  - Along x direction for 0 deg runs
- CalEnergyRaw
  - Minimum energy to reject MIP contamination
  - Maximum energy to reject double particles
- Cuts against problems due to high rate
  - GemDeltaEventTime
  - EvtTimeInSpill (time since start of spill)
  - But it's not enough -> cut on layer energies (see next slides)

700001949 (282 GeV, 60 deg)

CalELayer4:Tkr1Y0+(-47.4-Tkr1Z0)/Tkr1ZDir*Tkr1YDir

electron between 2 crystals

CalXtalEne[2][4][7]:Tkr1Y0+(-47.4-Tkr1Z0)/Tkr1ZDir*Tkr1YDir

Electron through xtal 2_4_7

no energy recorded !

CalXtalEne[2][4][6]+CalXtalEne[2][4][8]:Tkr1Y0+(-47.4-Tkr1Z0)/Tkr1ZDir*Tkr1YDir

Philippe Bruel   BT meeting - Dec. 4, 2008   3
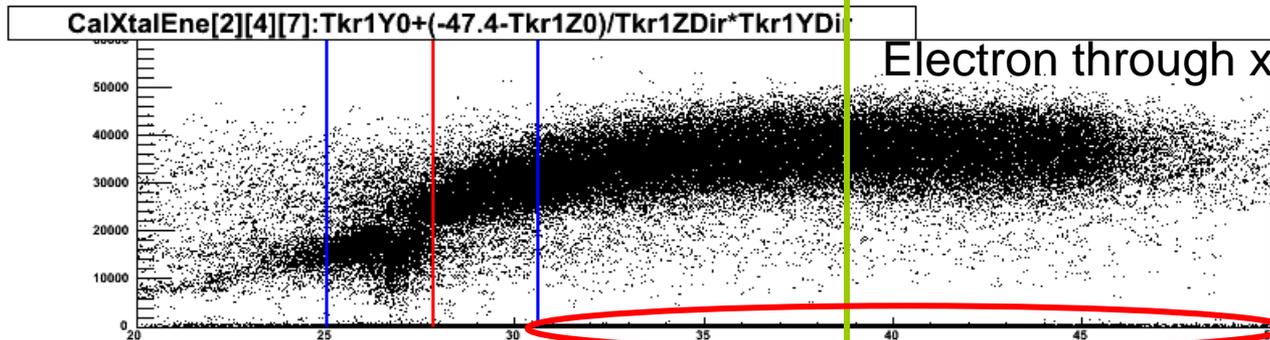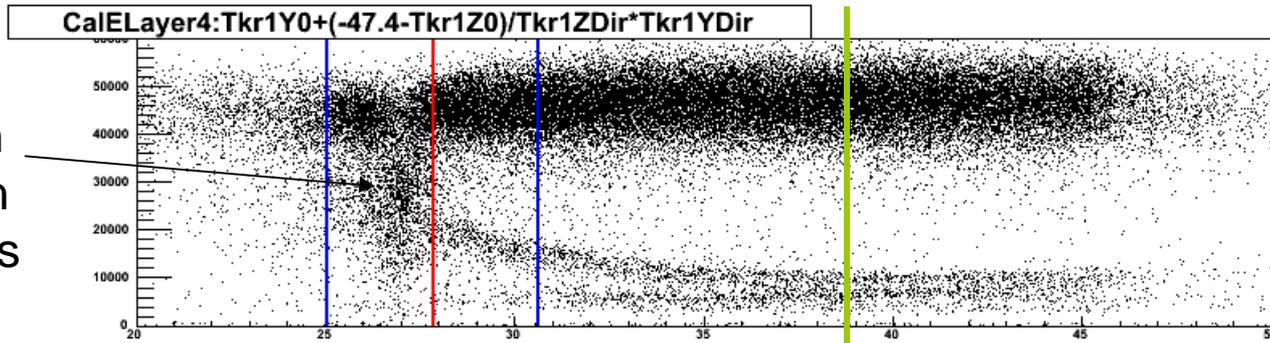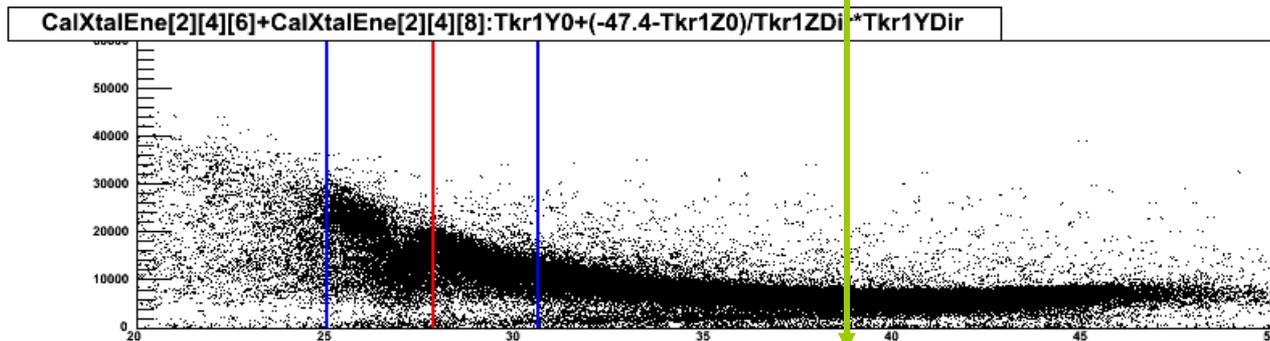
GemDeltaEventTime (events through xtal 2_4_7)

clear problem

but not only at small GemDeltaEventTime
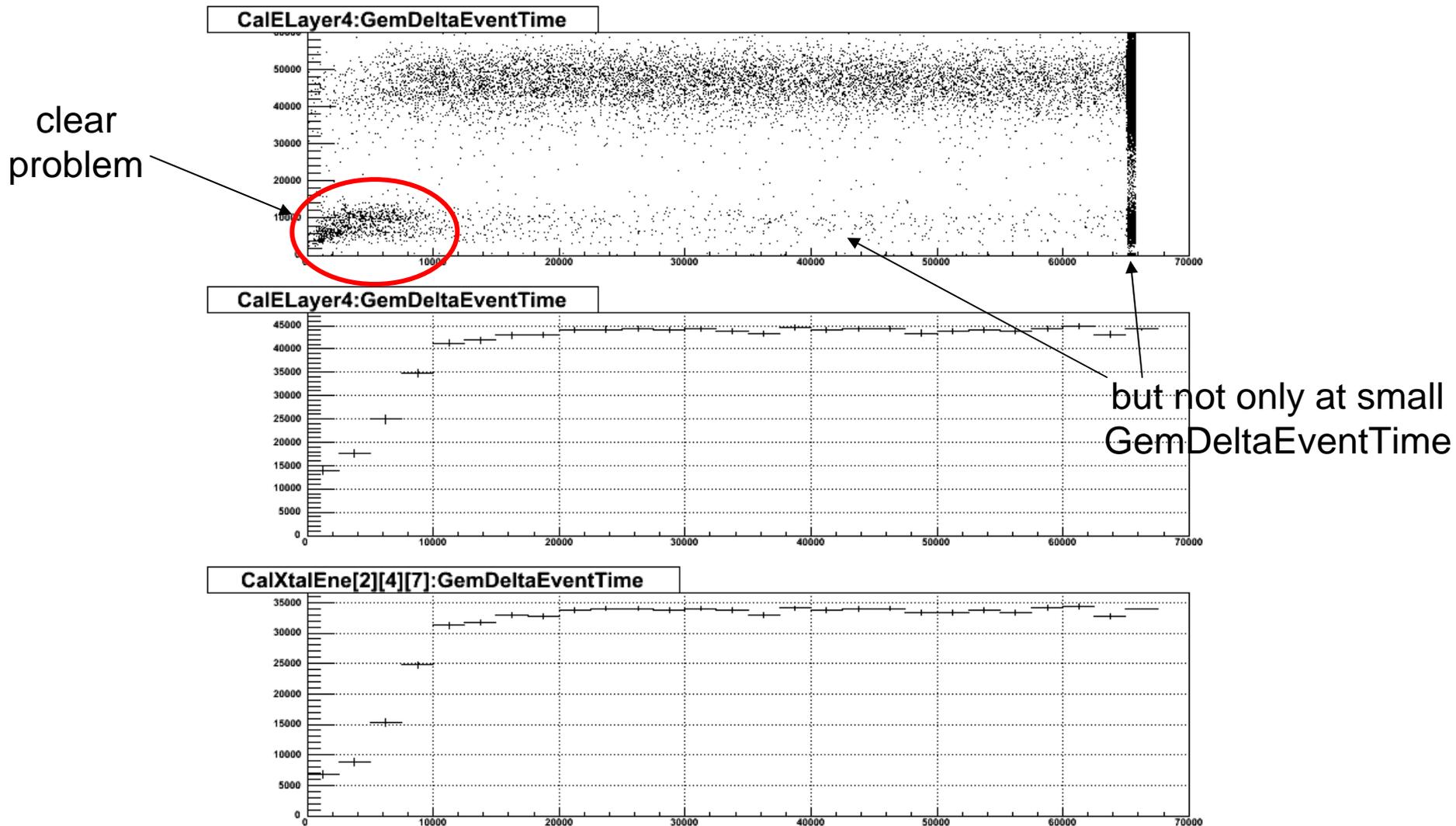
# EvtTimeInSpill (GemDeltaEventTime>10000)


the problem is
still here
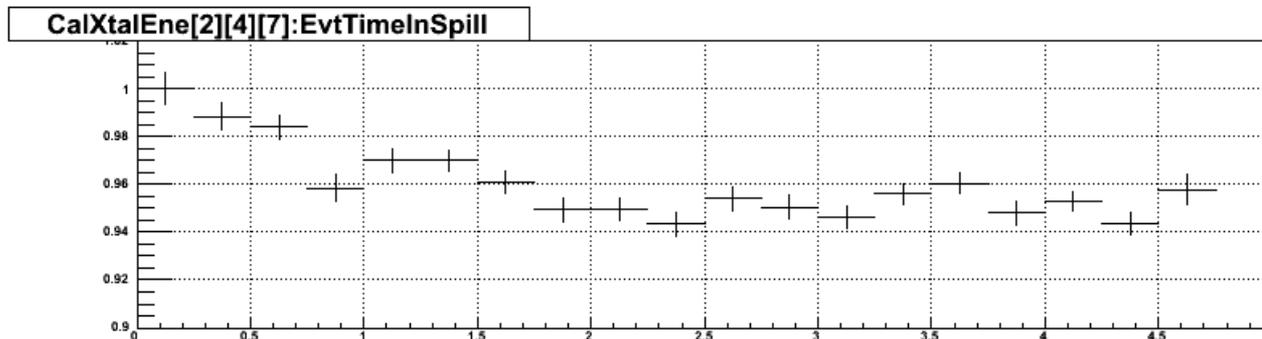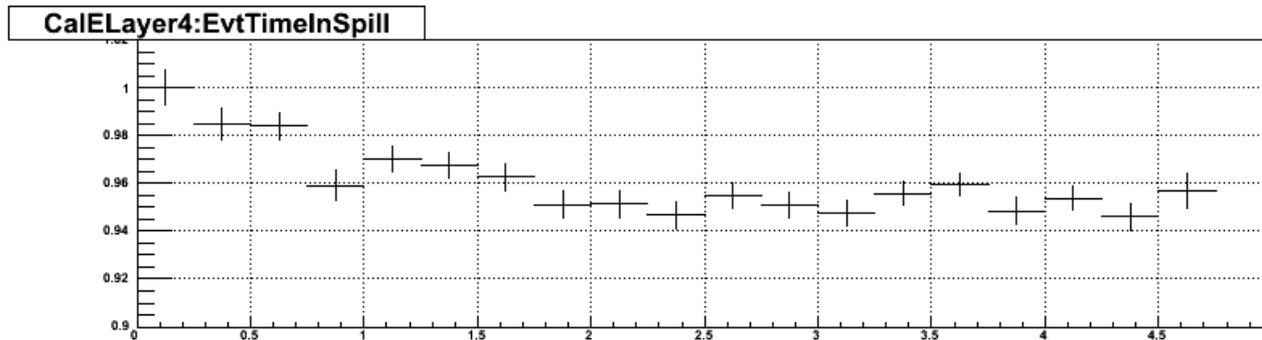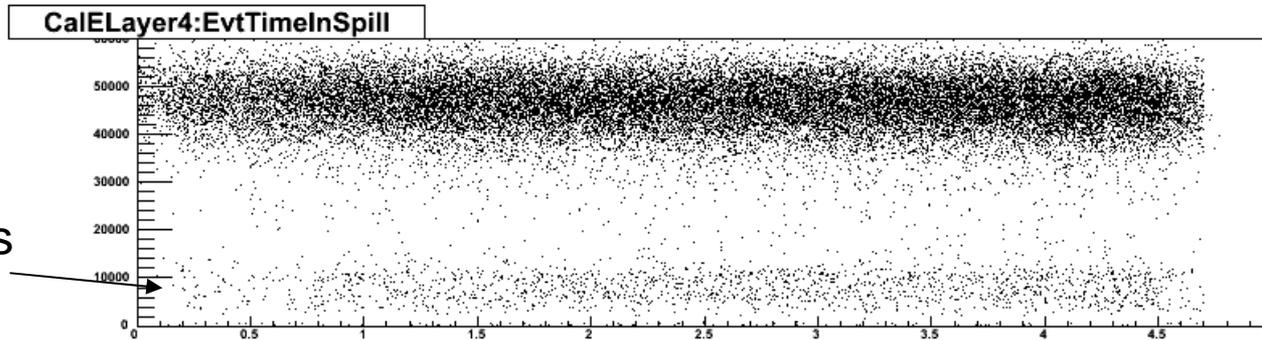
Cut on CalELayer4 needed

- No cut
- GemDeltaEventTime>10000 && EvtTimeInSpill<0.5
- && CalXtalEne[2][4][7]>100
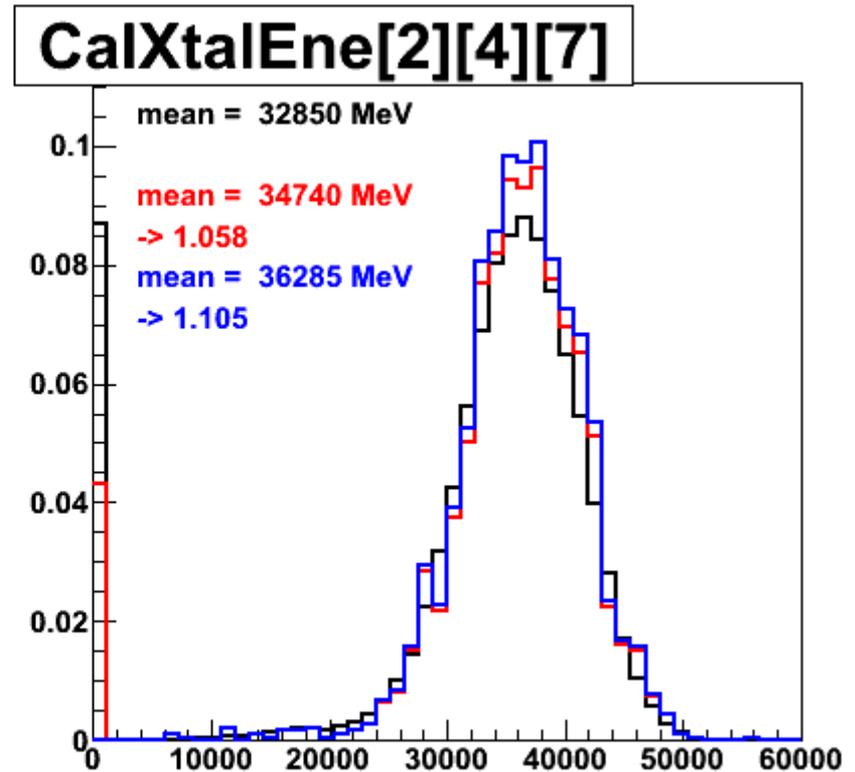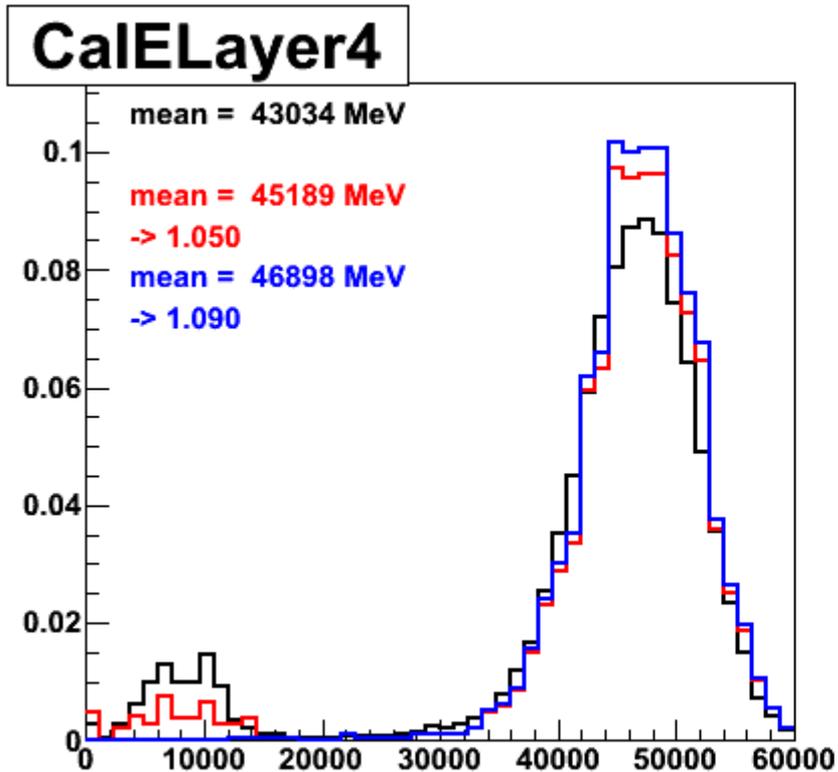
Data/MC ratios (0 deg)

**Tracker | Cal energies | Trans sizes**
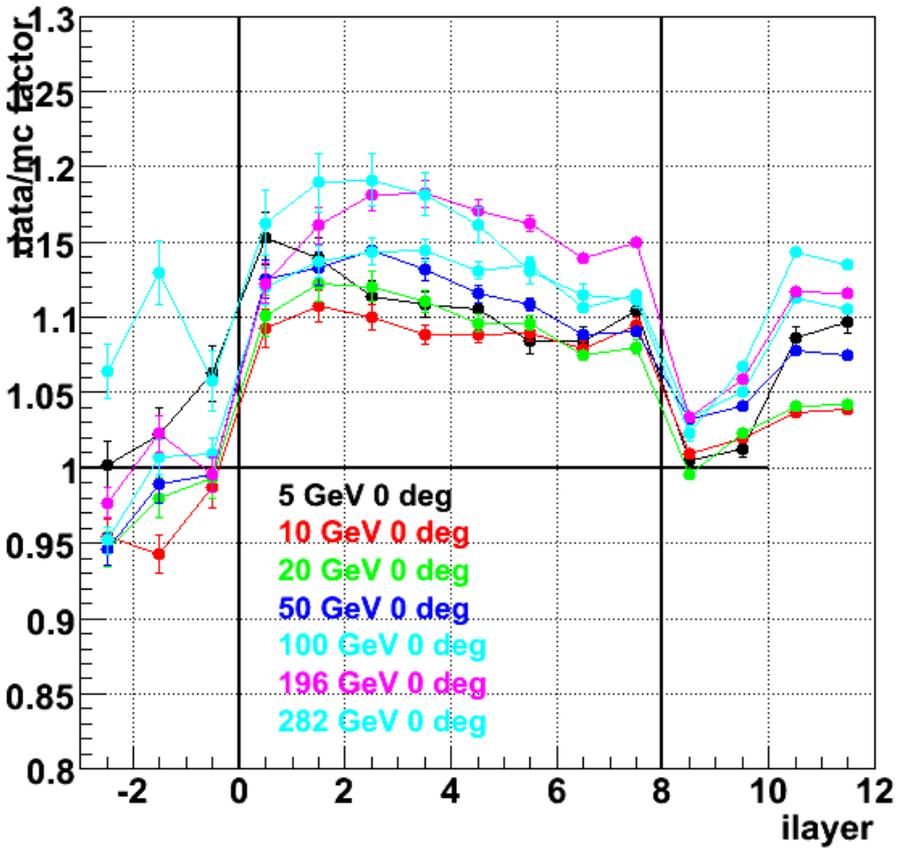
- -2.5 -> -0.5
  - TkrThinHits
  - TkrThickHits
  - TkrBlankHits
- 0.5 -> 7.5
  - CalELayer0 -> CalELayer7
- 8.5 -> 11.5
  - CalTrSizeTkrT95
  - CalTrSizeTkrT100
  - CalTrSizeTkrTL100
  - CalTransRms
- Rather good agreement for tkr variables and transverse size determined w/o longitudinal position

Data/MC comparison (0 deg / 10 deg)
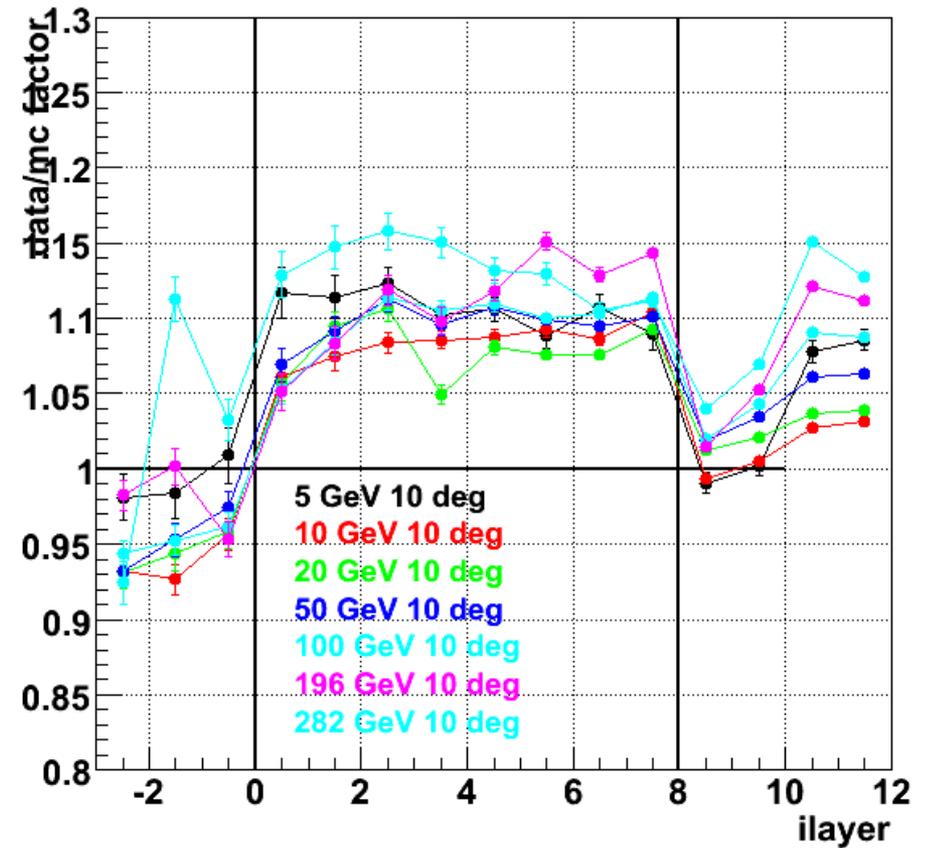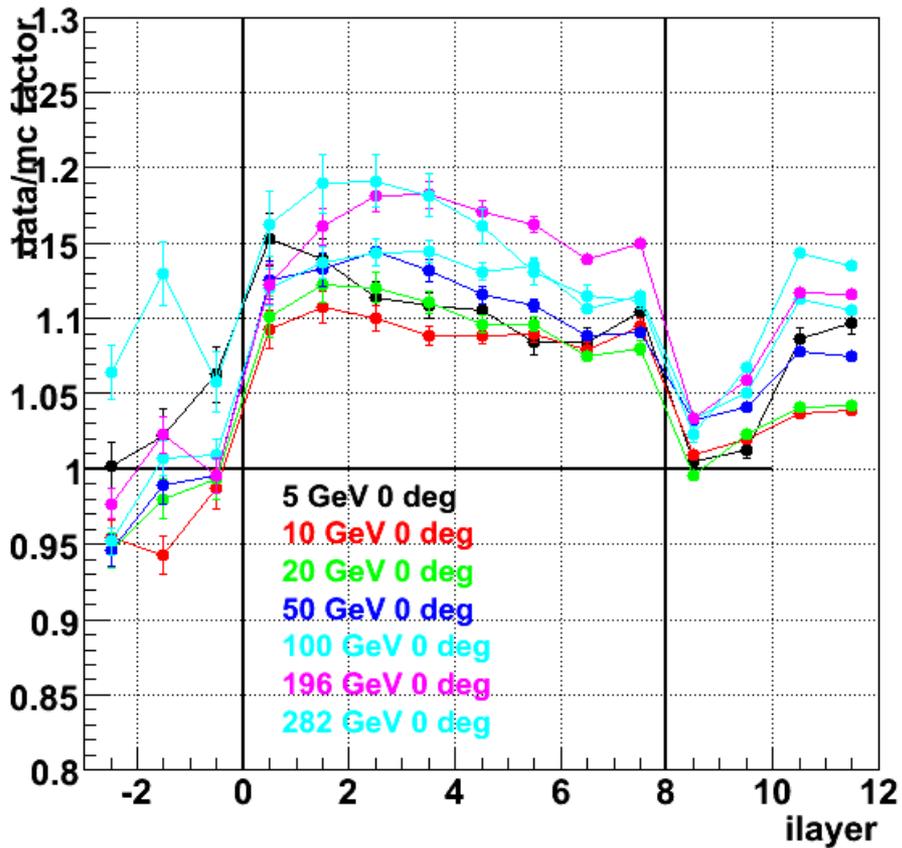
Data/MC comparison (20 deg / 30 deg)
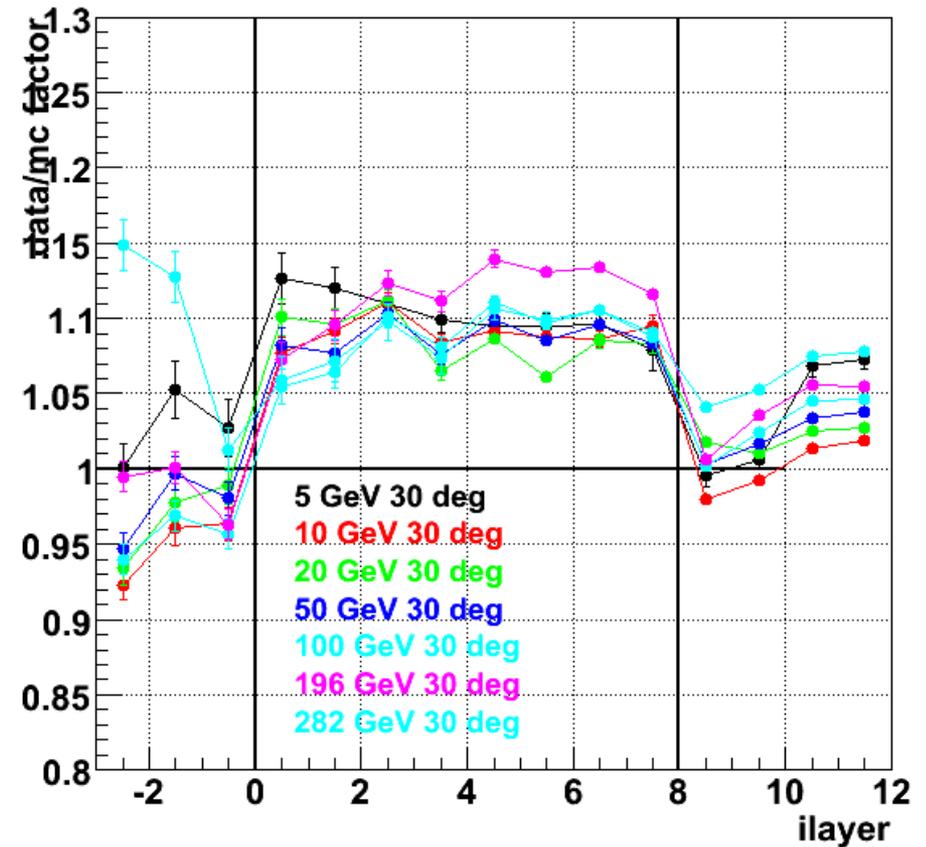
Data/MC comparison (45 deg / 60 deg)
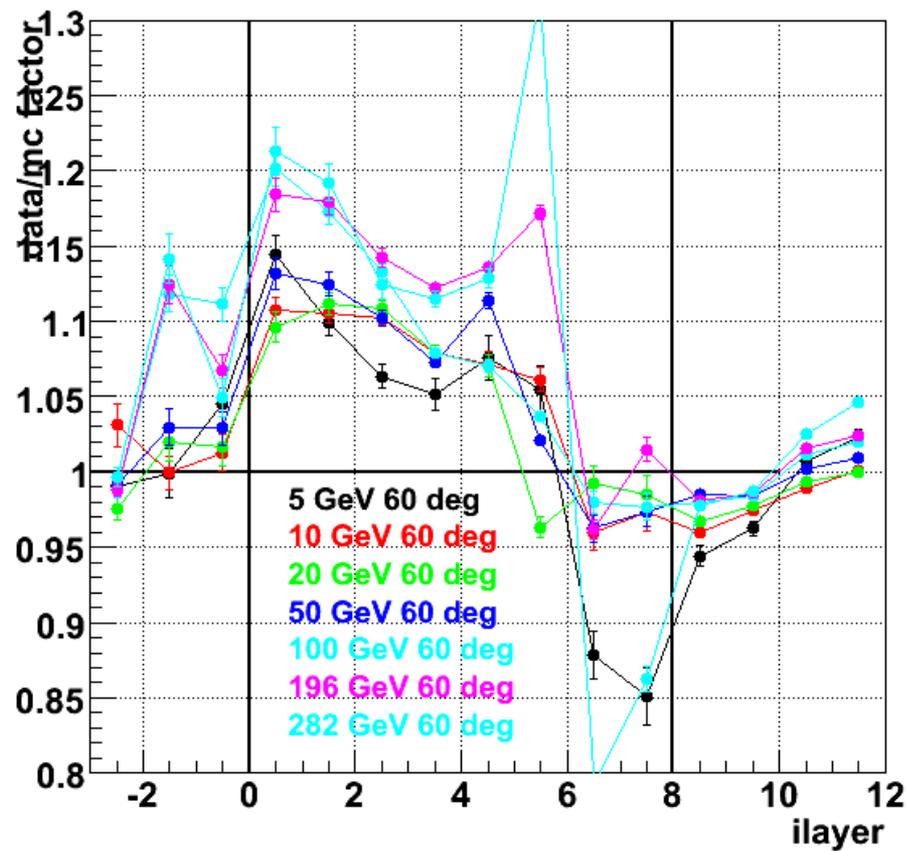
Data/MC comparison (all PS runs)

Data/MC comparison summary
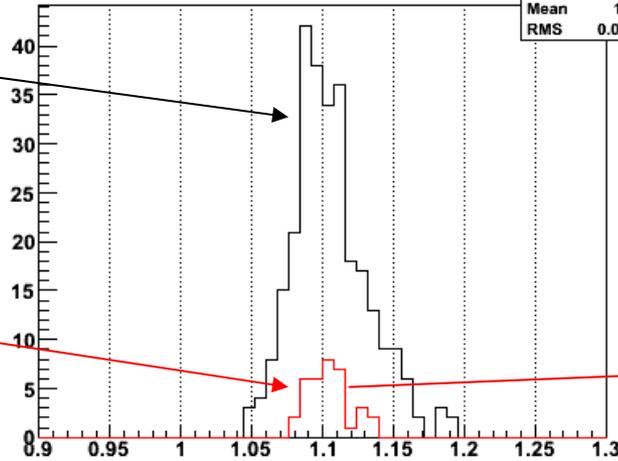
all layers

layer with max energy (less sensitive to extra material tuning)
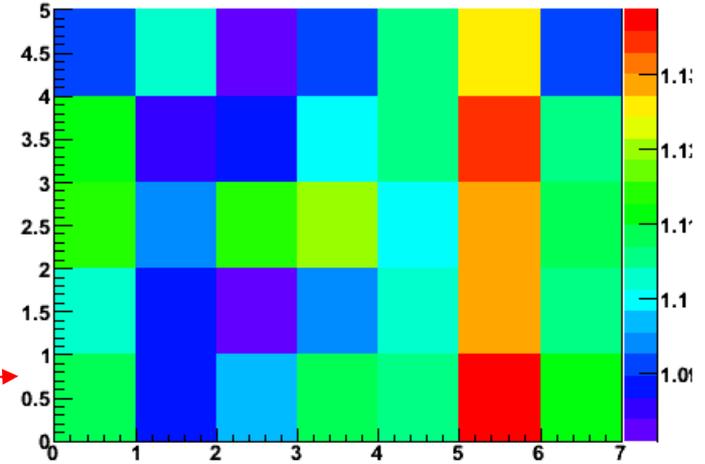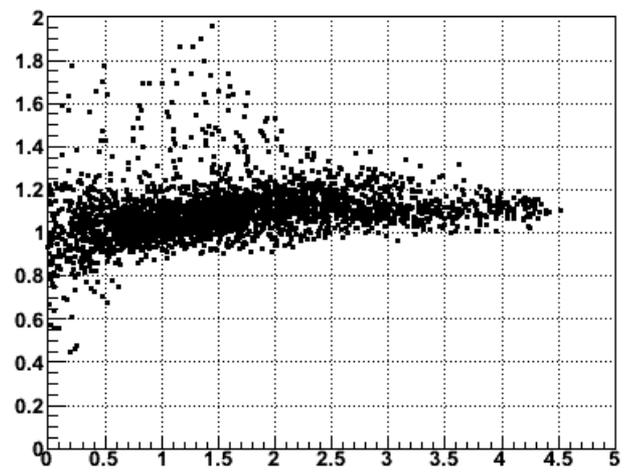
new LPM + extra material help in determining a correction fonction
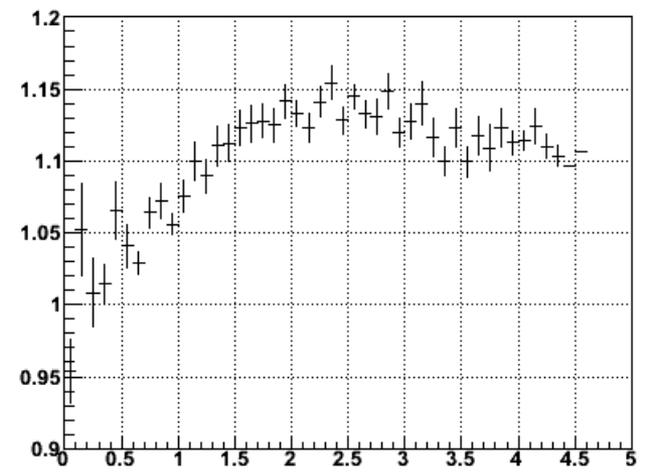
Data/MC comparison after xtal correction
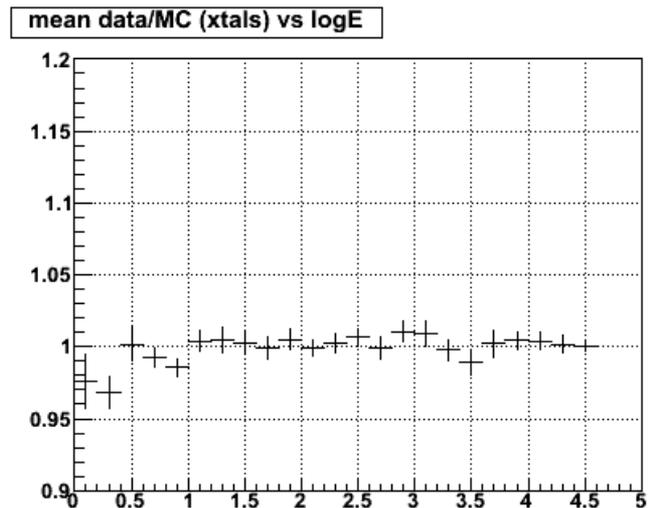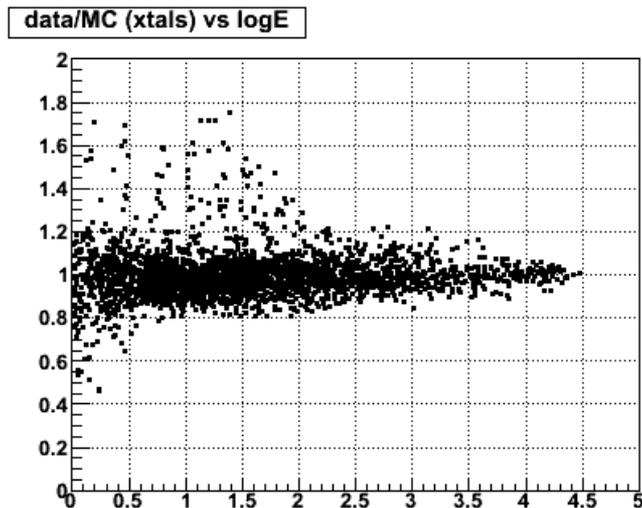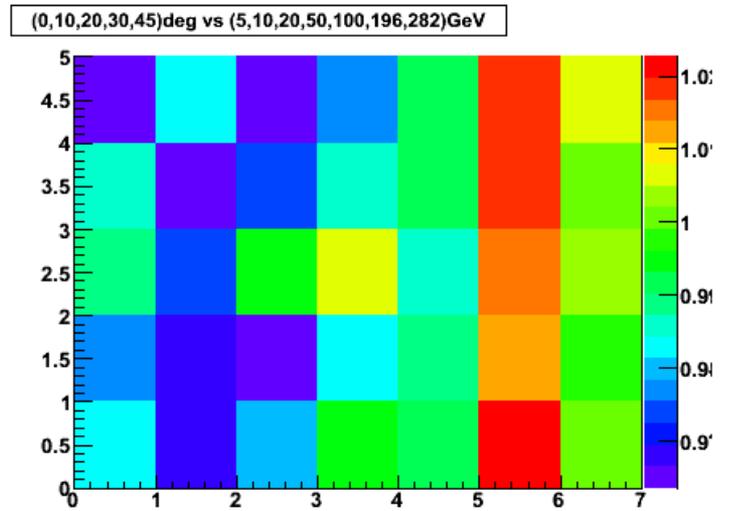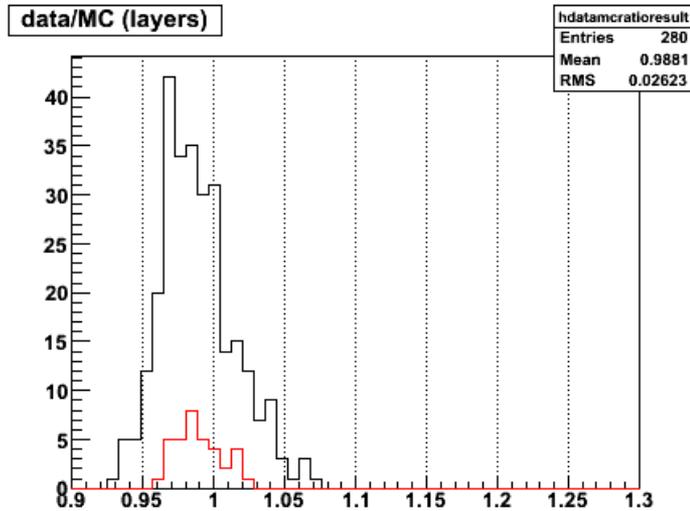
Conclusions

- ## Thanks to
  - new LPM implementation
  - ~optimal extra material
  - careful selection
- ## it seems that we've reached a global coherent description/understanding of the PS+SPS electron data
  - rather good agreement for tkr activity
  - rather good agreement for the transverse size
  - energy dependent correction of crystal energies
- ## Next :
  - less simple configurations (crossing towers, near cracks)
  - backsplash