

Electron shower profile with beam spread and inactive pads

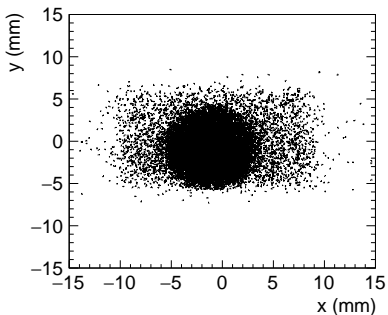
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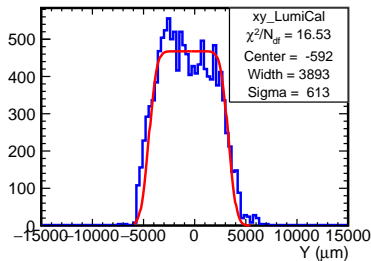
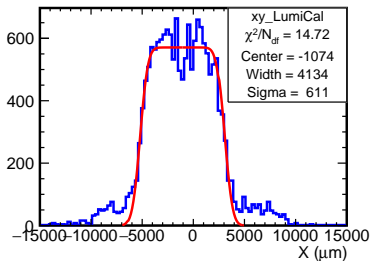


Position distribution at the front LumiCal plane



Distribution of beam impact points in the front LumiCal plane perpendicular to the beam. (from Oron's analysis of the telescope data)

Central slices in x,y



X-profile in the (Y-)central slice and vice versa

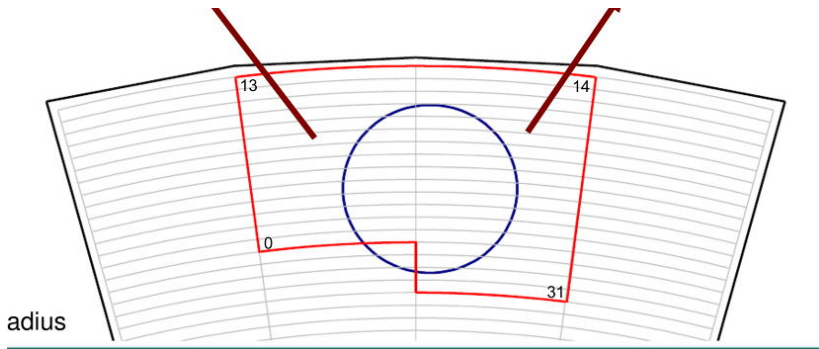
- Roughly flat circular beam profile, $\rho_X = 4.1 \text{ mm}$, $\rho_Y = 3.9 \text{ mm}$
- Angular distribution Gaussian, $\sigma_x = 1.6 \text{ mrad}$, $\sigma_y = 1.0 \text{ mrad}$ (see Oron's slides from Feb 16, '15)
- Angles are small – 40-60 micron additional lateral spread along the LumiCal prototype depth

Beam spread simulation

- Reading MC particles from .lcio file
- Geant4 resets MC particle vertices to zero
- Simulated beam starts from a point-like source ca 1.5 m upstream from LumiCal, with a flat angular distribution such that:
 - X- and Y-coordinate profiles at front LumiCal plane have radii 4.1 and 3.9 mm, respectively
 - RMS of X- and Y- angular distributions are 1.6 mrad (Y slightly too big)
- Beam halo not simulated

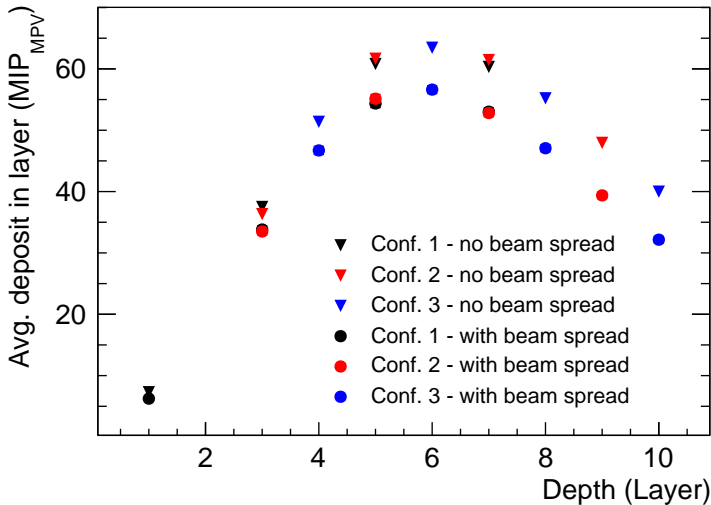
Active pads

- Cuts on the X- and Y- coordinates of the SimCalorimeterHit collection to include only depositions in the pads that were read out during TB

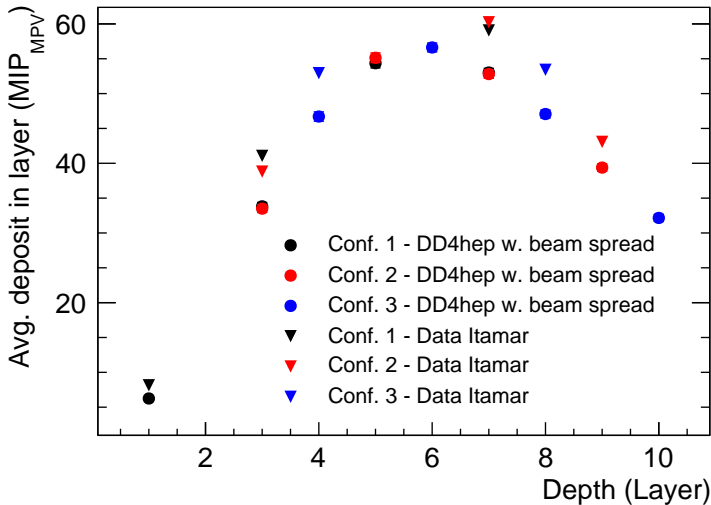


Sketch of the pads that were read out during TB

Profile difference with beam spread and inactive pads

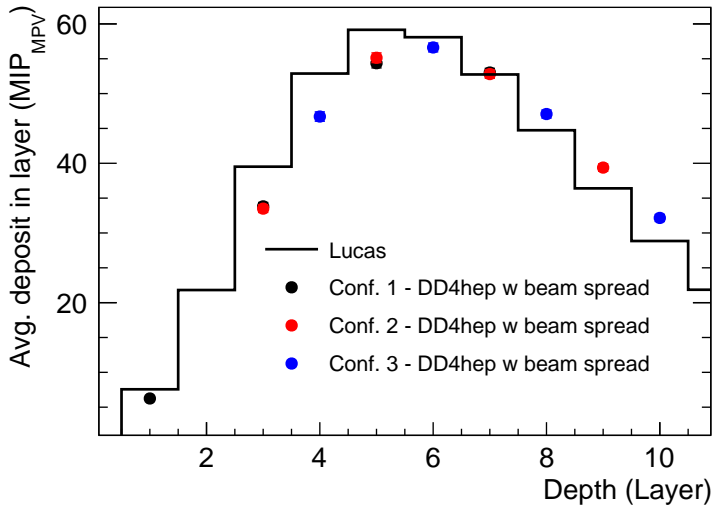
5 GeV e^- shower profile

Comparison with TB data (Itamar)

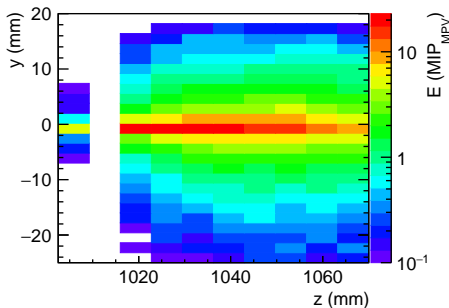
5 GeV e^- shower profile

Comparison with Lucas

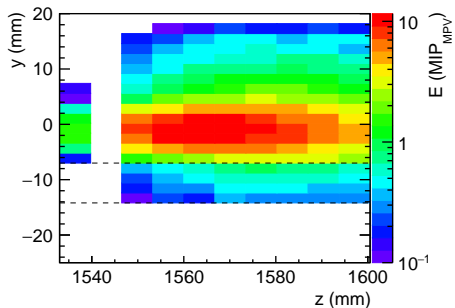
5 GeV e^- shower profile



YZ profile - Before and after



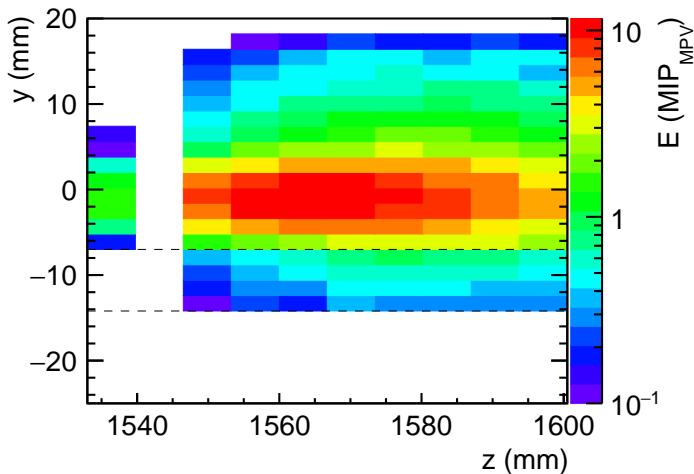
Before



After

Comparison of the YZ profile with point-like beam (before) and with the flat beam with 8 mm diameter (after).

YZ profile



Dashed lines indicate the coordinate cuts in the left- and the right wings of the sensors.

Conclusions

- Flat beam simulated with an approximation of the angular distribution and neglecting the beam halo
- Inactive pads taken into account
- Lower deposits as expected

Profiles and full distributions available at:

svnsrv.desy.de/public/FCAL/TB_and_Sim_results/