News from the Mask Region

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DESY

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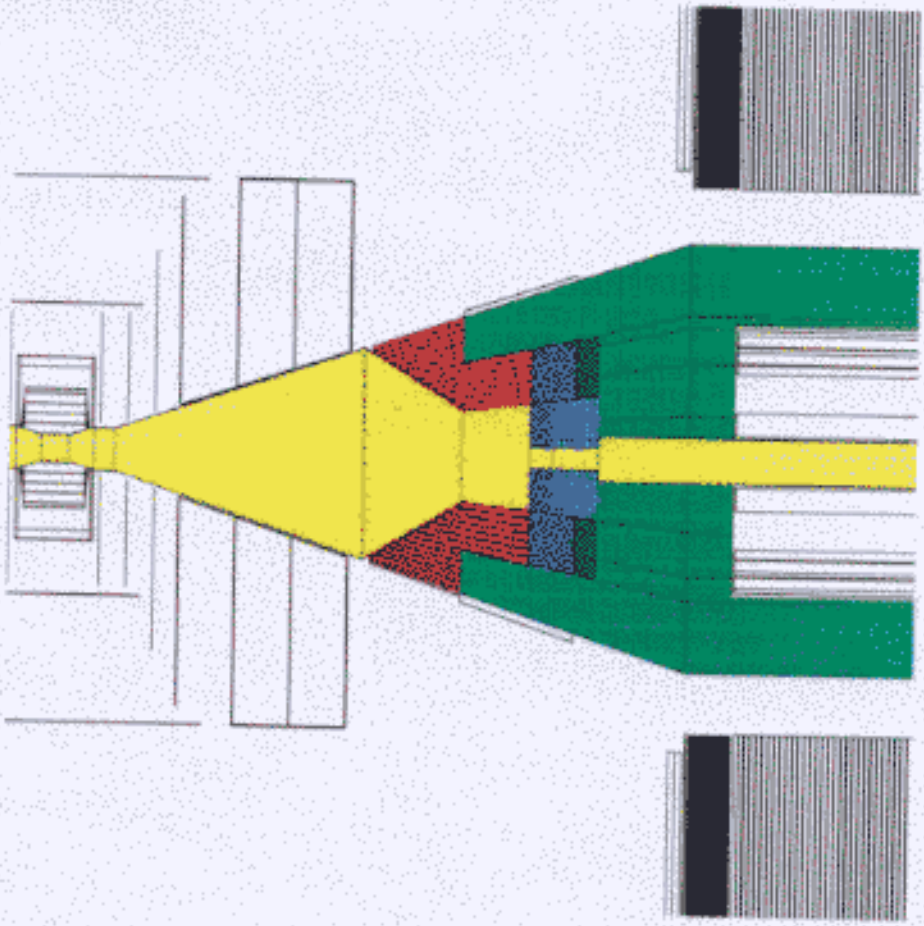
1. Design of the Mask Region
2. Instrumentation at Small Angles
3. Detecting Electrons at Small Angles

The Mask

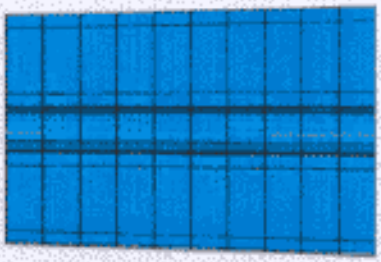
Main purpose of the mask

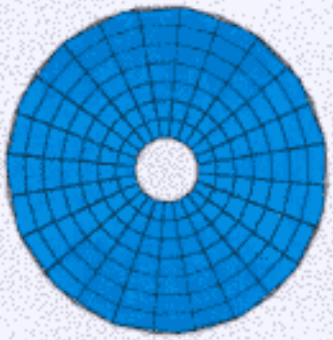
- Shield tracking detectors from backscattered pairs and secondaries
- Reduce neutron flux (graphite absorbers)
- Shield SI from synchrotron radiation



- Provide instrumentation for small angles
  - Low Angle Tagger LAT: 27.5 – 83.1 mrad
  - Luminosity CALorimeter LCAL: 4.6 – 27.5 mrad

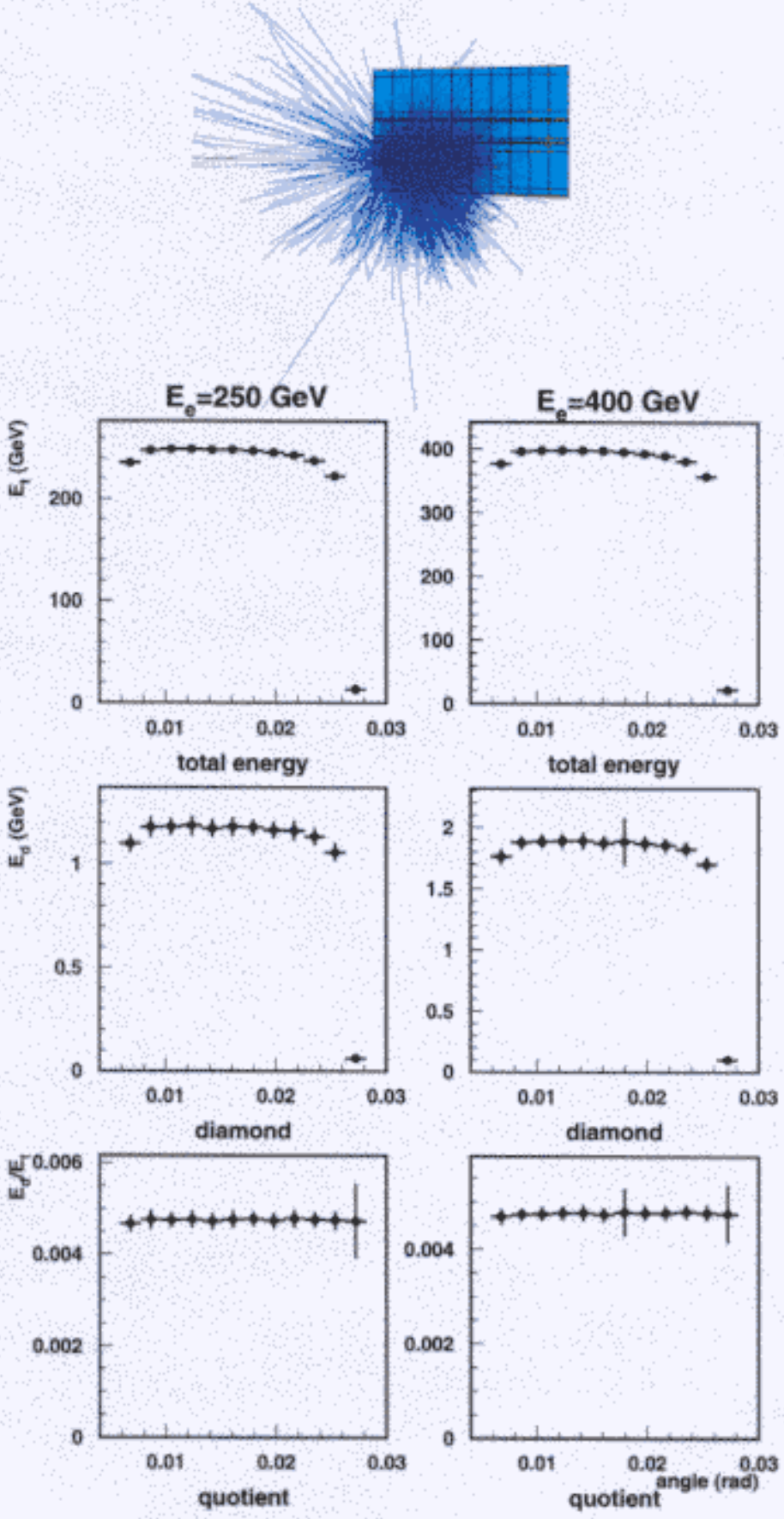
Instrumentation of the LCAL



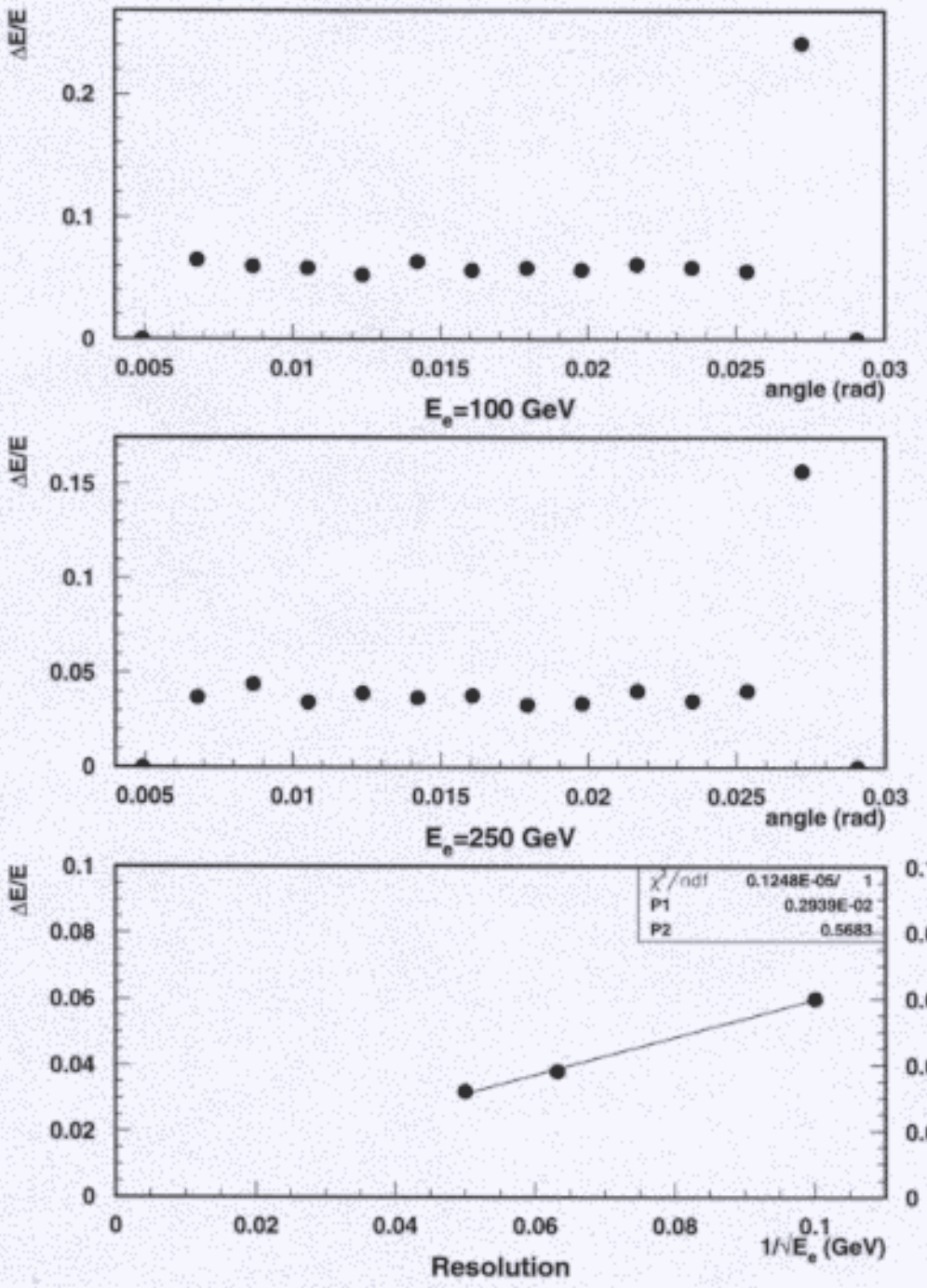


- 20 layers of diamond/tungsten
- first layer is diamond
- $\Delta\theta \approx 3.3$ mrad
- $\Delta\phi = 15$ deg

Performance of the LCAL – Detection of Bhabhas

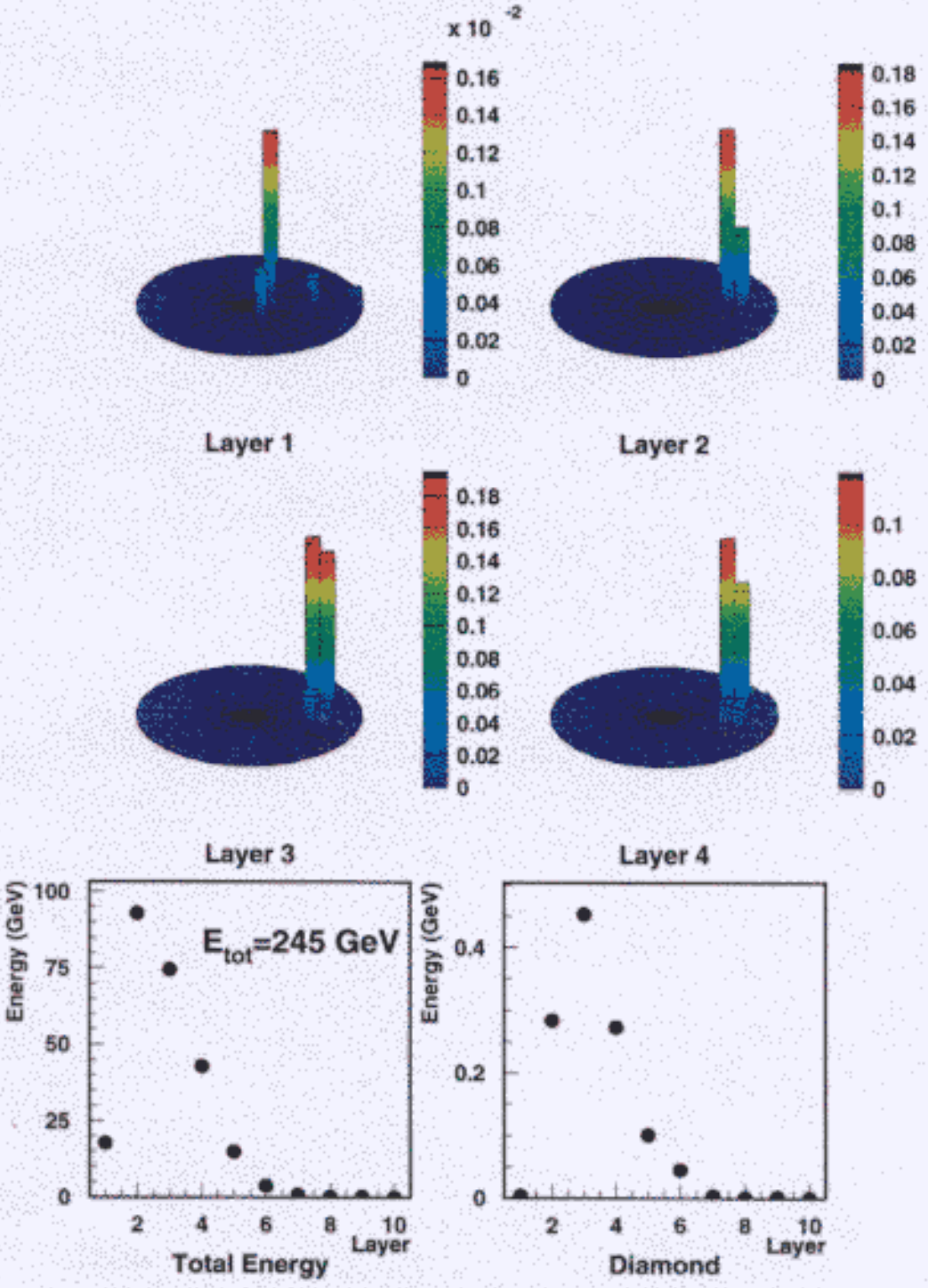


Performance of the LCAL – Energy Resolution



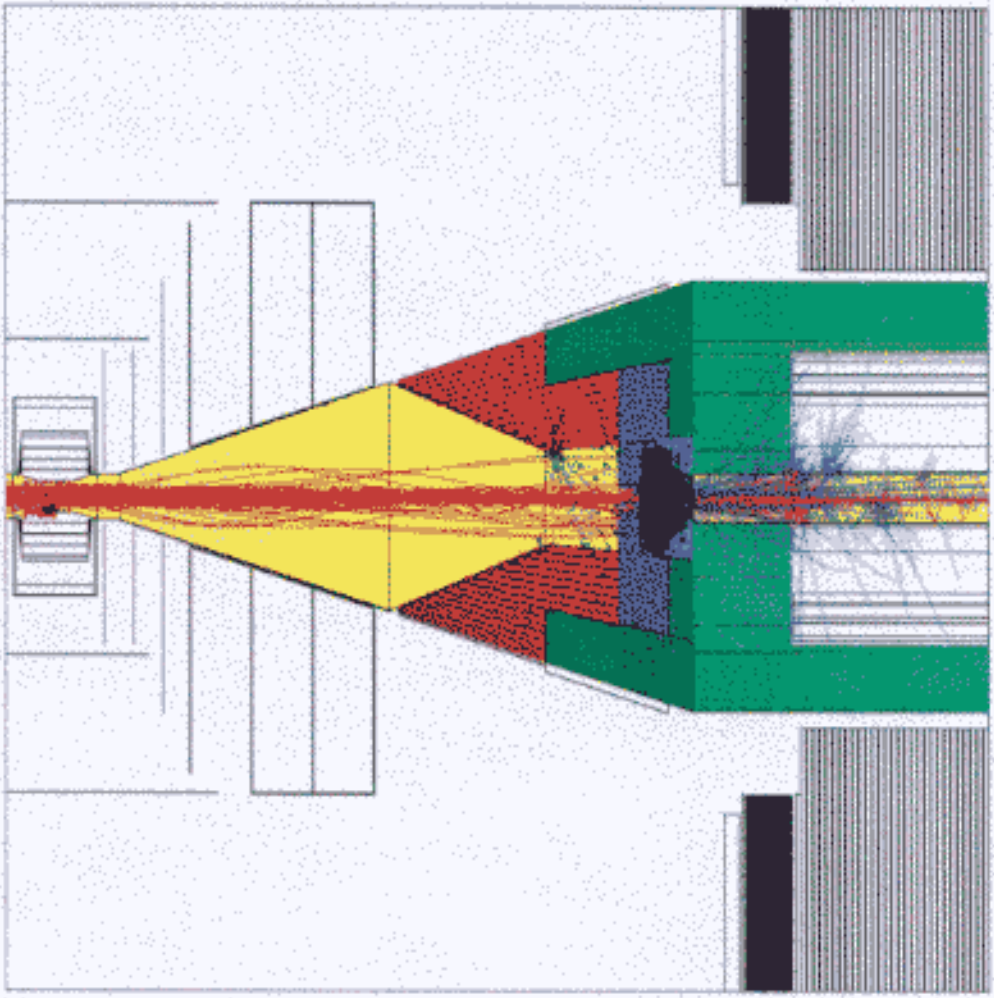
Performance of the LCAL – Electron Signal

250 GeV Electron



Pairhits in the Mask

≈ 0.1% of one bunchcrossing @ 500 GeV , 3T



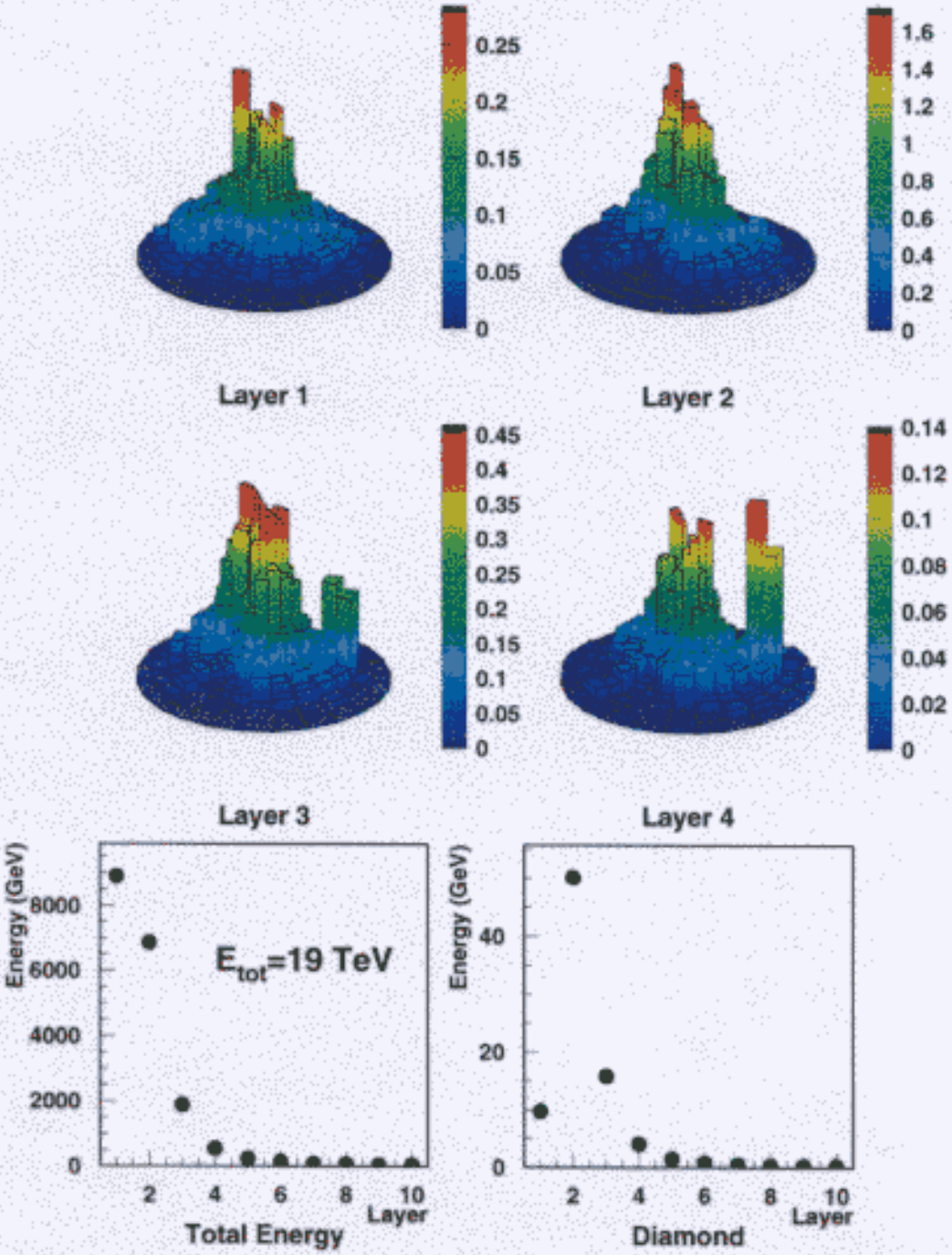
Pairs on one side ($z \geq 0$)

Energy	# produced	Total E	# on LCAL	E on LCAL
500	60000	150 TeV	110000	21 TeV
800	90000	490 TeV	170000	35.5 TeV

Every channel of LCAL fires !!

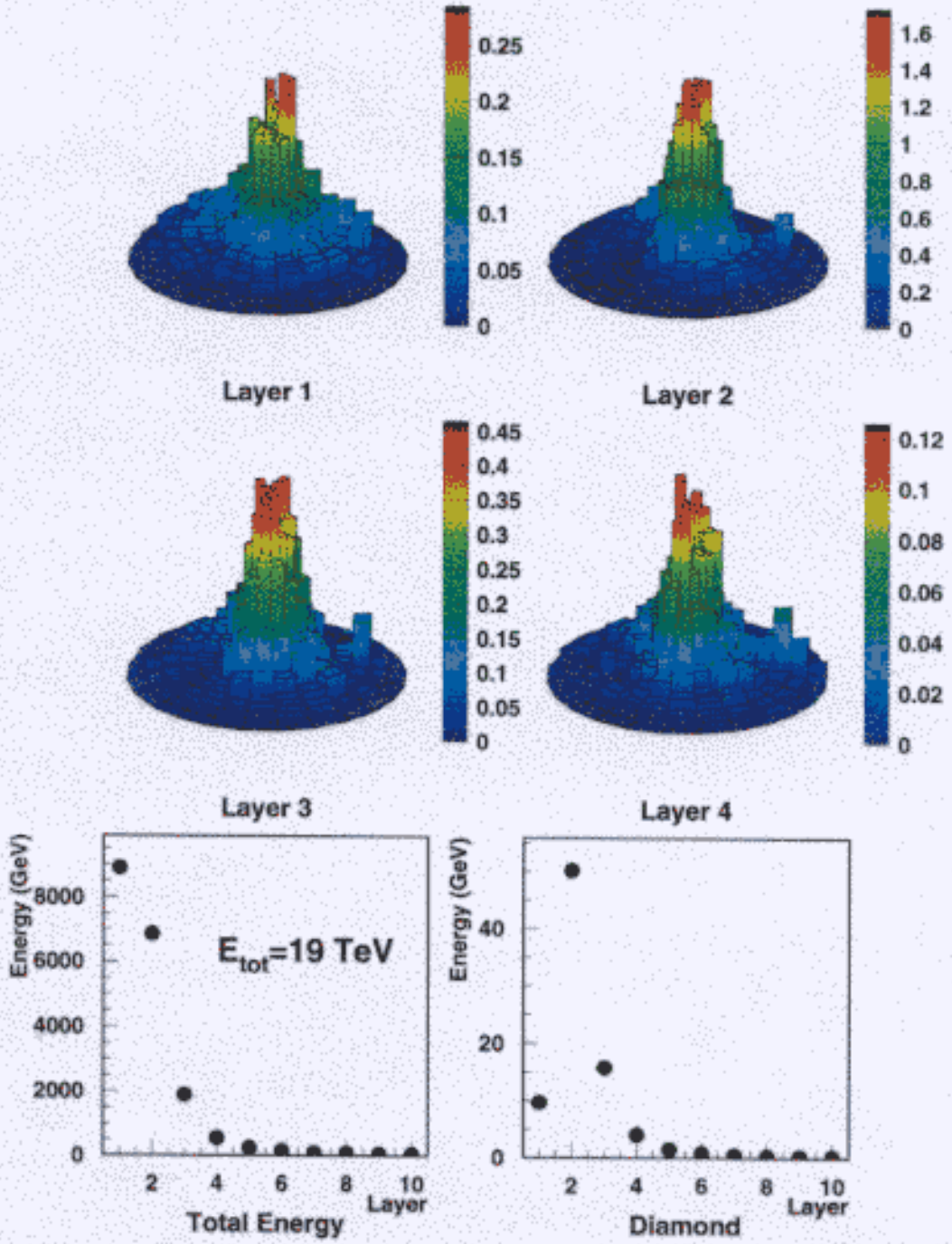
250 GeV Electron and Background

$$\theta = 18mrad$$



100 GeV Electron and Background

$$\theta = 20mrad$$



Conclusion and Outlook

Conclusion

- First iteration of a detailed design of the mask and it's instrumentation is done
- Load from beamstrahlung pairs in the mask is huge $\longrightarrow$ mask detectors must be fast and radiation hard
- LCAL design as W/Diamond calorimeter
- High energy electrons can be seen down to angles below 20 mrad.

Outlook

- Final design of LAT and LCAL has to be found (segmentation etc.)
- Performance of LAT and LCAL has to be quantified (work is in progress)