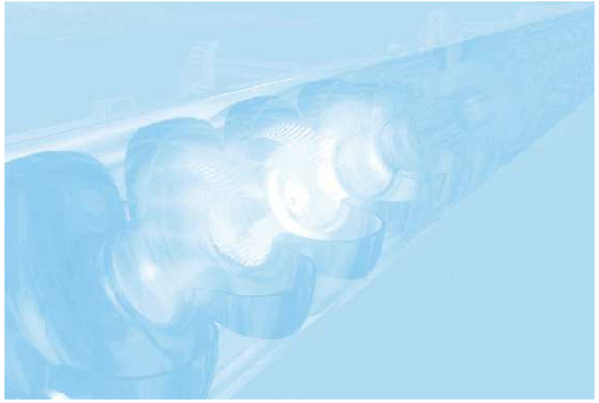
Status of BRAHMS

Vasiliy L. Morgunov

DESY, Hamburg and ITEP, Moscow



ECFA–DESY Workshop, 1–4 April 2003, Amsterdam

BRAHMS Status

BRAHMS is still under development, even through we are moving towards GEANT4

New feature in BRAHMS:

- **Separation of Simulation and Reconstruction**
- **Cleaner communication between the two: agree on a common hit format**
- **Digitization step is included**
- **Much improved visualization routines for the user**
- **Implementation of common OUTPUT format (nearly identical the SIMDET one)**

Overall BRAHMS becoming more stable.

However there still is no official release: we are waiting for the settling of the discussion on a unified hit format with Mokka and other simulation frames (see Frank Gaede presentation).

In the meantime intermediate version of BRAHMS are available on request from Ties.Behnke@desy.de

Why still BRAHMS?

Why we are still working with BRAHMS:

- **At the moment the geometry in BRAHMS is much more detailed (for the inner part) than in Mokka (although work is under way to improve the Mokka geometry)**
- **The geometry for the calorimeters in BRAHMS and Mokka is different in some details; see latter in this talk.**
- **At the moment realistic tracking is only possible with BRAHMS hits**
  - **Although a common hit format has been implemented between Mokka and BRAHMS, the digitization is not yet properly handled in Mokka hits. Tracking results are unreliable.**
- **It is expected that over the next few month a rapid improvement of Mokka and stronger reliance on GEANT 4 simulation will happen**
- **However the reconstruction for quite a while will be at best a mixture. BRAHMS simulation will be the baseline (at least for the tracker) against which results should be compared.**

New BRAHMS's Calorimeter Hits

Last BRAHMS Version – 308

New output format of calorimeter hits after simulation was implemented.

Cell size 1 cm $\times$ 1 cm $\times$ 1 sampling layer for both calorimeters.

Main part of hit containment:

1. **Geometrical keyword – compressed integer*4, unique cell attribute;**
2. **Energy deposited in cell – real*4;**

Optional information:

3. **X coordinate of hit – real*4;**
4. **Y coordinate of hit – real*4;**
5. **Z coordinate of hit – real*4;**
6. **Link to the first particle hit cell – integer*4**

Hits with 1 cm $\times$ 1 cm $\times$ 1 sampling layer can be collected into bigger electronic cells, in particular into TESLA–TDR conventional tile–HCAL cell structure.

Digitization

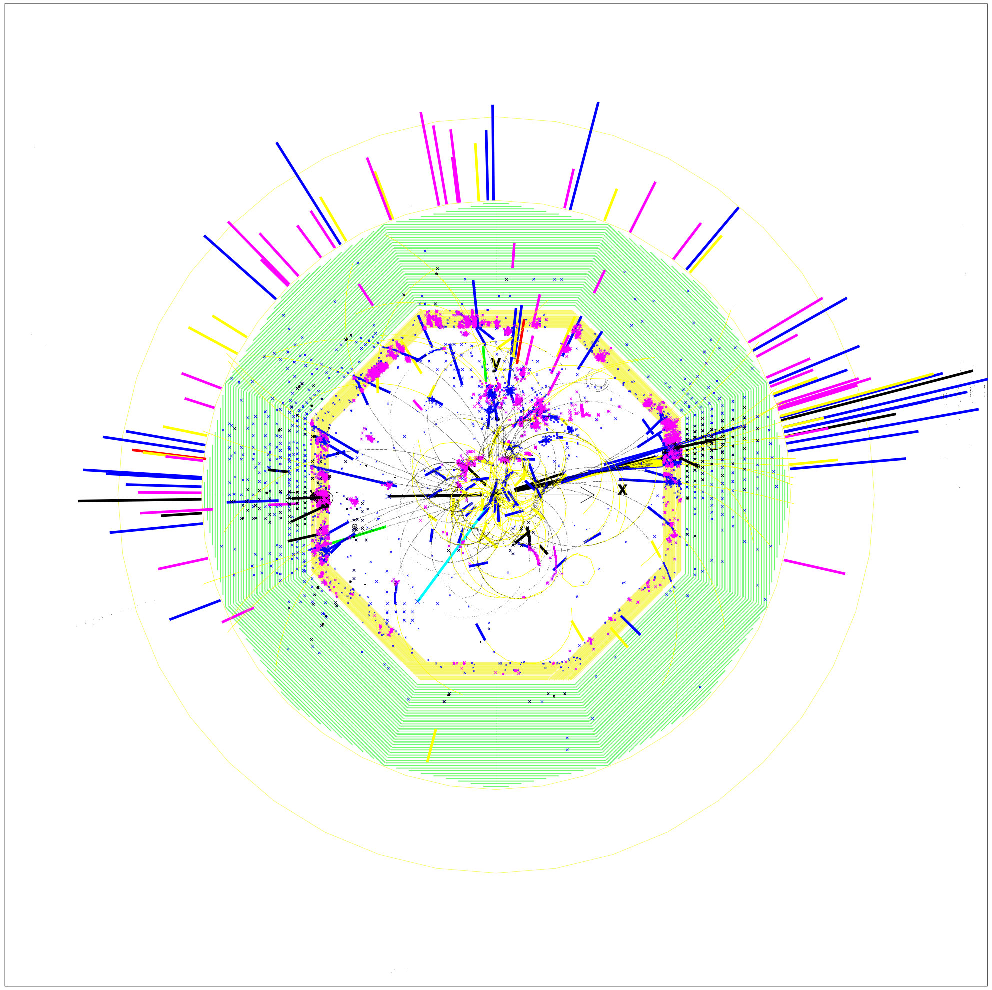
New logical division included in BRAHMS.

Instrumental effects can be placed here for further investigation,

such as tile noneuniformity, photodetector noise, ADC dynamic range, ...

Particle–Flow Visual Representation

Final reconstructed four–vectors at IP are moved at the cylinder surrounding calorimeter.



$$e^+e^- \rightarrow t\bar{t}; \quad E_{CM} = 500\ GeV$$

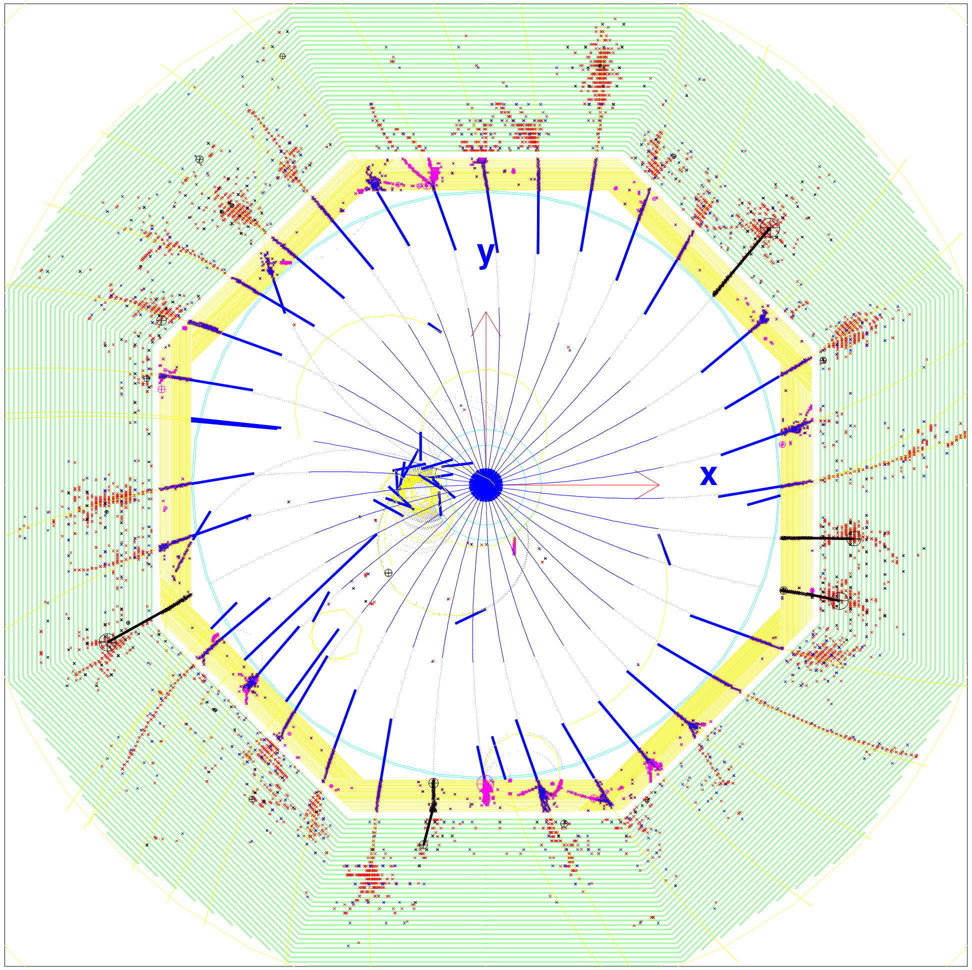
Thanks to Karsten Buesser.

BRAHMS can Read and Reconstruct Mokka Simulated Events

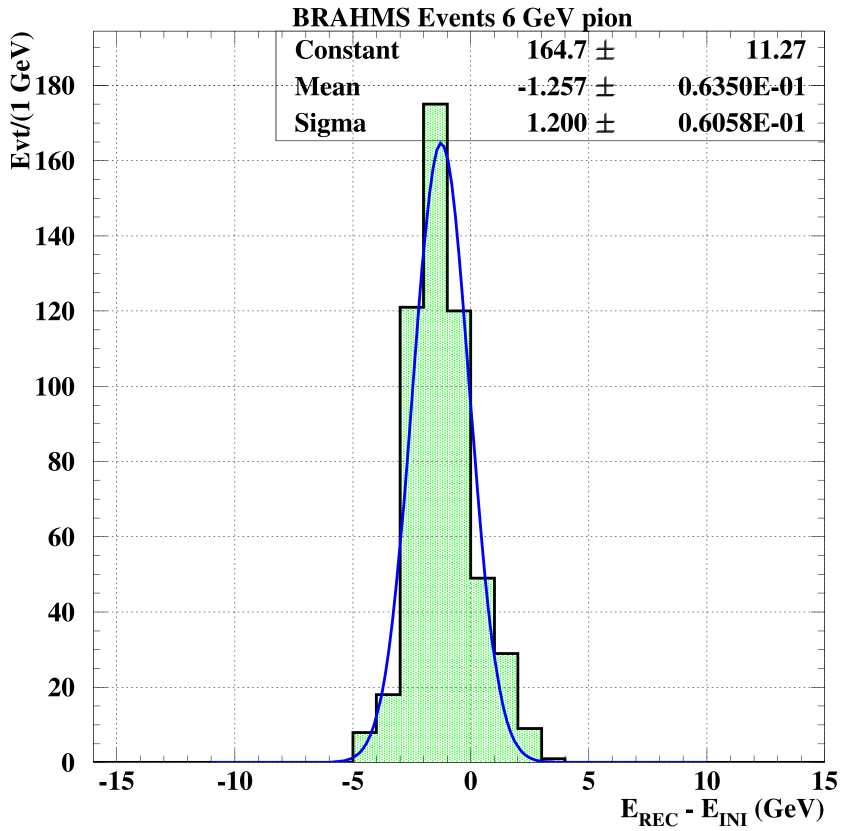
Thanks to Frank Gaede

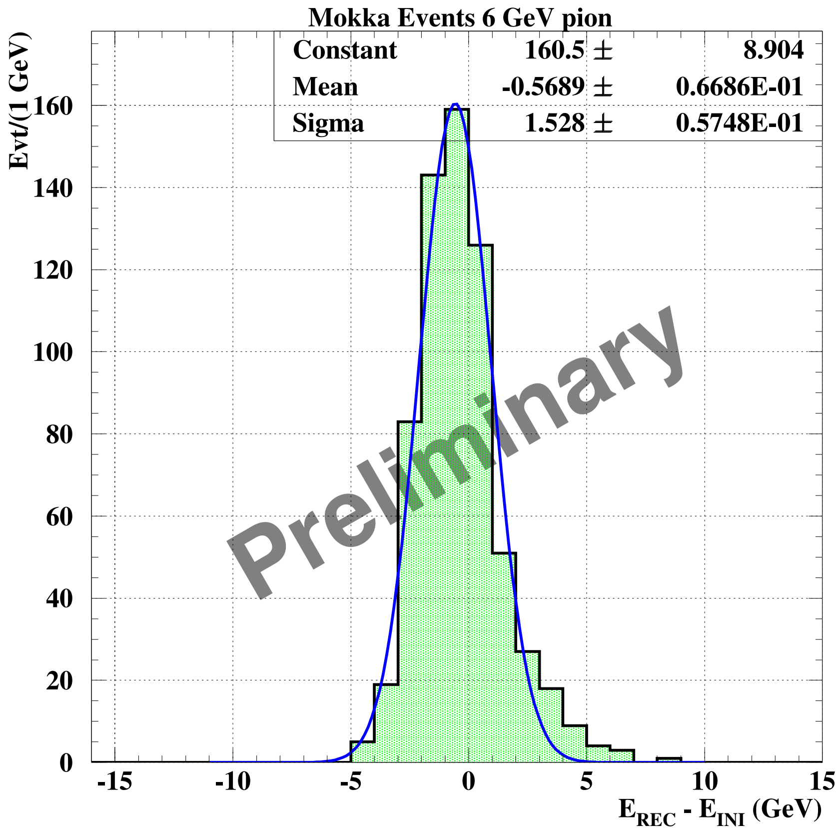
New Output from Mokka

Pion scan



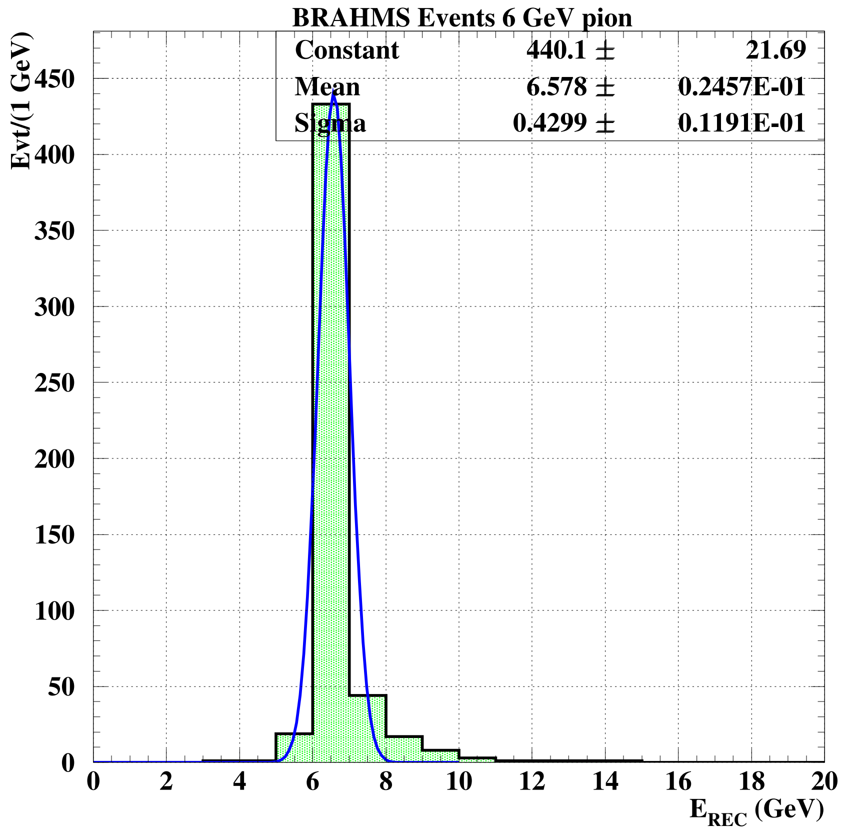
Individual Pions in BRAHMS and Mokka Detector

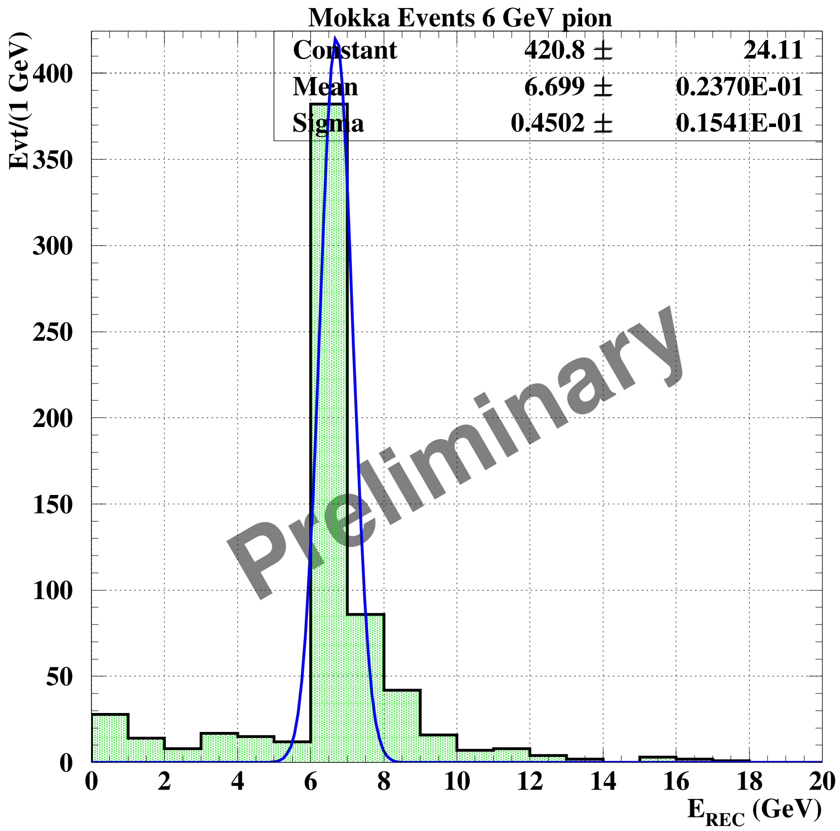




Reconstructed Calorimeter Energy

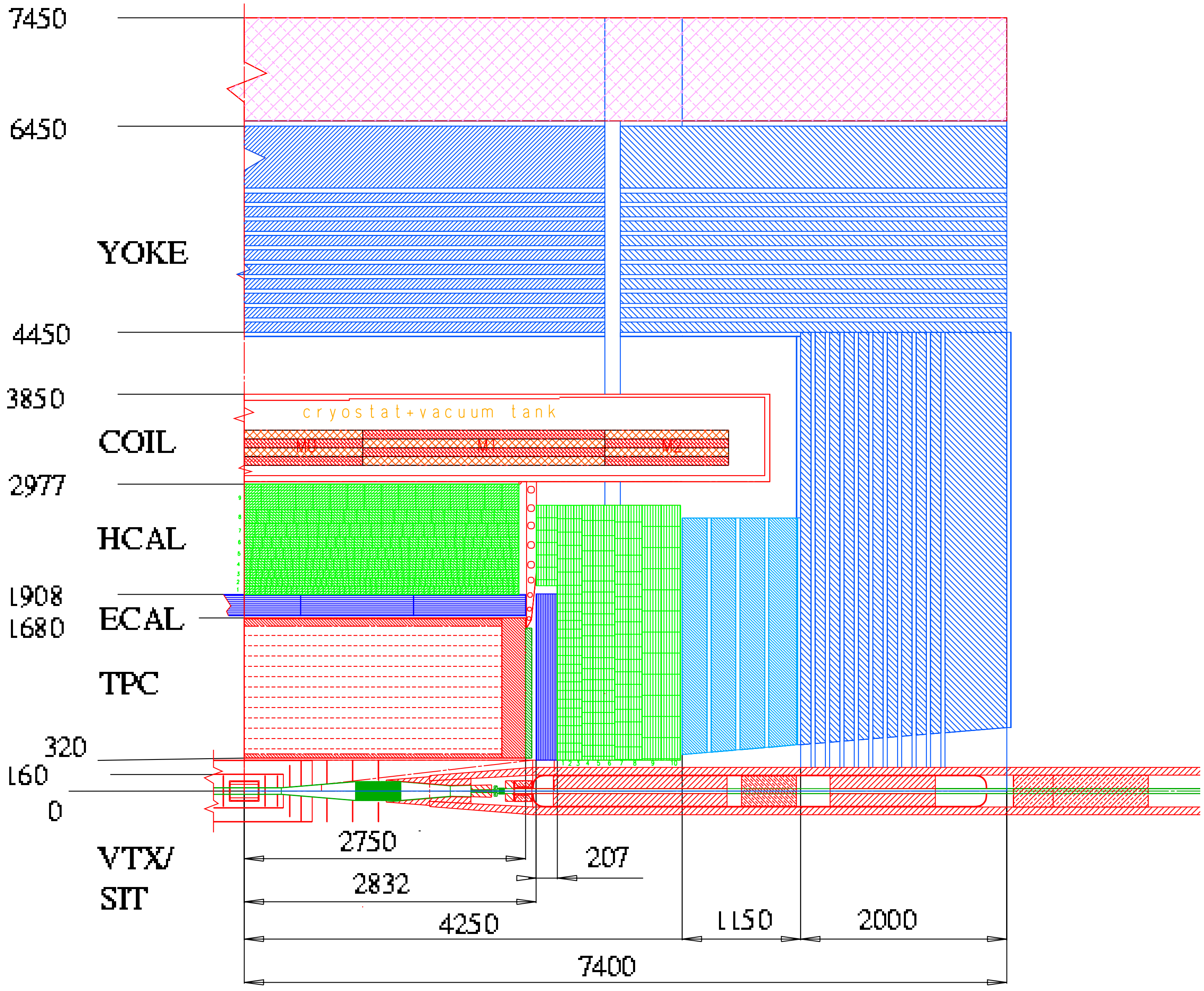
Individual Pions in BRAHMS and Mokka Detector



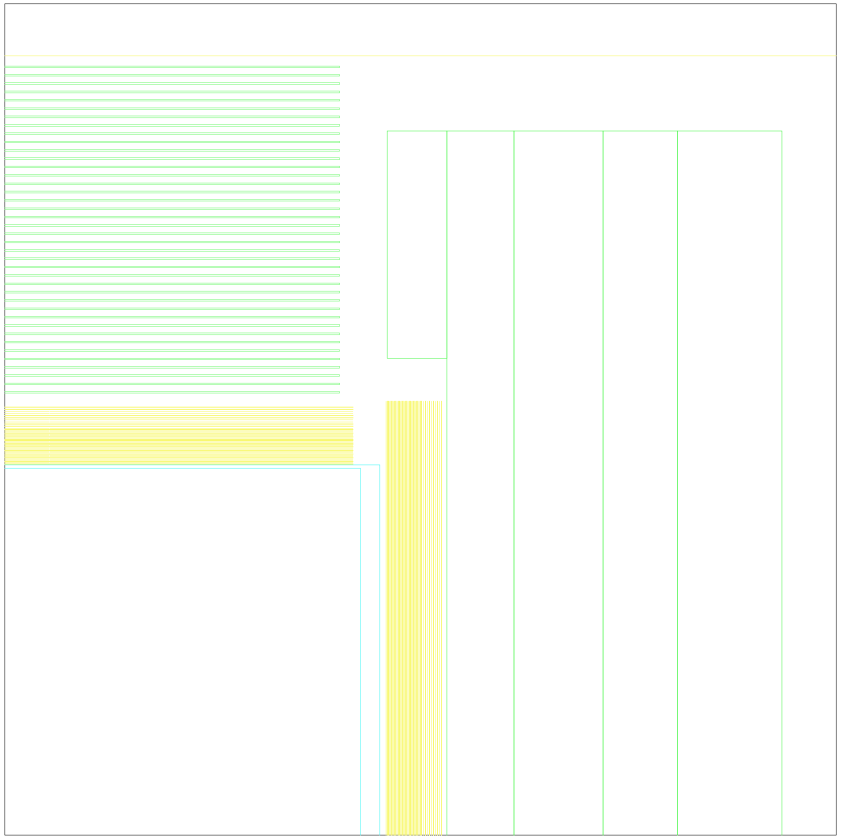


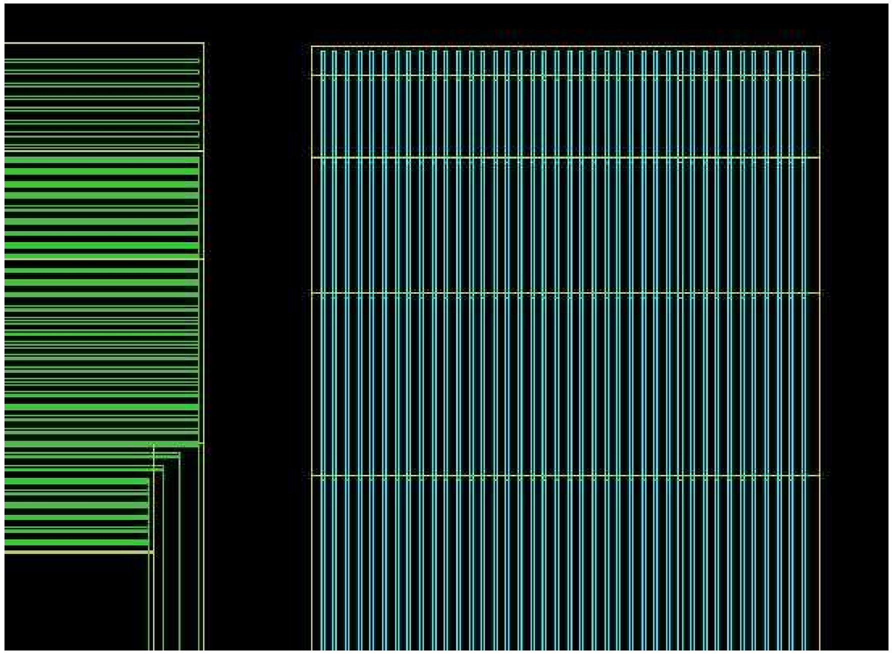
Energy–Flow Algorithm Applied

TESLA TDR Detector Geometry



BRAHMS and Mokka Calorimeter Geometry





Conclusion

Work is in progress ....