



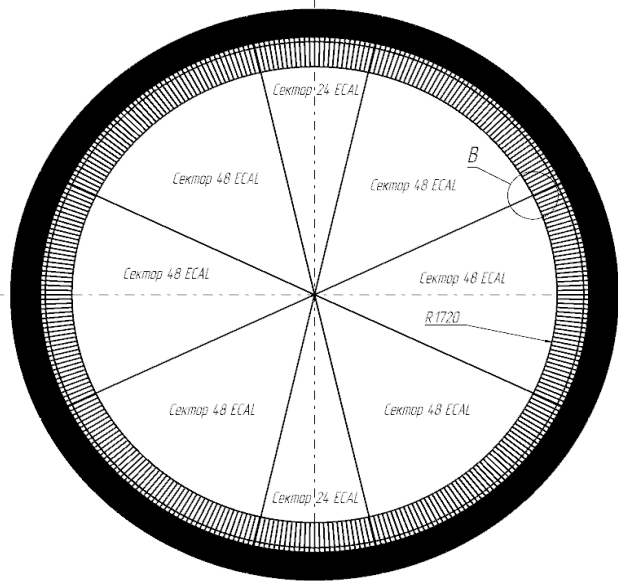
# Studies of the Electromagnetic Calorimeter with projective geometry for the MPD/NICA

*Boyana Dabrowska*

*I.Tyapkin, M.Martemyanov, V. Kulikov, A.Zinchenko and group of ECal/MPD*

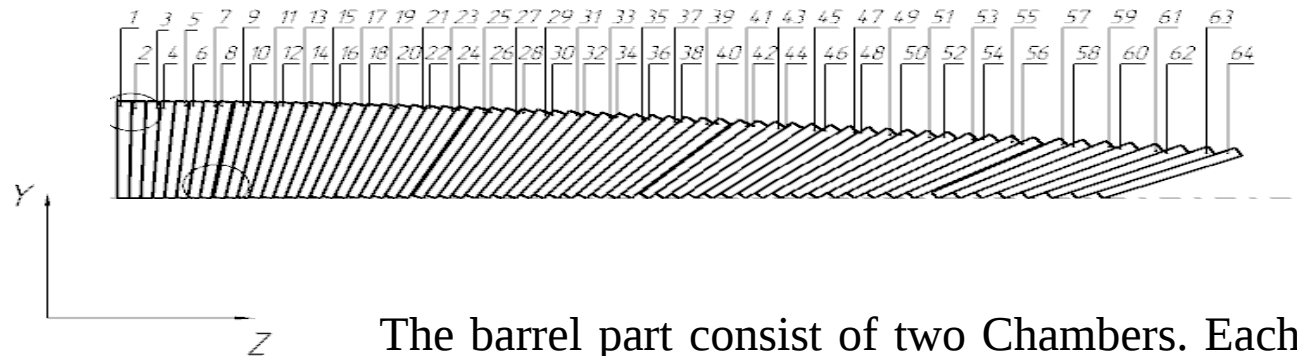
# Monte Carlo simulations

## Geometry in MpdRoot



## EMC module

- ✓ Total number of modules : 43008
- ✓ Each module has 221 Pb ( $h = 0.3$  mm) plates and 221 FscScint ( $h = 1.5$  mm)
- ✓ Module is fixed by two plates on top and bottom (Kapton,  $h = 8$  mm)
- ✓ EMC geometry is stored in ROOT – file ([emc\\_v2.root](#))



The barrel part consist of two Chambers. Each of them consist eight sectors:  
- two of them - 24 modules in Phi plane;  
- six of them - 48 modules in Phi plane;  
Every row in sector composed with 64 modules in Theta plane.

## Two types of digitizers and cluster methods in MpdRoot:

- I type* - Classes made by Maxim Martemyanov (from group of ITEP);
- II type* - Classes made by Alexander Zinchenko (JINR);

### Digitizer

**I type:** Use special function which relates point to the corresponding module by minimal angle between module axis and direction to the point and merges all points in active element to hit.

**II type:** Use GeoManager class.

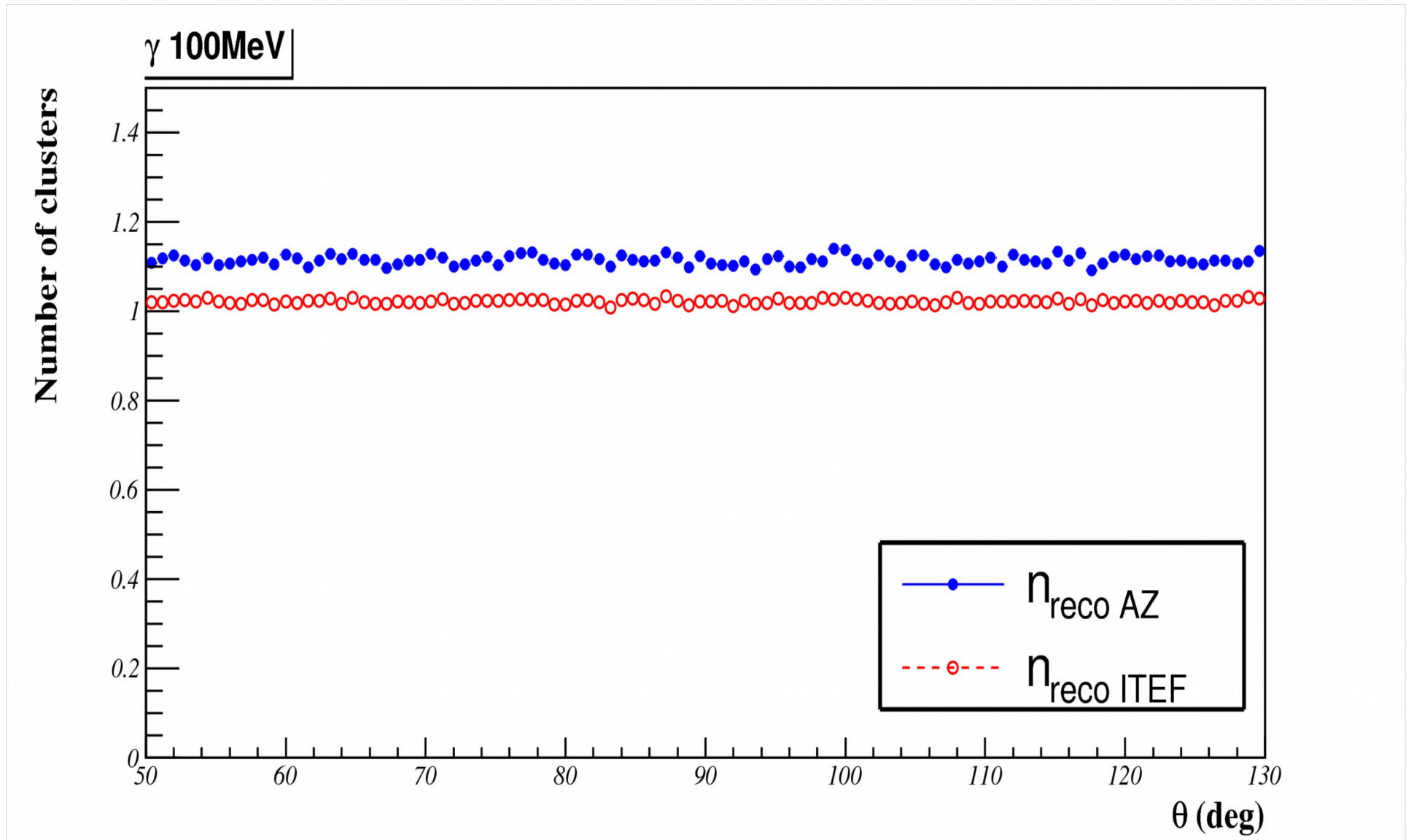
### Cluster method

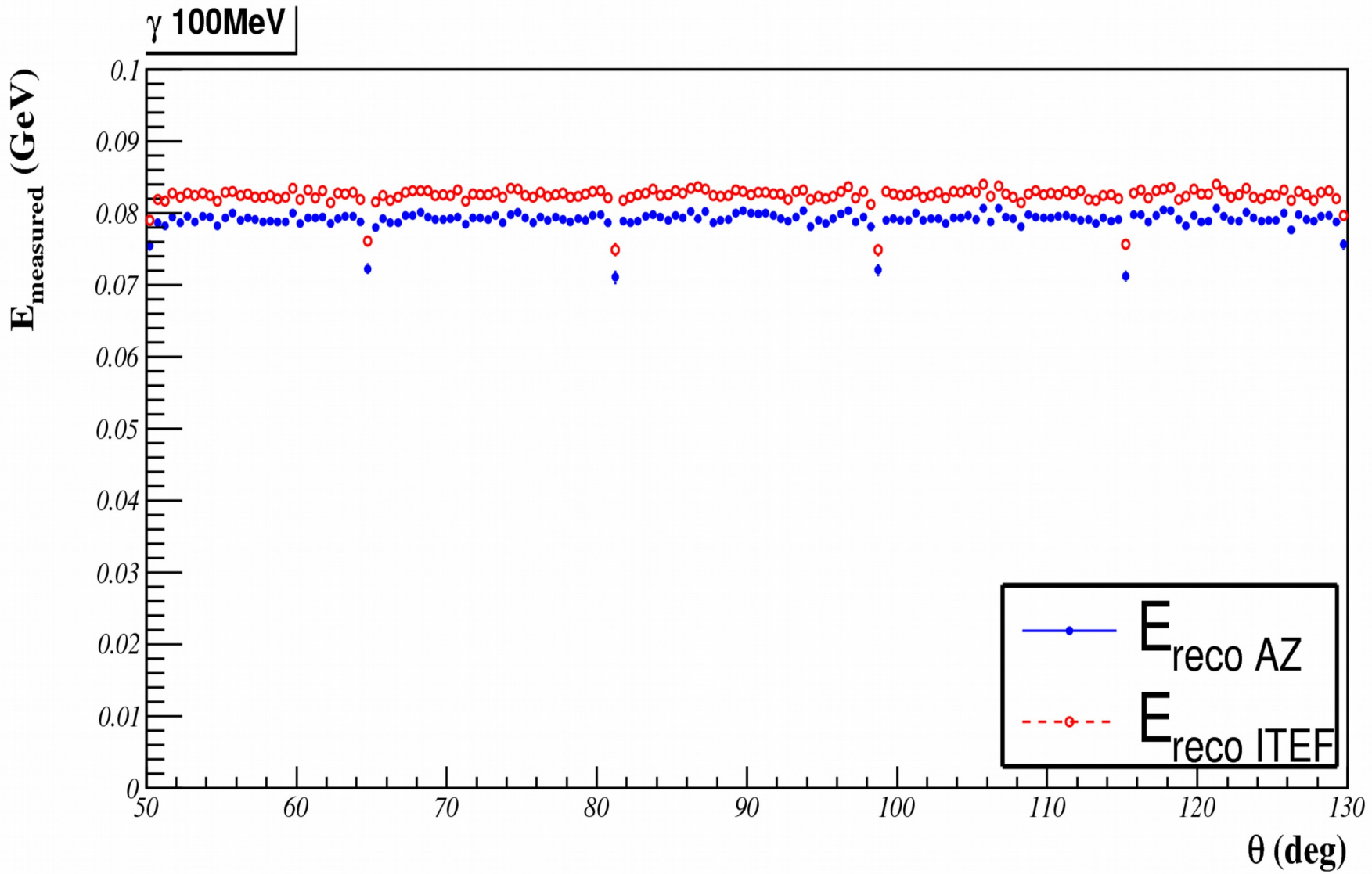
**I type:** Algorithm is merging hits into cluster around hit with maximal energy. It's based on a module frame and it used nRow and nLine;

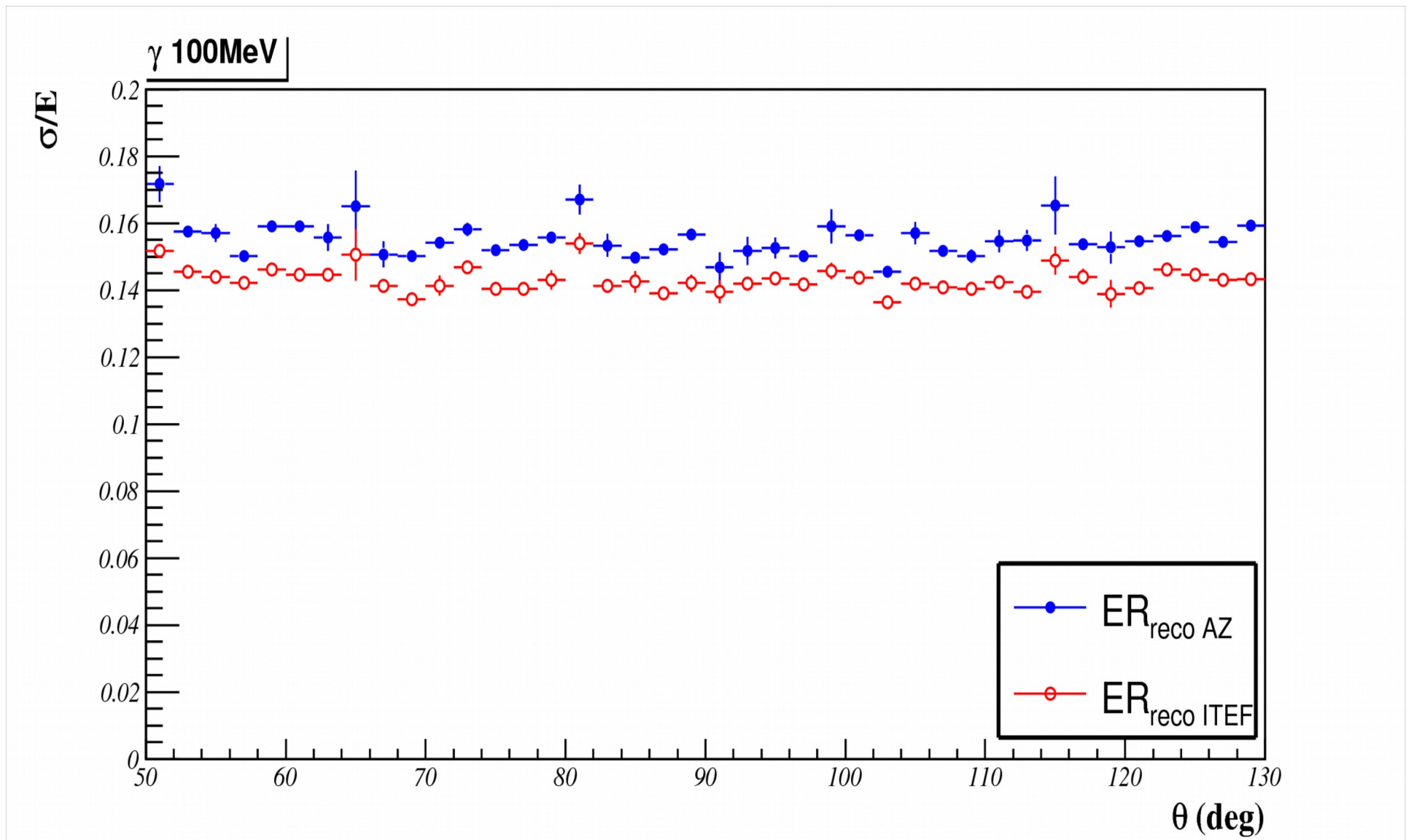
**II type:** Also algorithm merges hits into cluster around hit with maximal energy, but we have digits alongside each other.

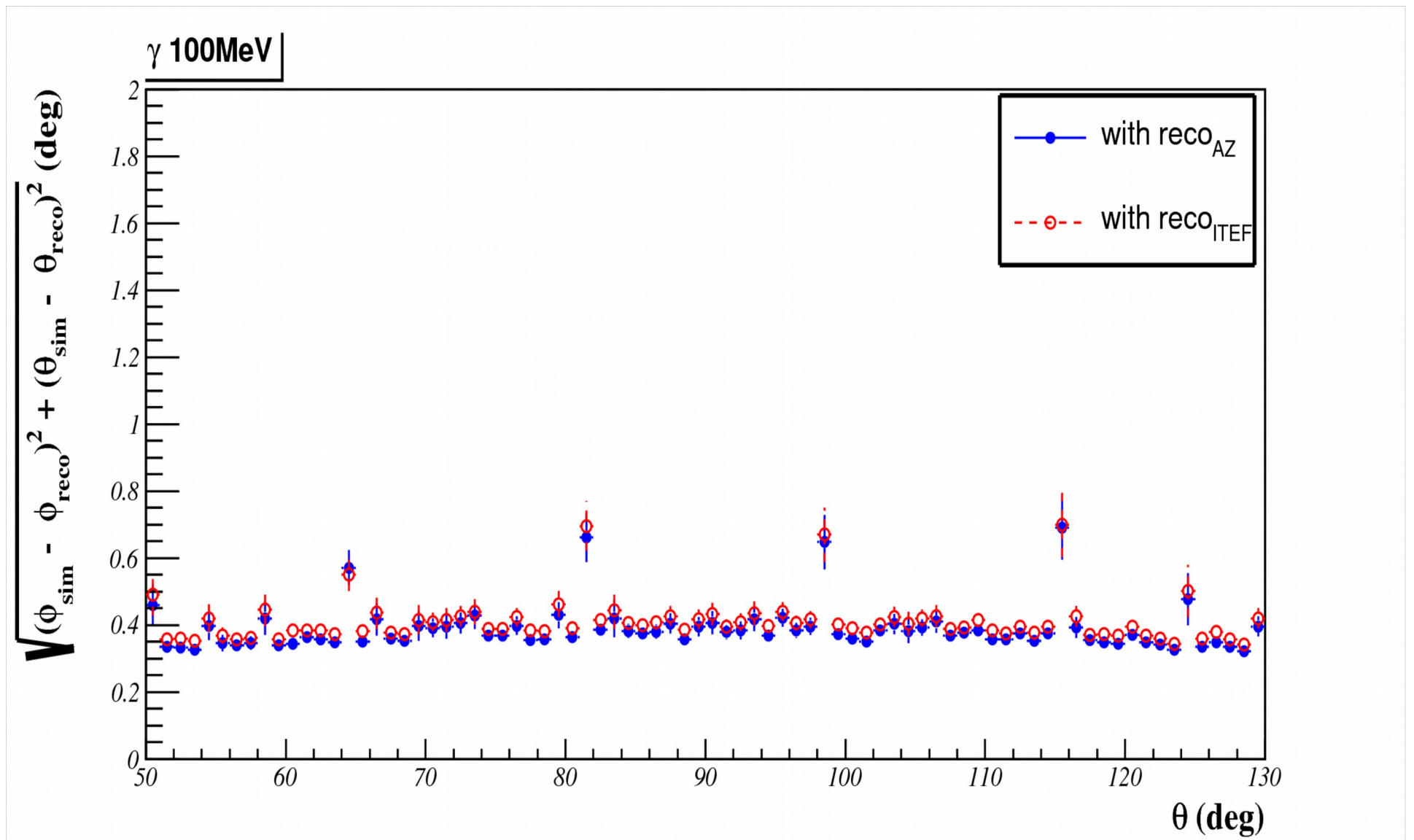
## ECal parameters checked with these two methods:

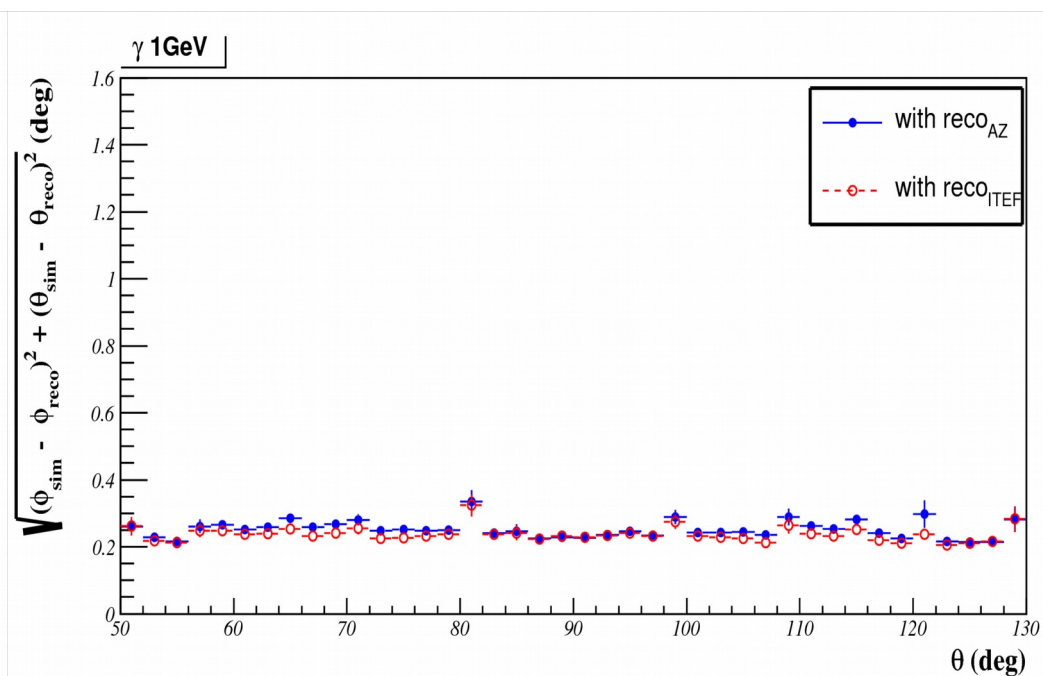
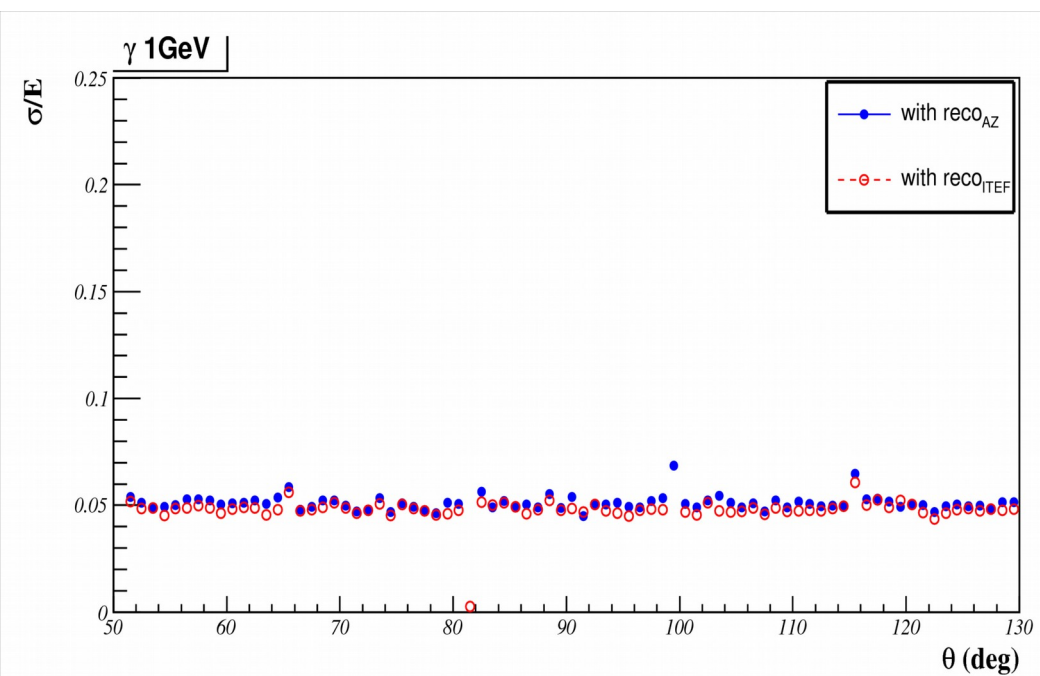
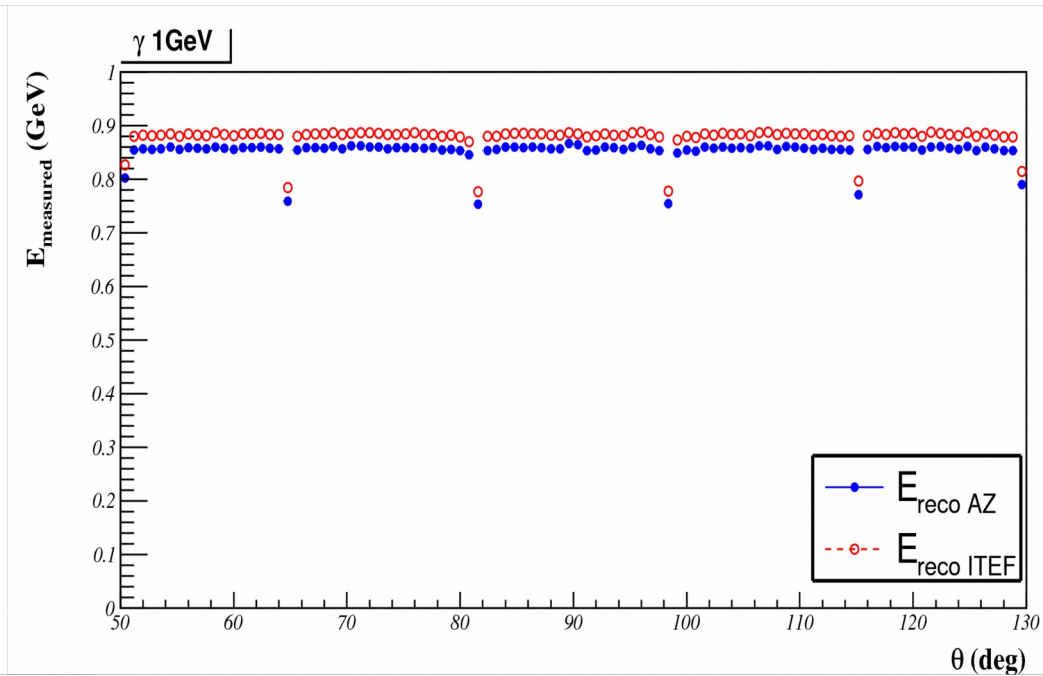
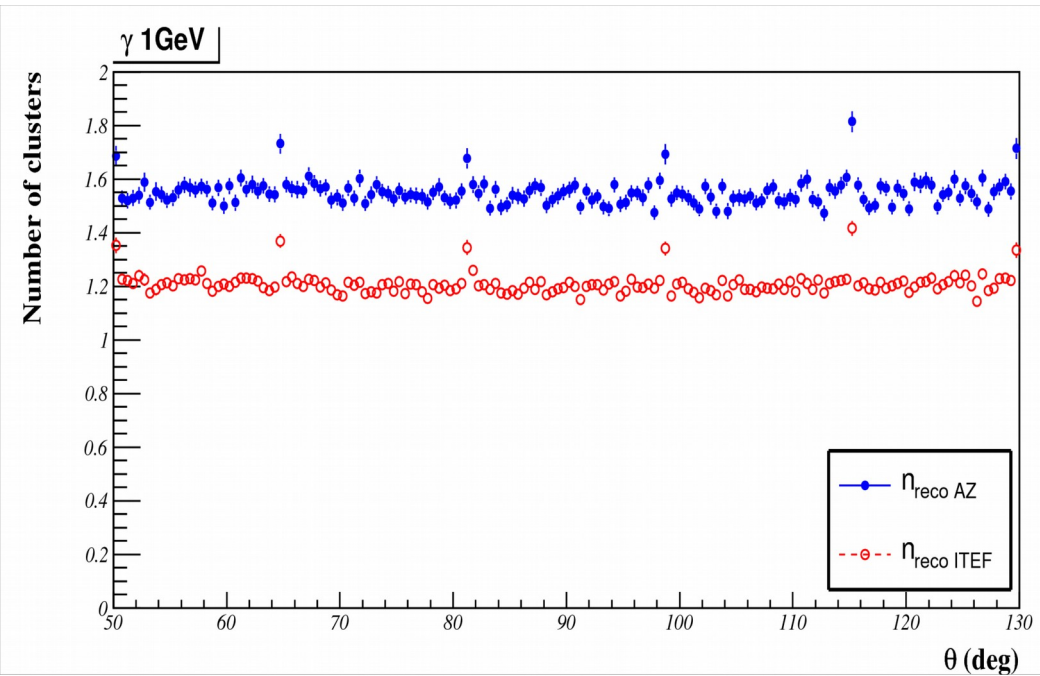
1. BOX Generator, only ECal;
2. Photons with different energy;
3. Events 100 000, with magnetic field 0.5T, Threshold > 10MeV;
4. Hit fall in azimuth angle 89.2 degree and in polar angle range  $50 \div 130$  degrees.





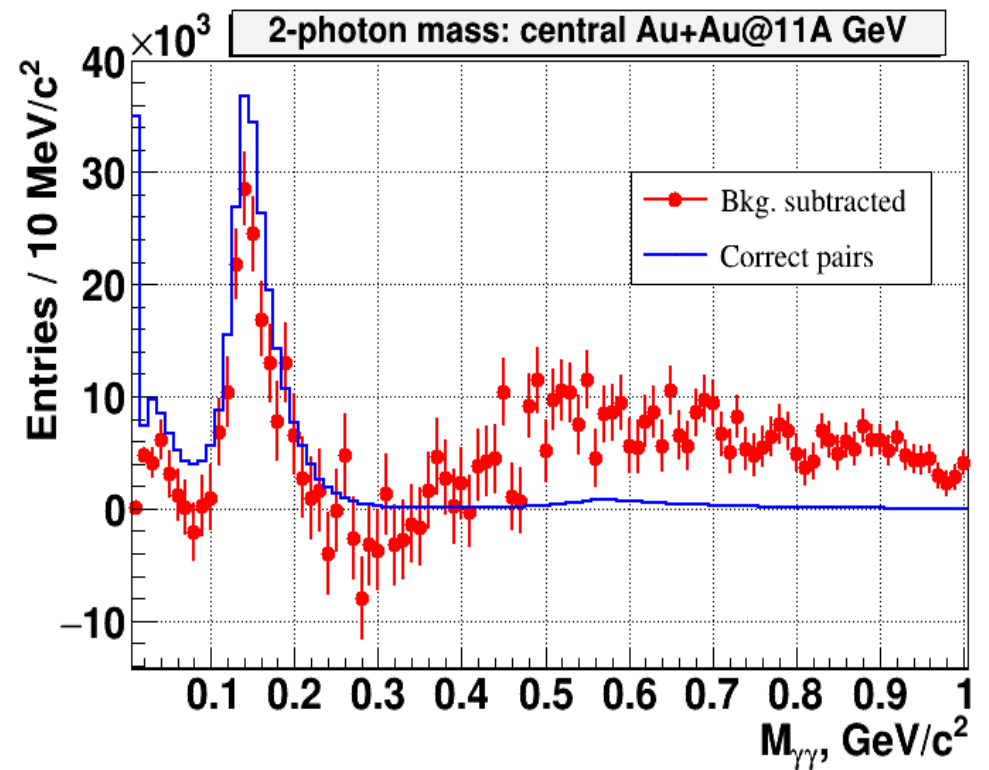
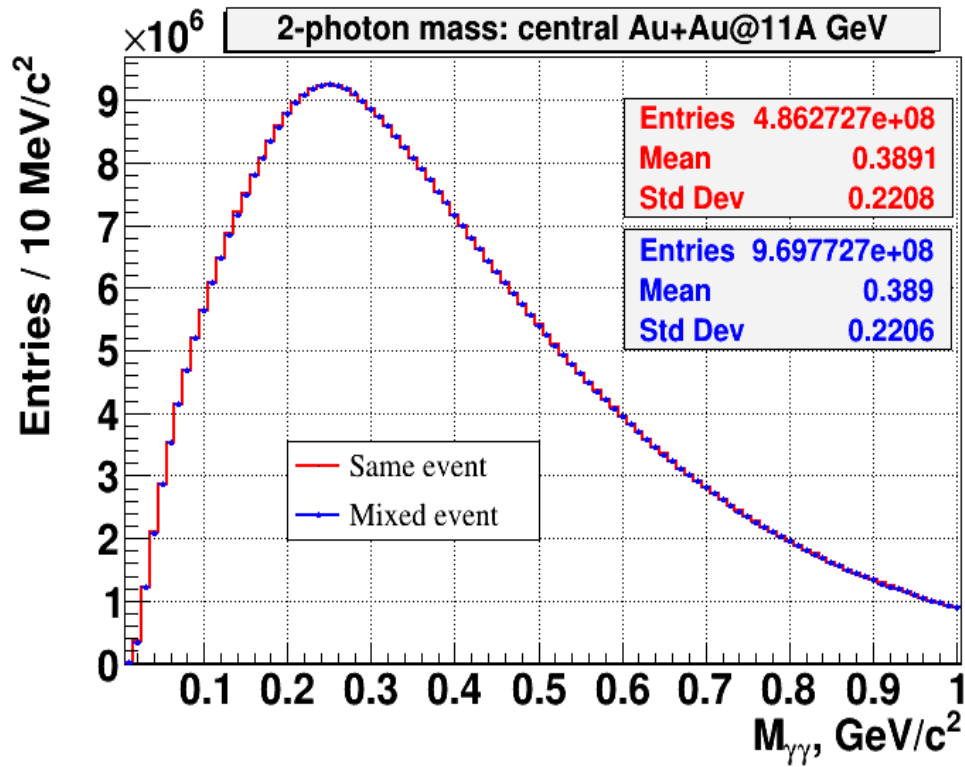








# By A. Zinchenko



## Conclusions and future steps:

1. Both of types work correctly.
2. For low energy it's better to use type I.
3. For high energy, type II is more precise.
4. Next step is to make and use *Matching class*.
5. II type already have *Matching class*.