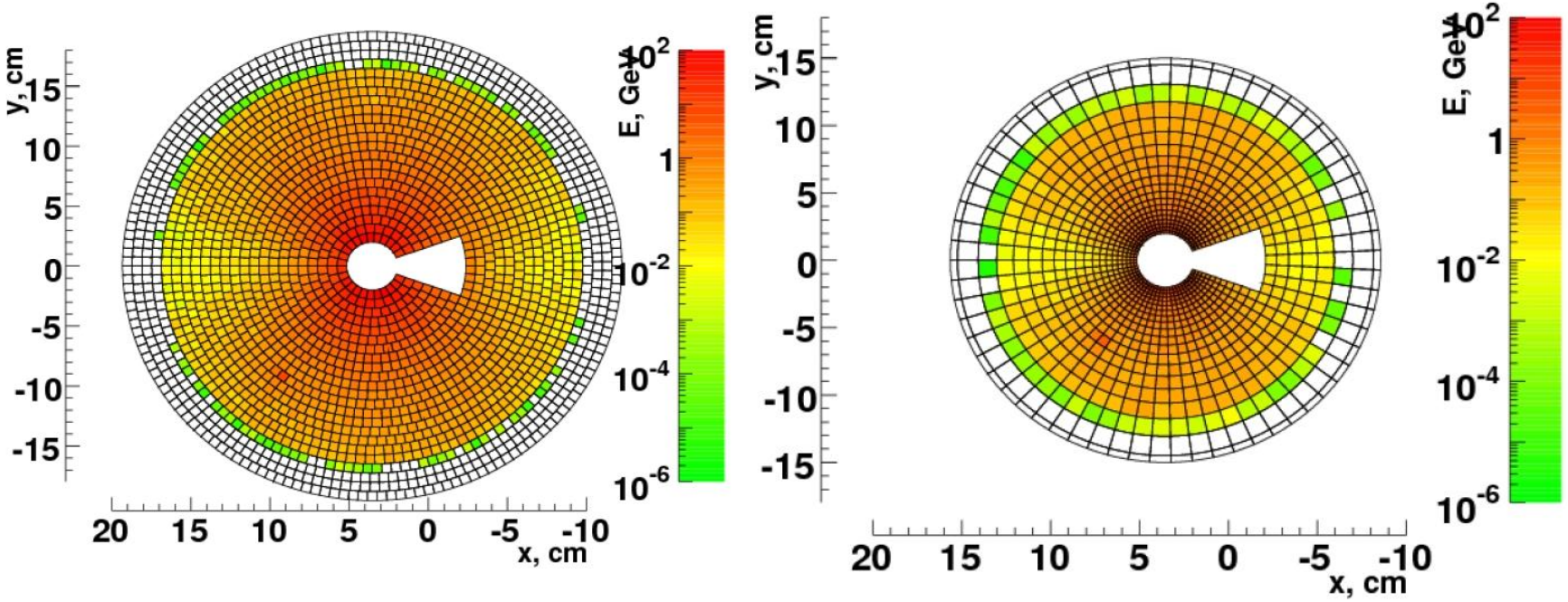
Goals

- Find bugs in program code of Beam Calorimeter Simulation tool (BeCaS) connected with wrong writing energy deposition to pads and fix it.
- Simulate Background (BG) for Uniform and Radial segmentations (US and RS), Calculate average BG and RMS
- Find the layers of maximum energy deposition for BG and showers
- Compare average BG and RMS for one layer and one angle for two segmentations (US and RS)

Correcting program code

Previous results:

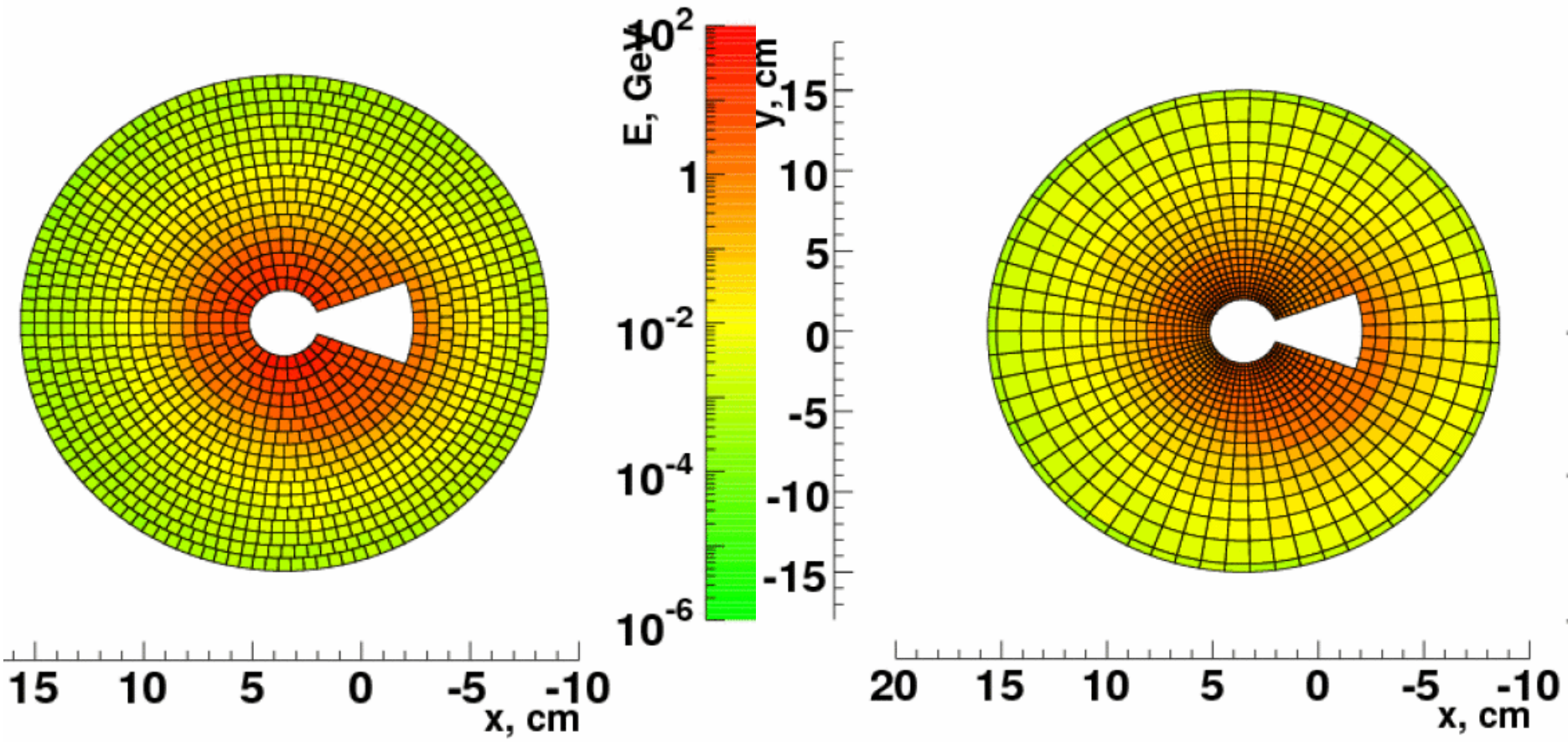


Background from one bunch(plus shower 250 GeV) for different segmentations:

- Wrong energy deposition in pads of Radial Segmentation (RS)

The reason was found in one of the program of BeCaS and code was corrected

Average Background after correction

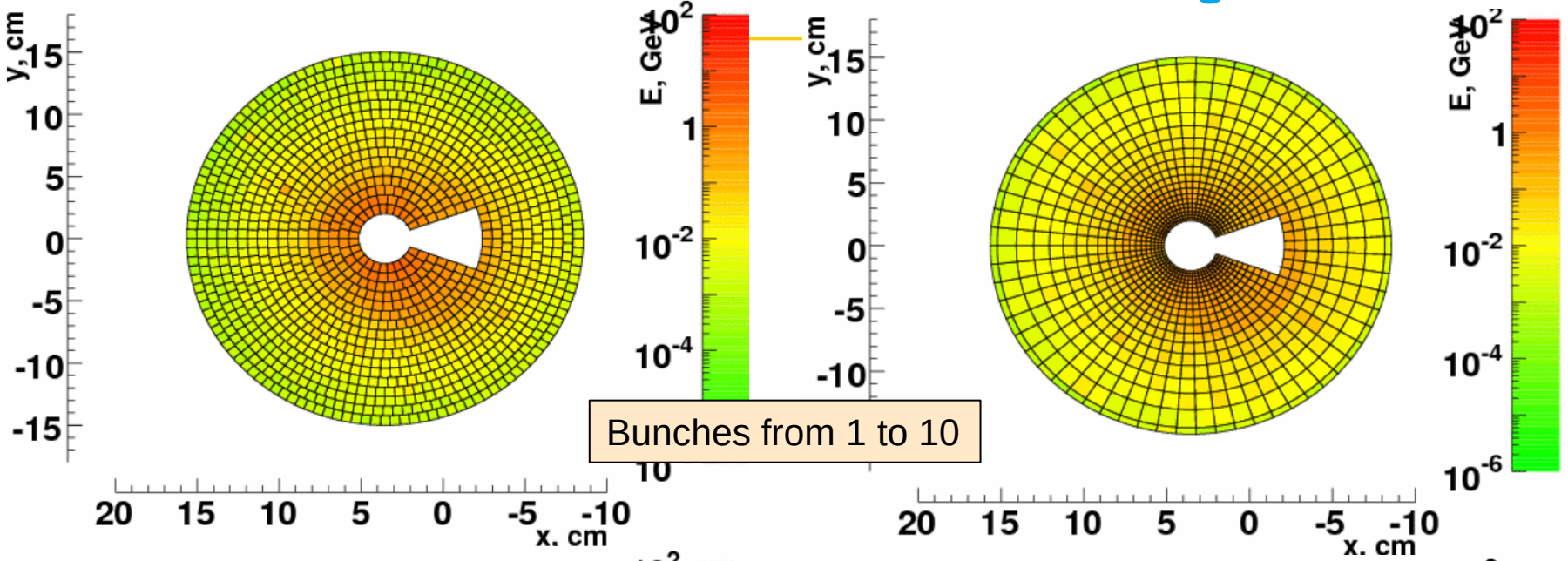


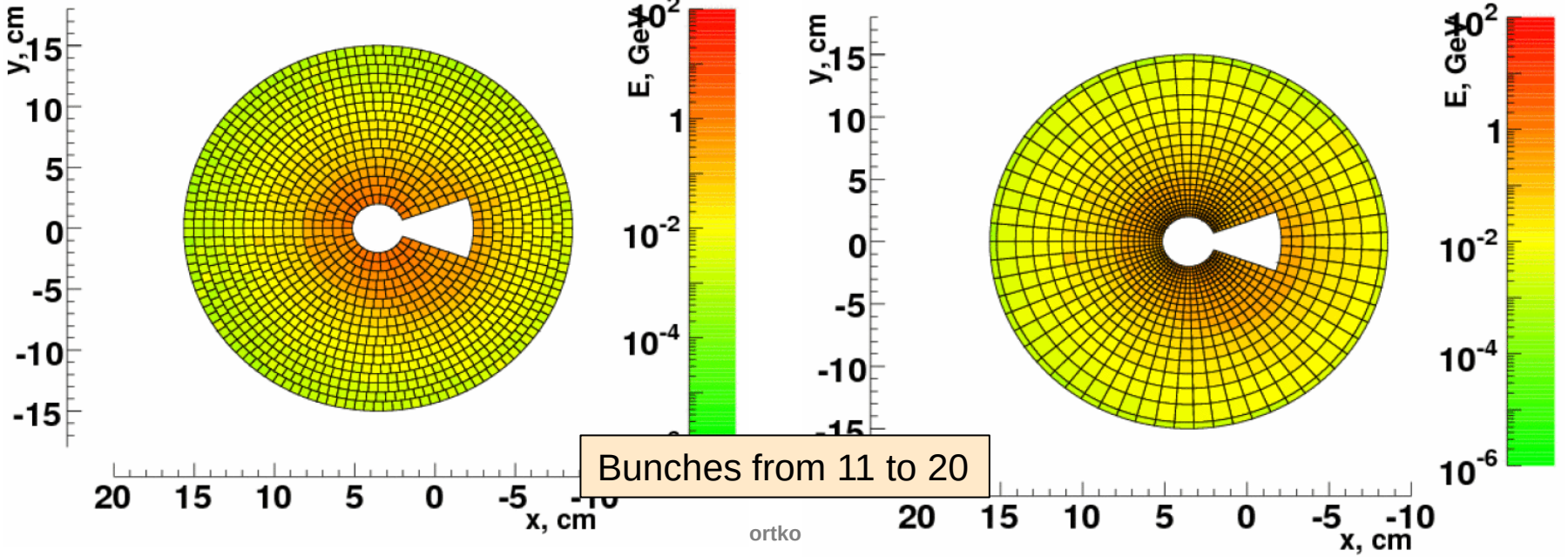
First 10 bunches were given

Average full energy deposited in all sensors in all layers for both segmentations:

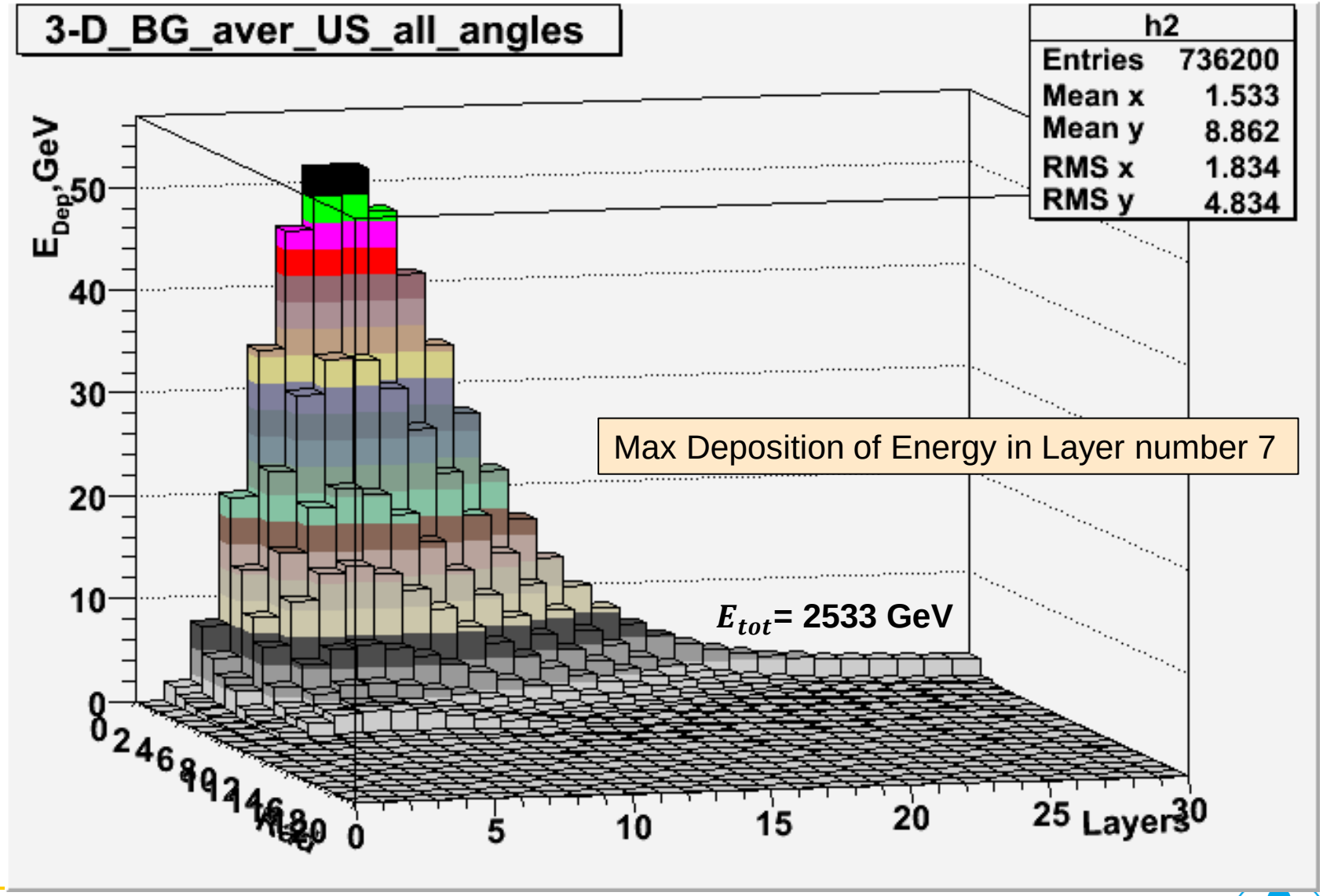
E_{tot}= 2533 GeV

RMS background after correcting

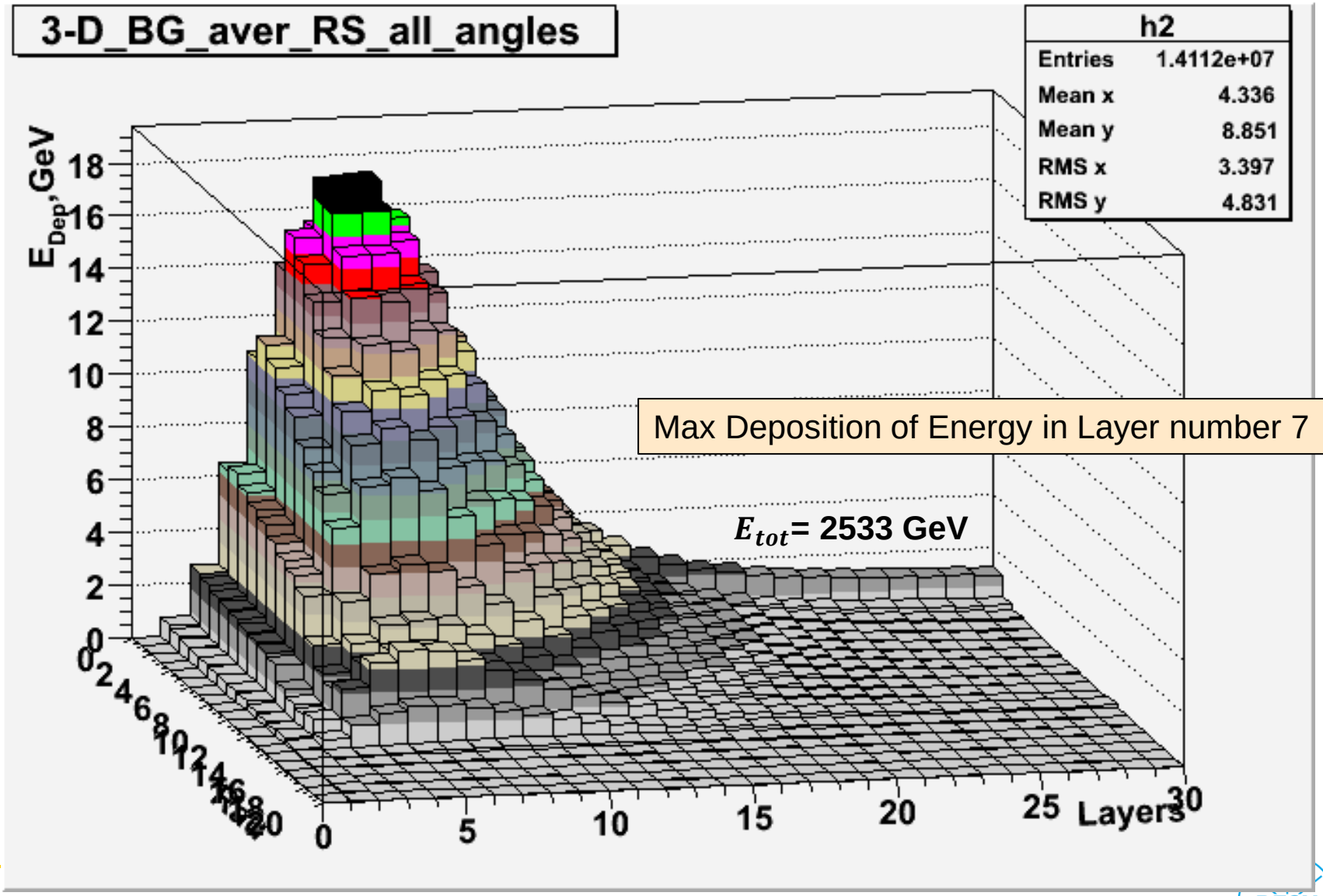




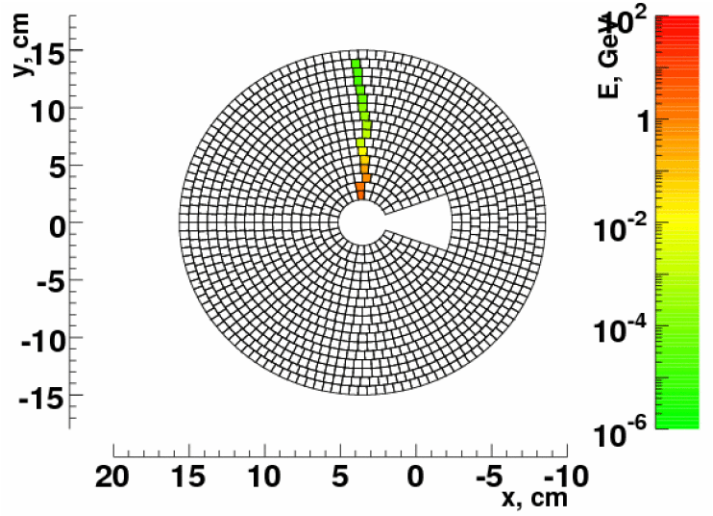
3-D Average(10 bunches) Background Uniform Segmentation for all angles

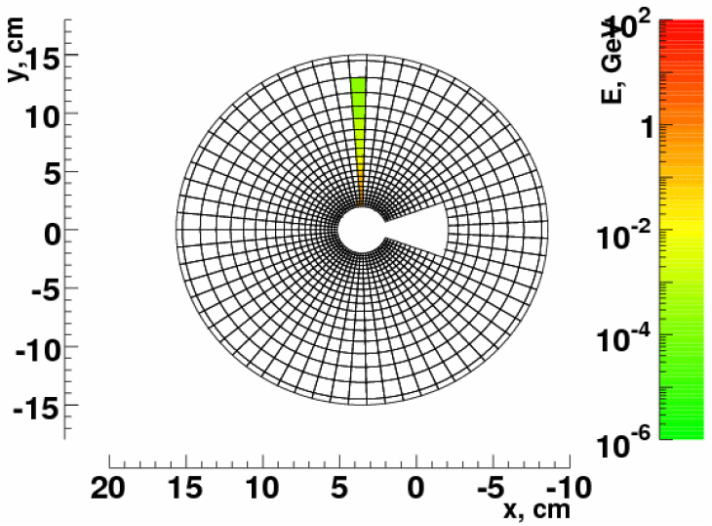


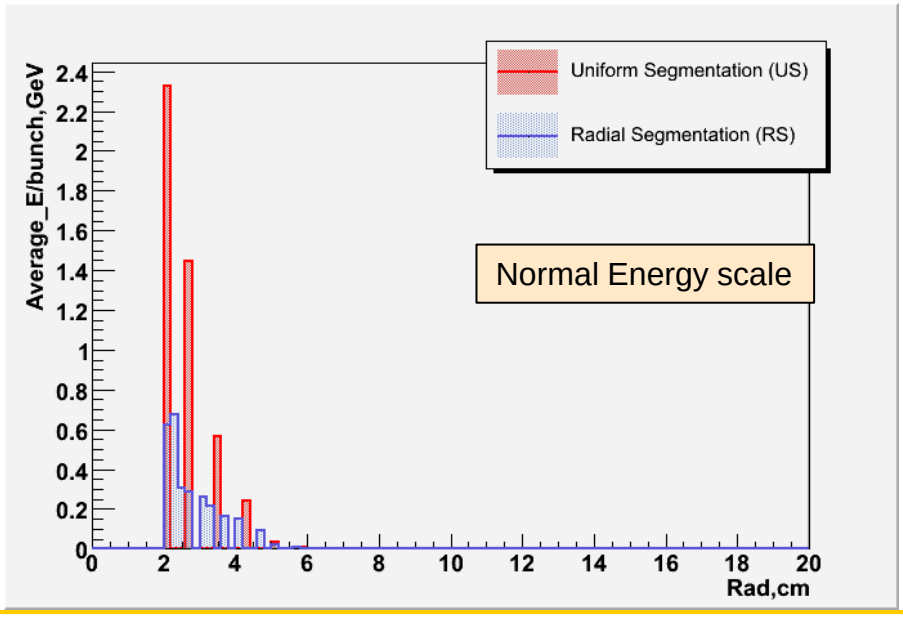
3-D Average(10 bunches) Background Radial Segmentation for all angles

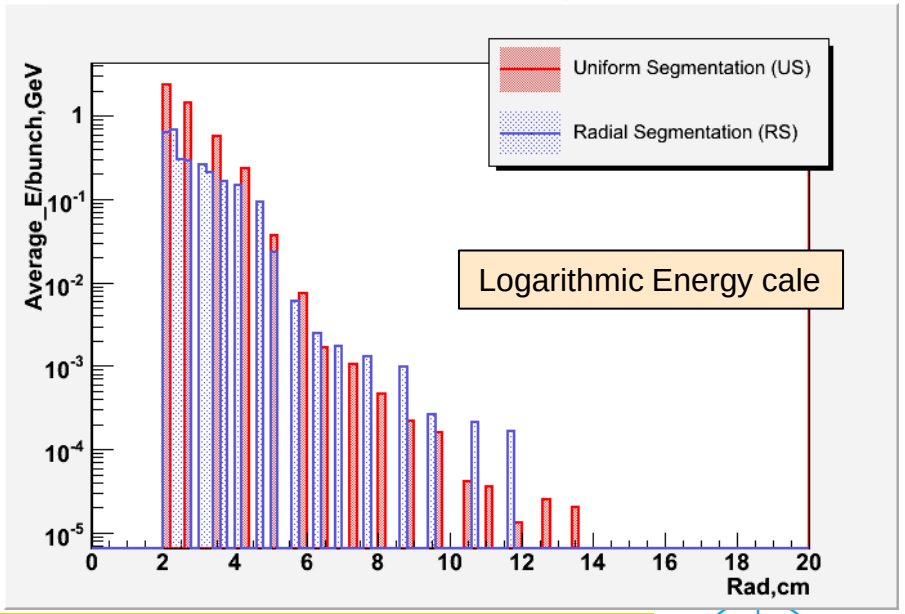


Average BG for Layer number 7 for one vertical angle

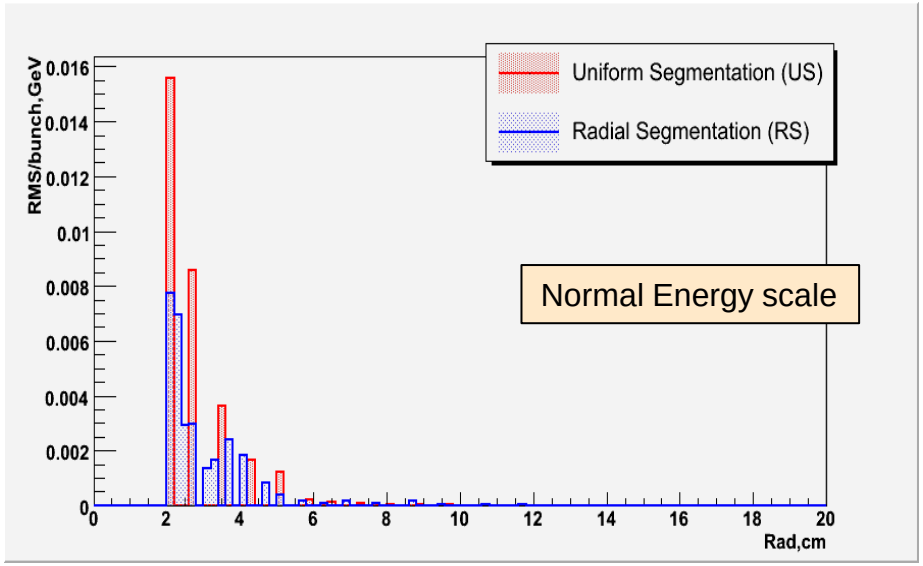


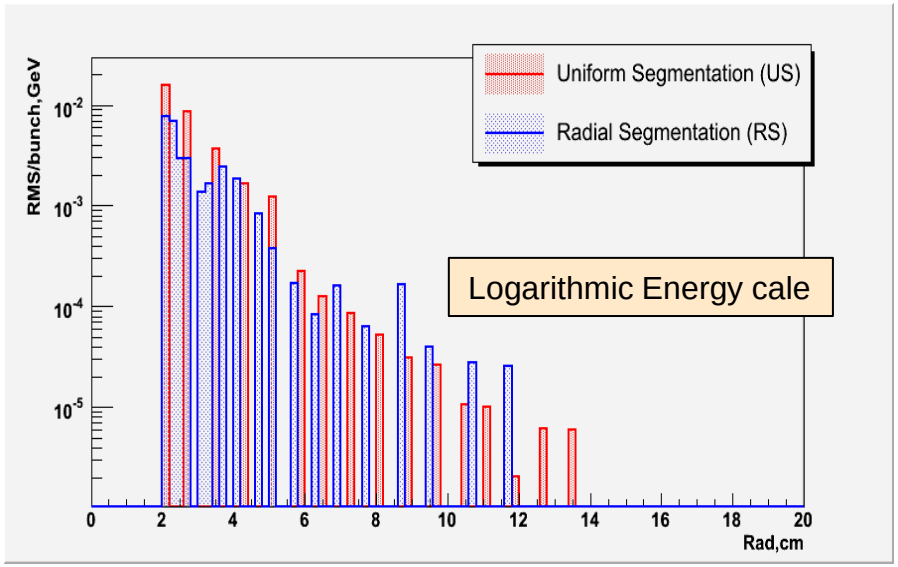






RMS for Layer number 7 for one vertical angle





-> Energy deposition average background and rms per pad for RS
much less then for US for smal radiuses -> easier detection showers there

Summary

Done:

- The errors in program codes of BeCaS were founded and fixed
- Resimulated background for uniform segmentation and radial segmentation (100 bunches for each) after BeCaS correction
- Compared average background and RMS for uniform segmentation and radial segmentation for one layer and one angle
- Can be seen advantage radial segmentation over unifrom

To Do:

- Get information for better optimization of shower reconstruction algorithm (Plot histograms with sum of average BG and showers, with different energy and different radius of showers for layers of maximum deposited energy of BG and of showers.)
- Create high energy single electrons with fixed energy for different radial and angular position (E, β_x, β_y, β_z, x, y, z) with higher probability electron enter calorimeter than it was before. Simulated them and get showers
- Improve reconstruction algorithm: look at (random_BG – average_BG) / RMS for pads of every radius
- Calculate efficiency of reconstruction algorithm for its different modifications