Occupancies of SPD ECAL for different cell energy thresholds

SPD Physics & MC Meeting

Andrei Maltsev[1]

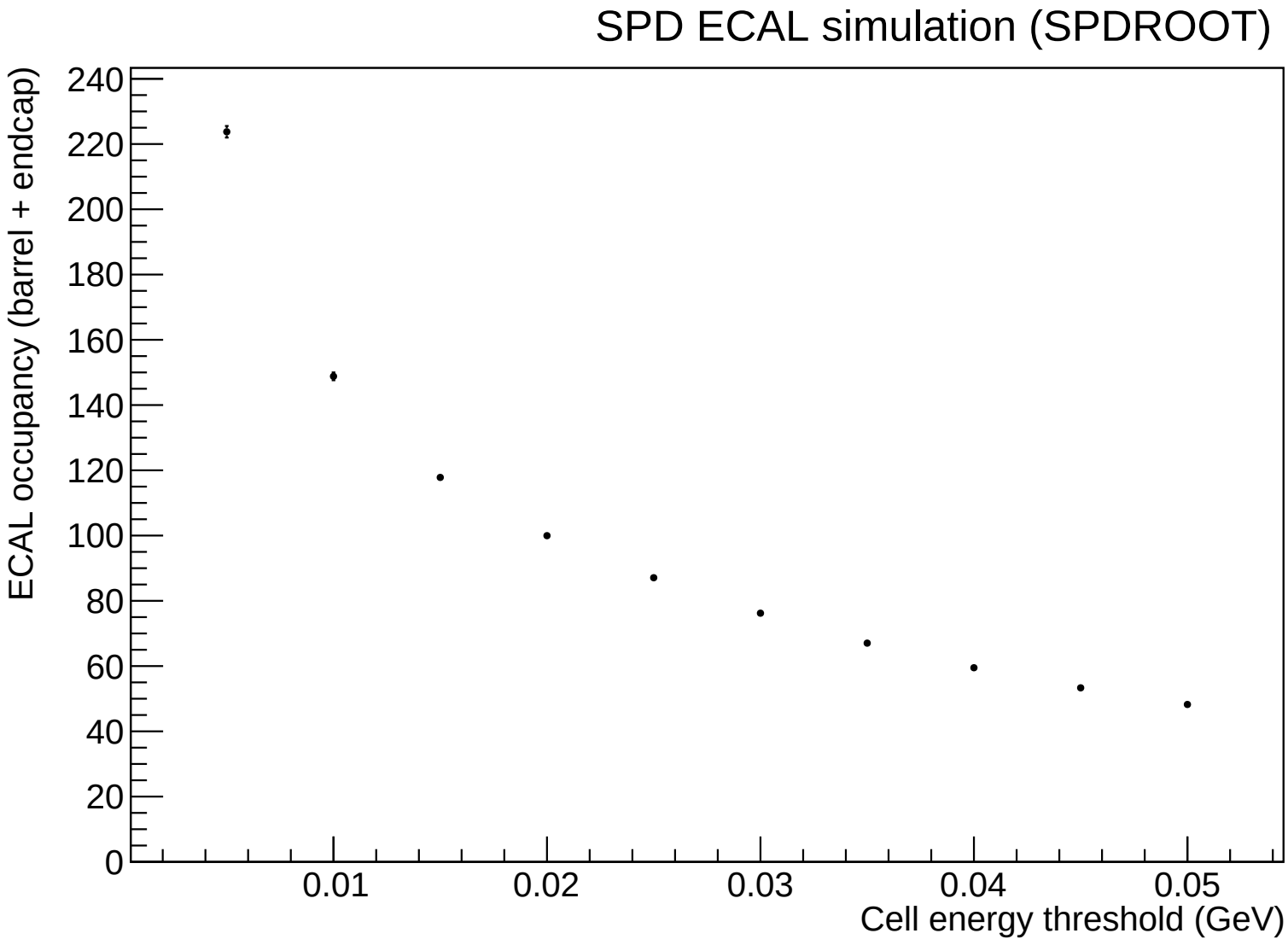
25.02.2026

[1] andrii.maltsev@cern.ch

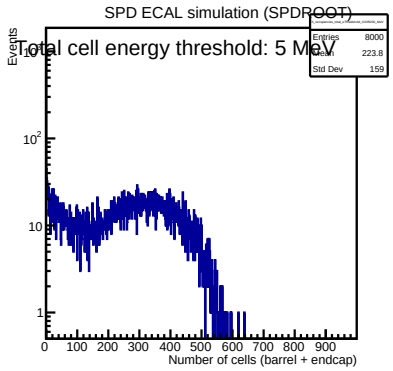
Methodology

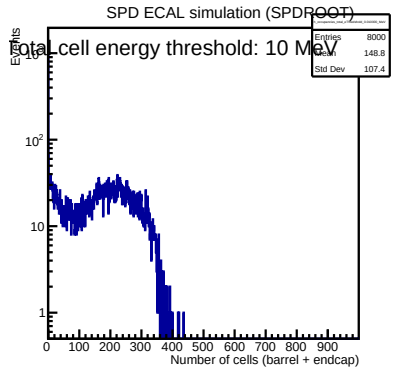
- Minimum bias production "MC2025$_{\text{S2.minbias}}$-P8-spdroot4174-dev.27GeV-UU.PROD2025"
- Occupancy = number of cells with energy above threshold
- Energy threshold: total energy in cell (lead + scintillator)
- Number of cells for each particle type also determined

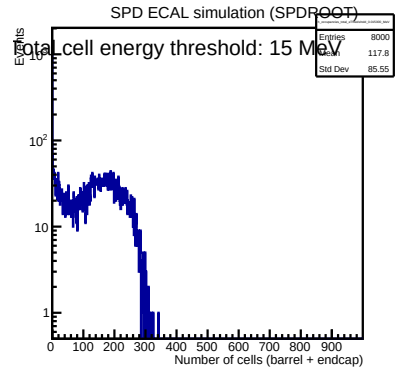
Occupancies

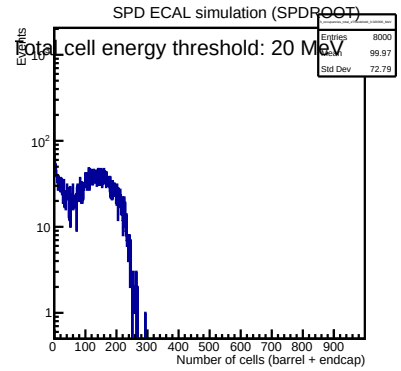


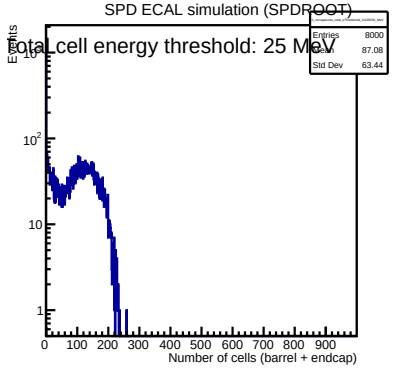
Occupancies for different energy thresholds

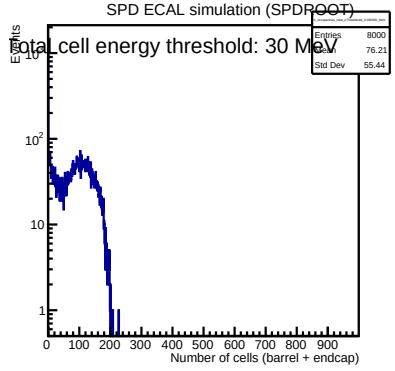


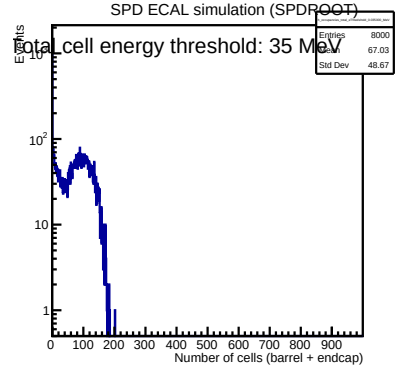


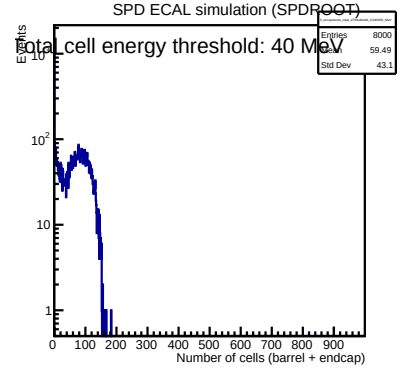


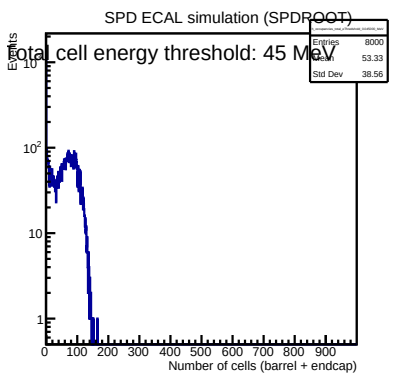


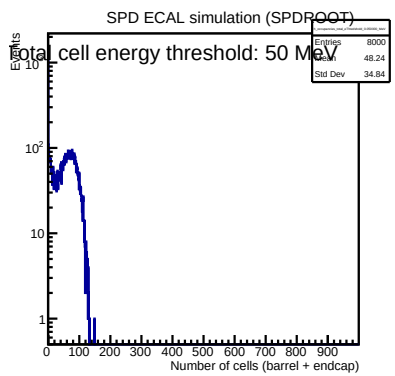


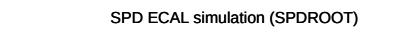


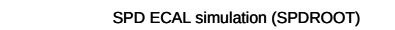




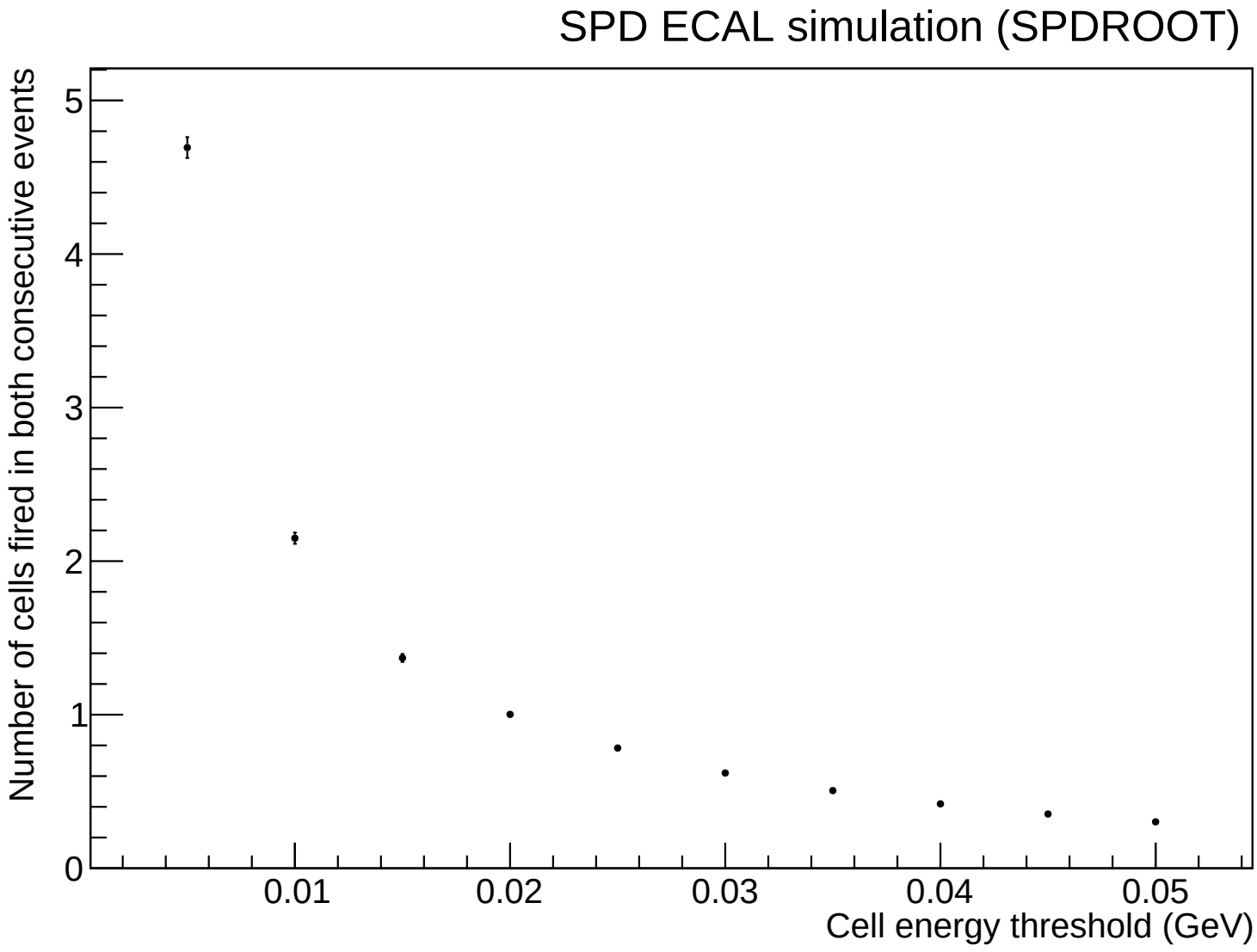




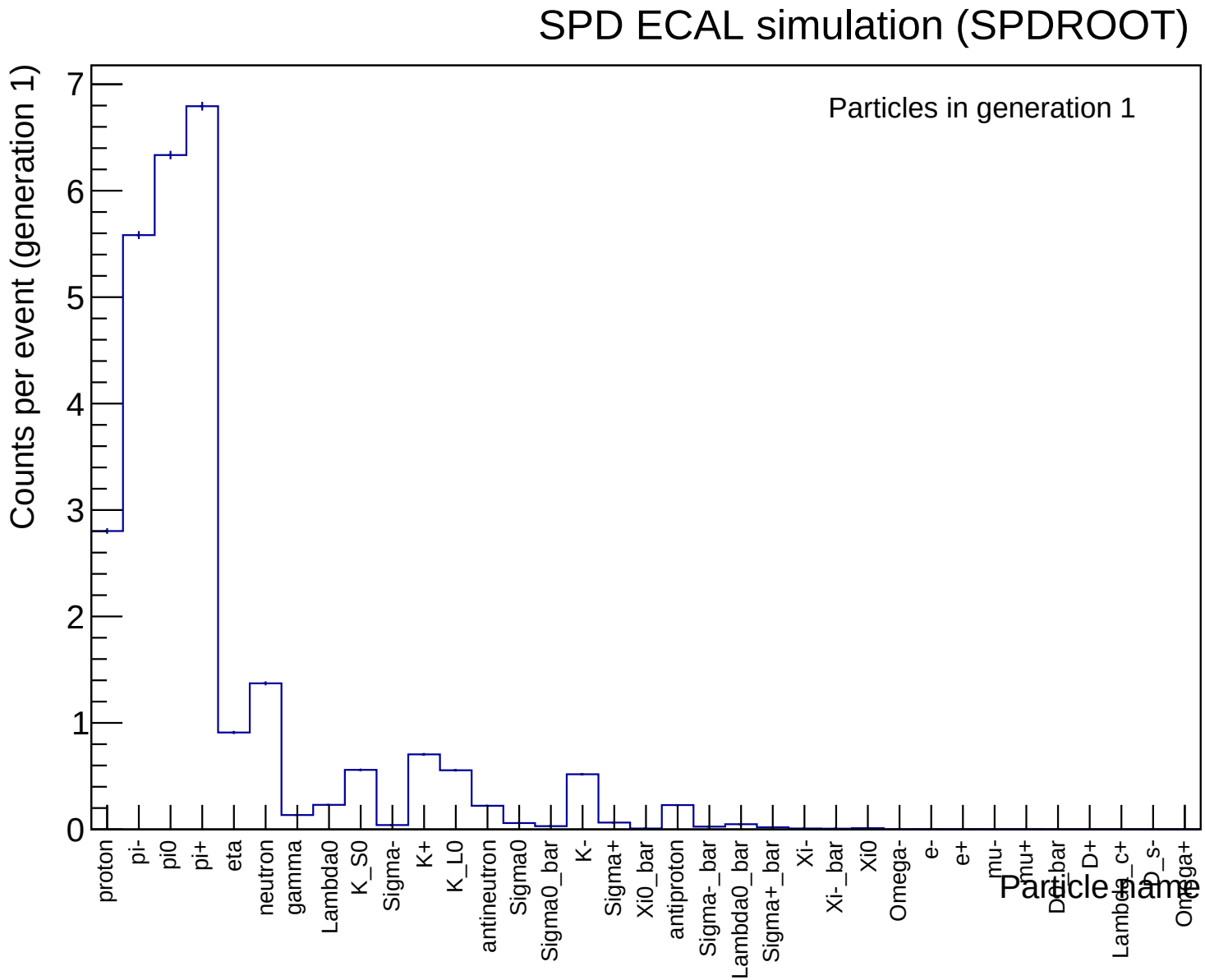




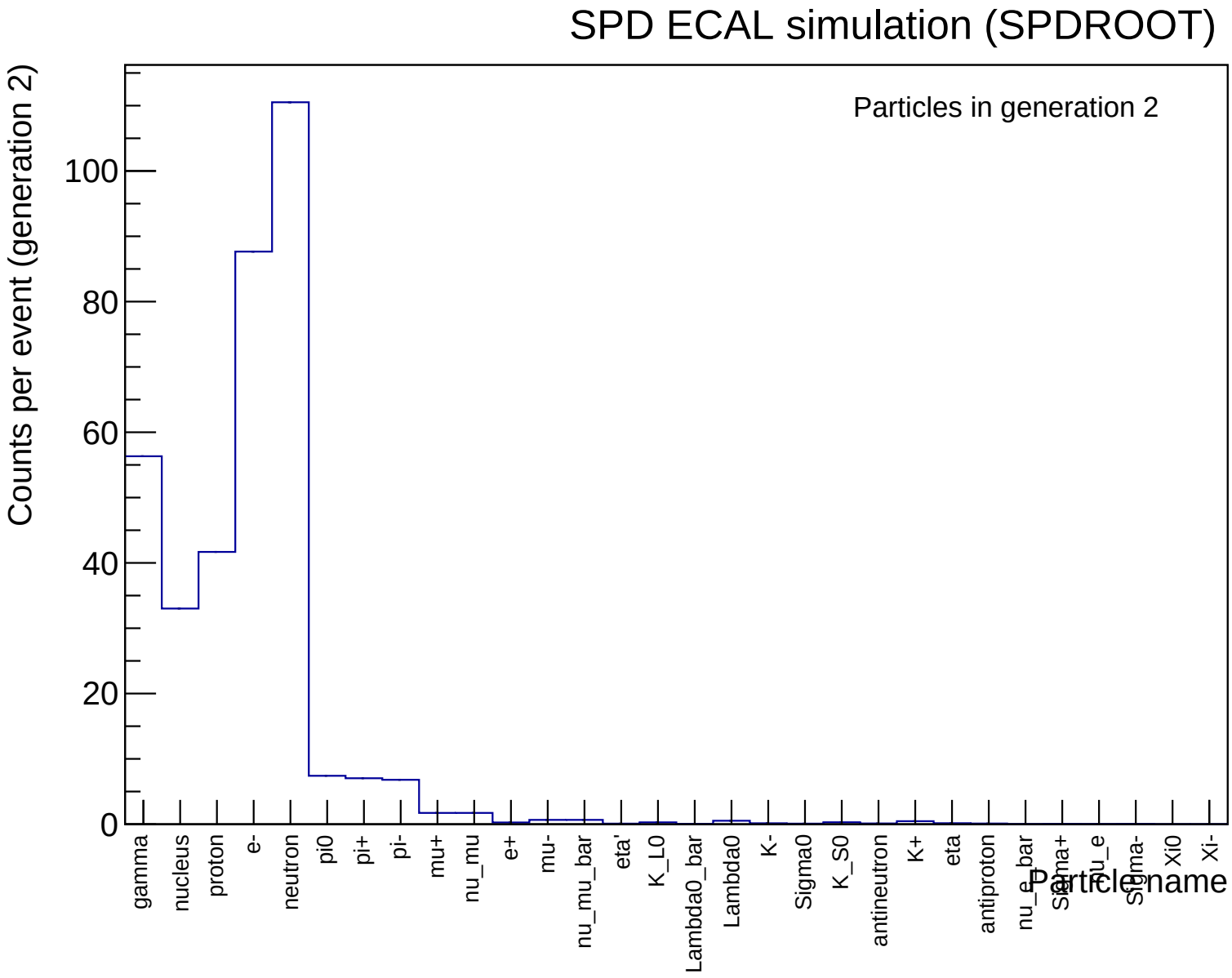
Number of cells above threshold in two consecutive events



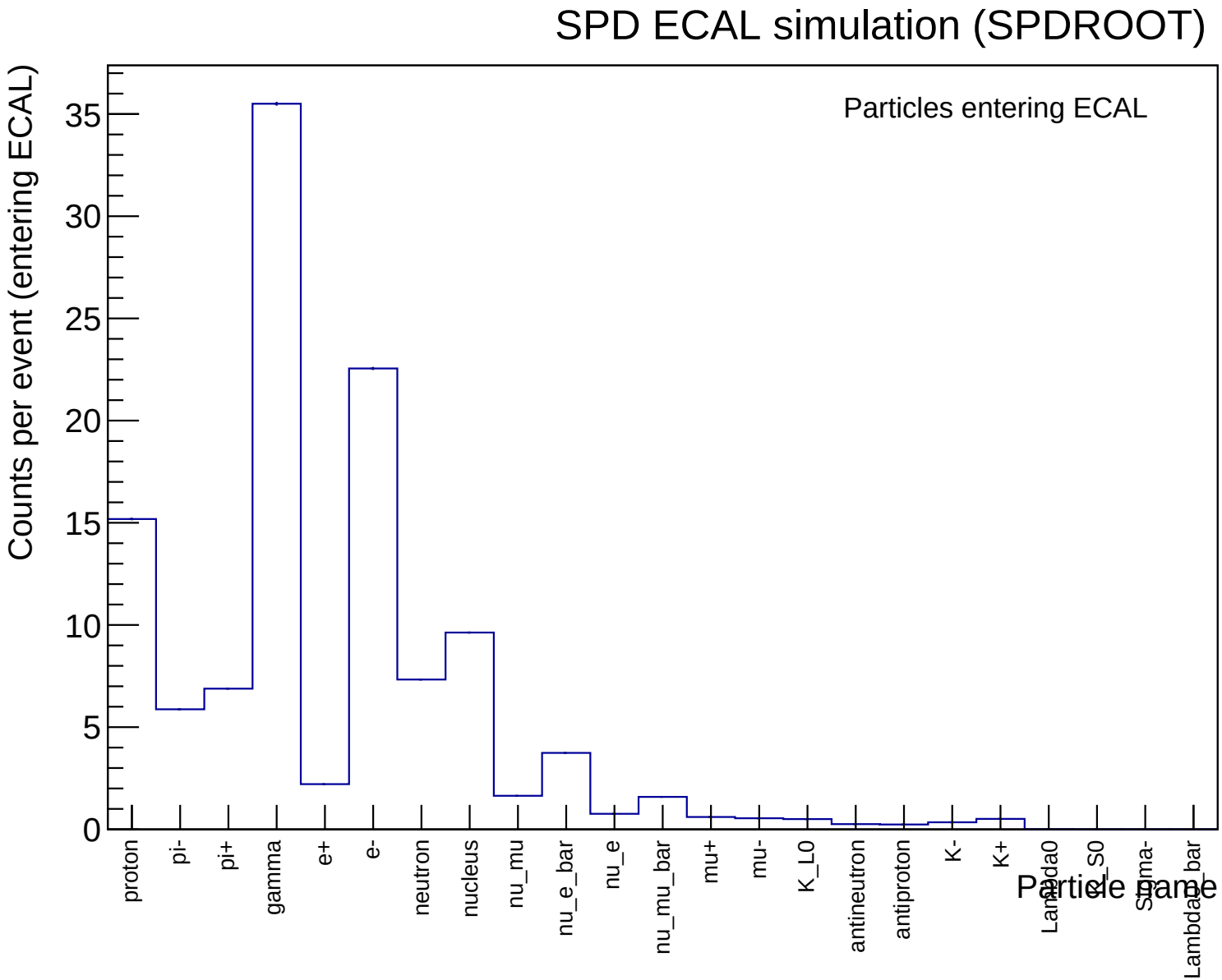
Some test pictures: particles in generation 1



Some test pictures: particles in generation 2



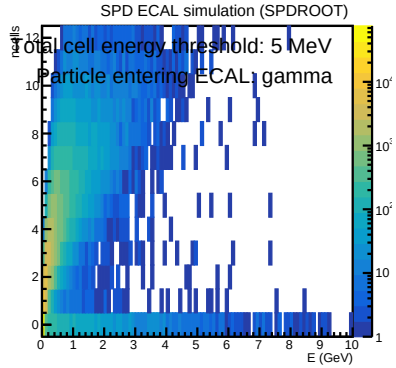
Some test pictures: particles entering ECAL

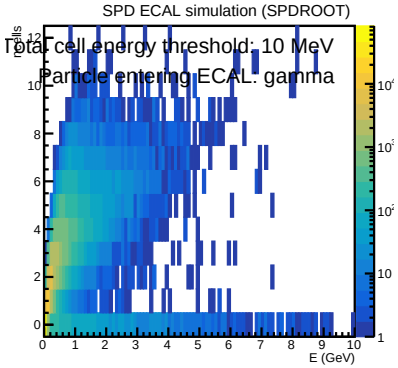


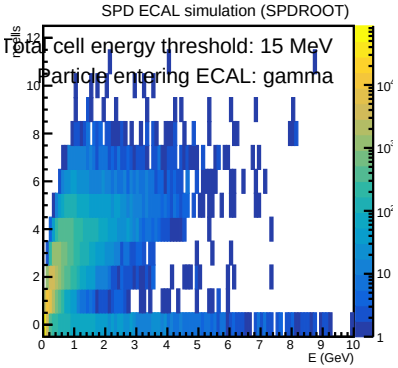
Some test pictures: particles entering ECAL

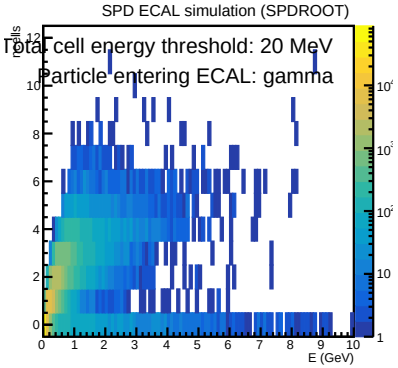
- Definition of "entering ECAL":
  - produced inside the cylinder with ECAL inner dimensions
  - either died in ECAL or passed through ECAL without interaction
- MC truth information on energy deposition in hits used to backtrace until particle is "entering ECAL"
- less than 1% of particles not traced to origin (part is coming from RS, part unknown)

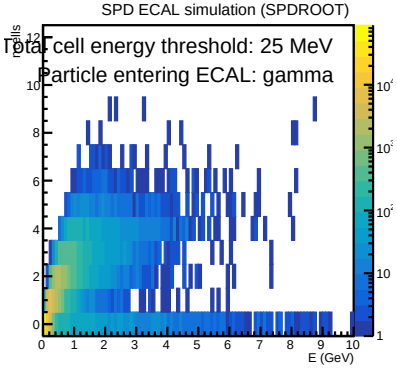
Gamma entering ECAL

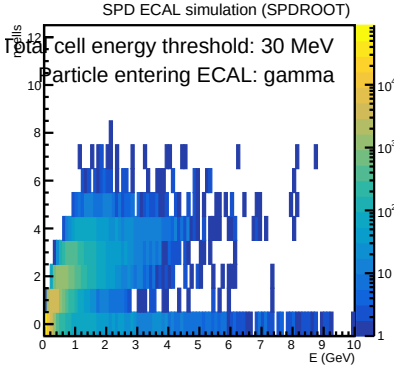


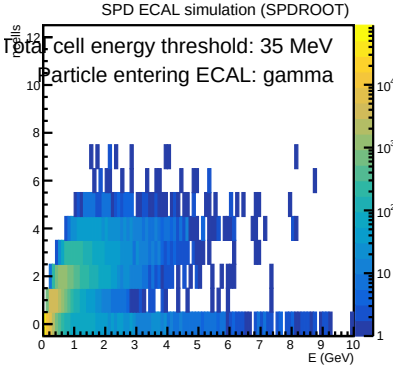


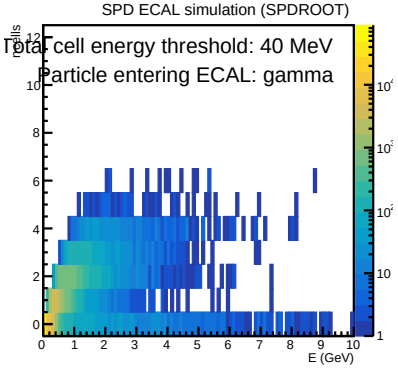


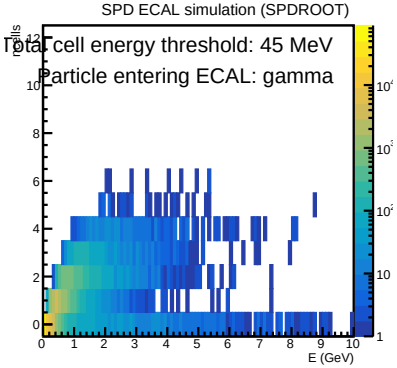


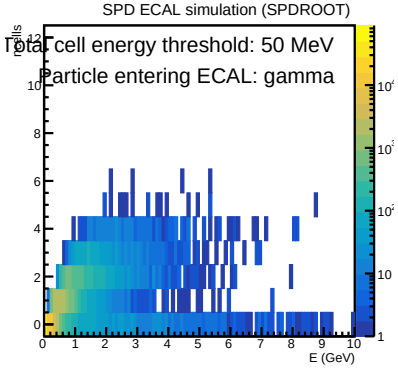








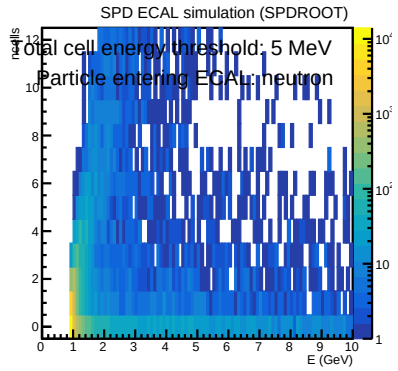


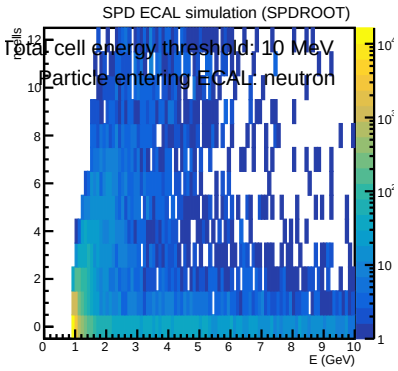


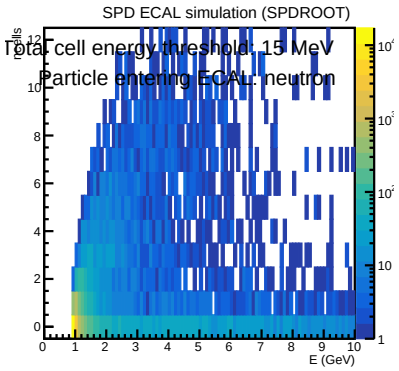
SPD ECAL simulation (SPDROOT)

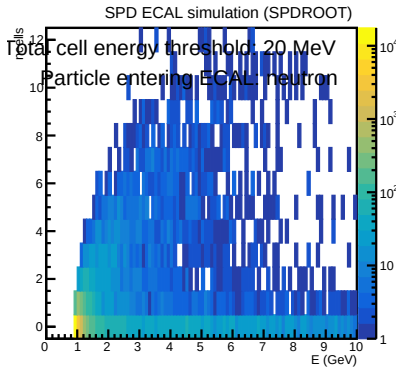
SPD ECAL simulation (SPDROOT)

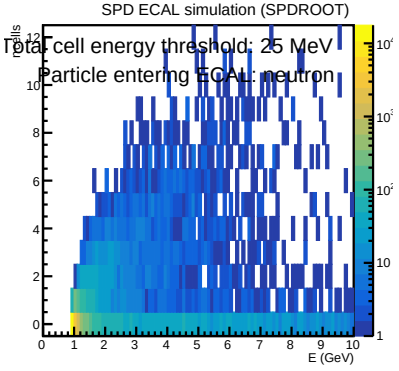
Neutrons entering ECAL

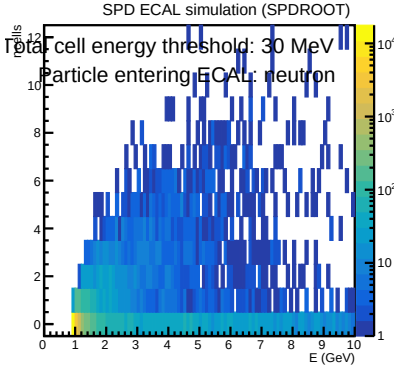


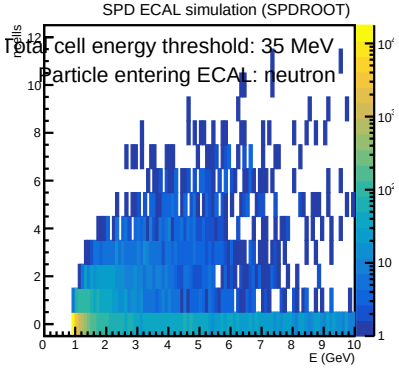


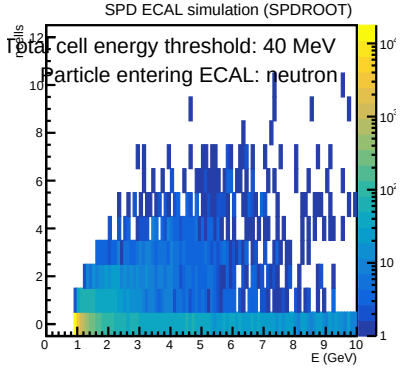


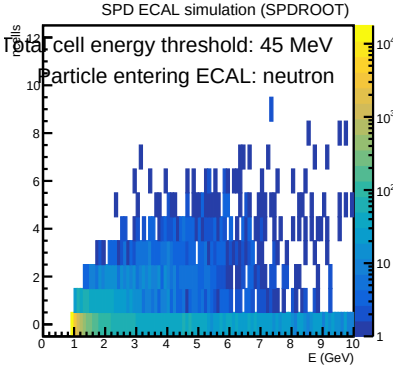


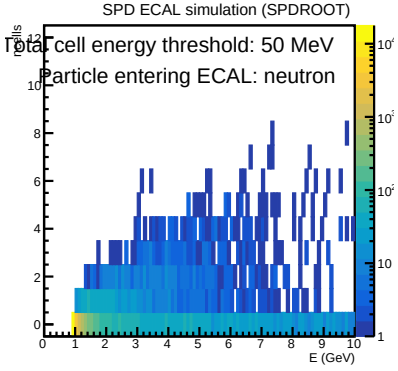








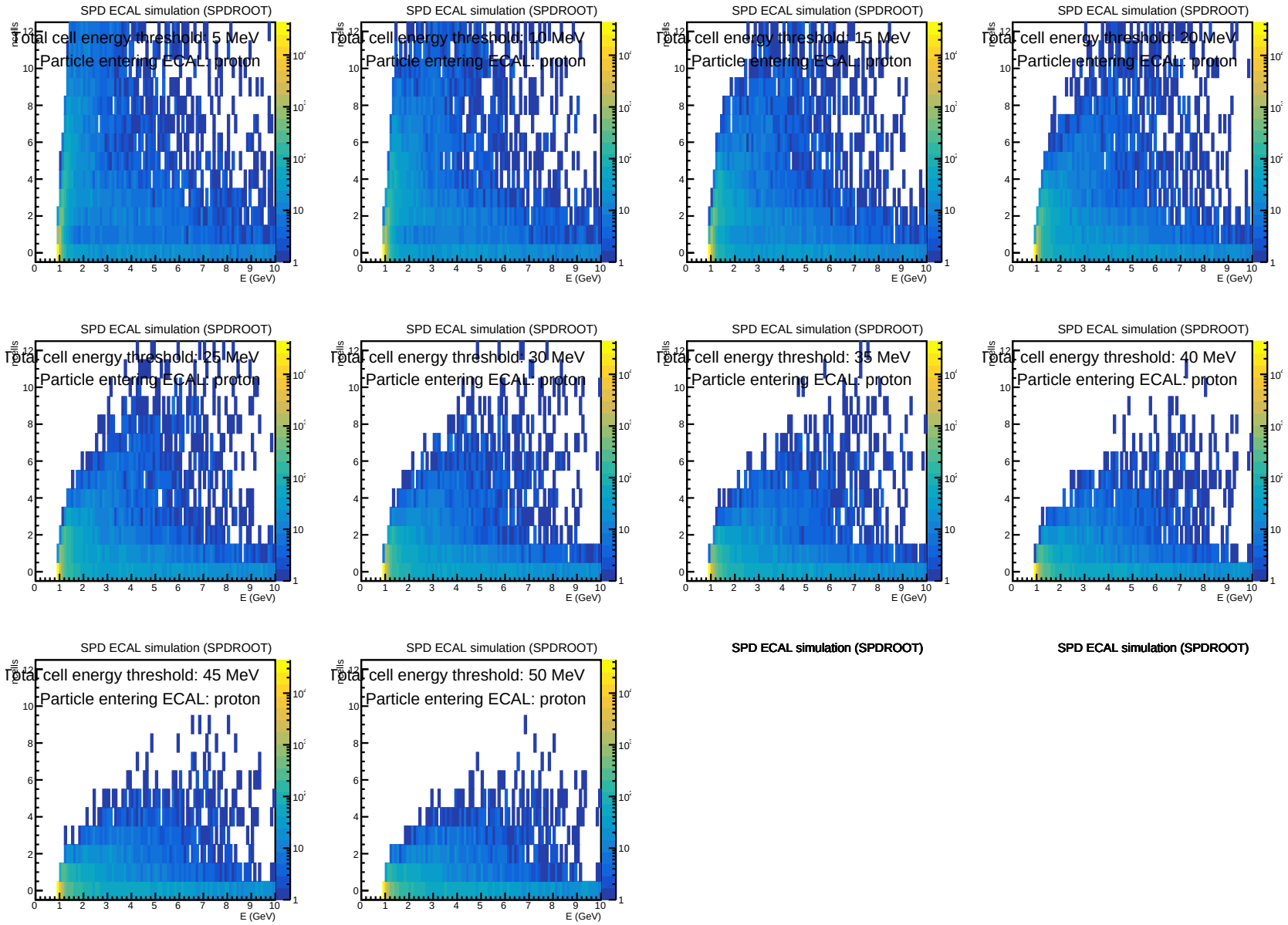




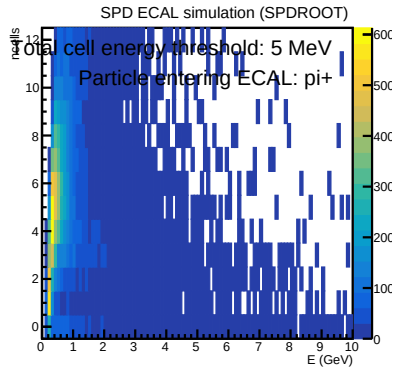


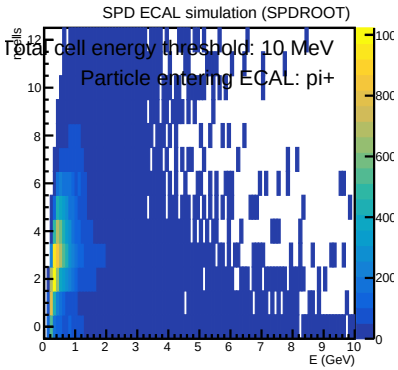


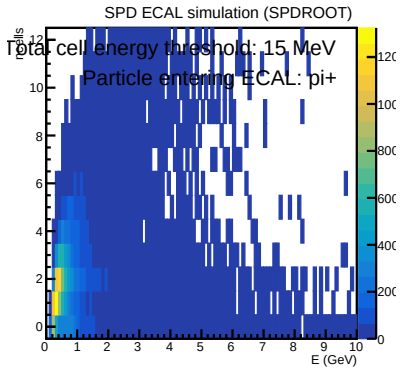
Protons entering ECAL

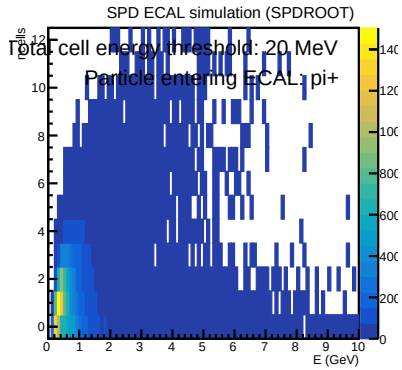


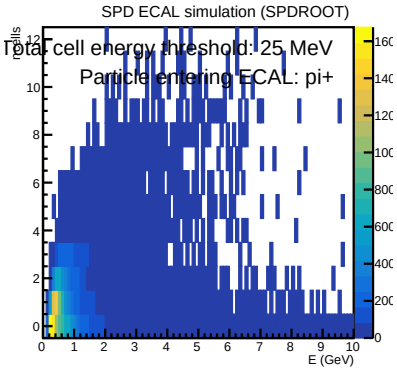
Pi+ entering ECAL

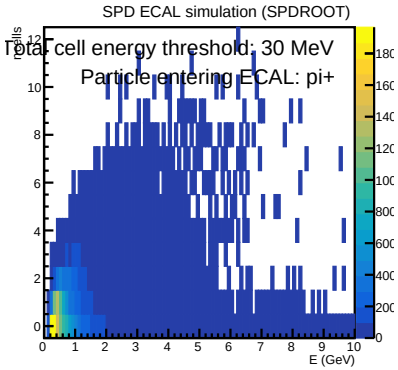


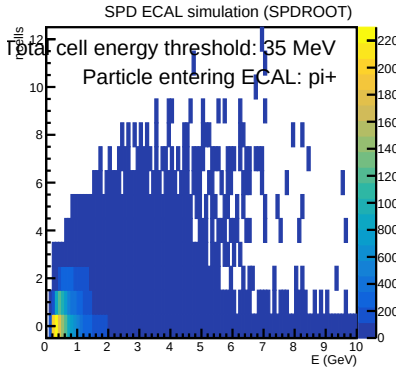


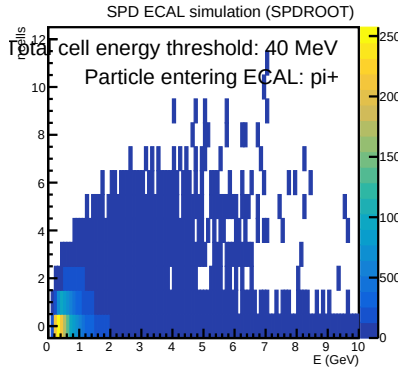


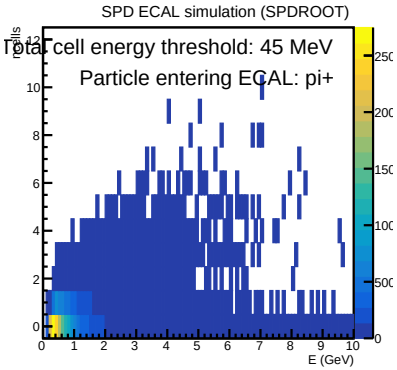


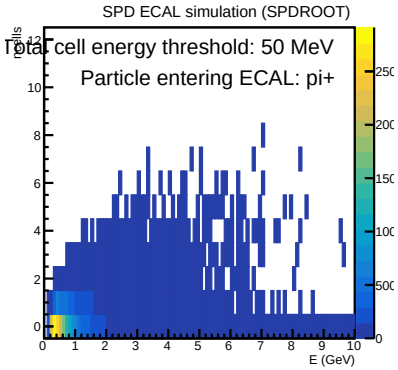
















Conclusions

- $\approx$ 150 cells for 10 MeV total energy threshold
- most of the signals come from low energy photons and e+/e-

Plans:

- algorithm for backtracing signals to origin photon/pion
- Sampo reconstruction
- make the study on energy resolution for different thresholds