

Simulation of stand **MiniSPD** on Geant4

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Purpose of my work

- Run a simulation of the stand MiniSPD on of cosmic rays particles (μ , e , p) with different energies

Stand MiniSPD

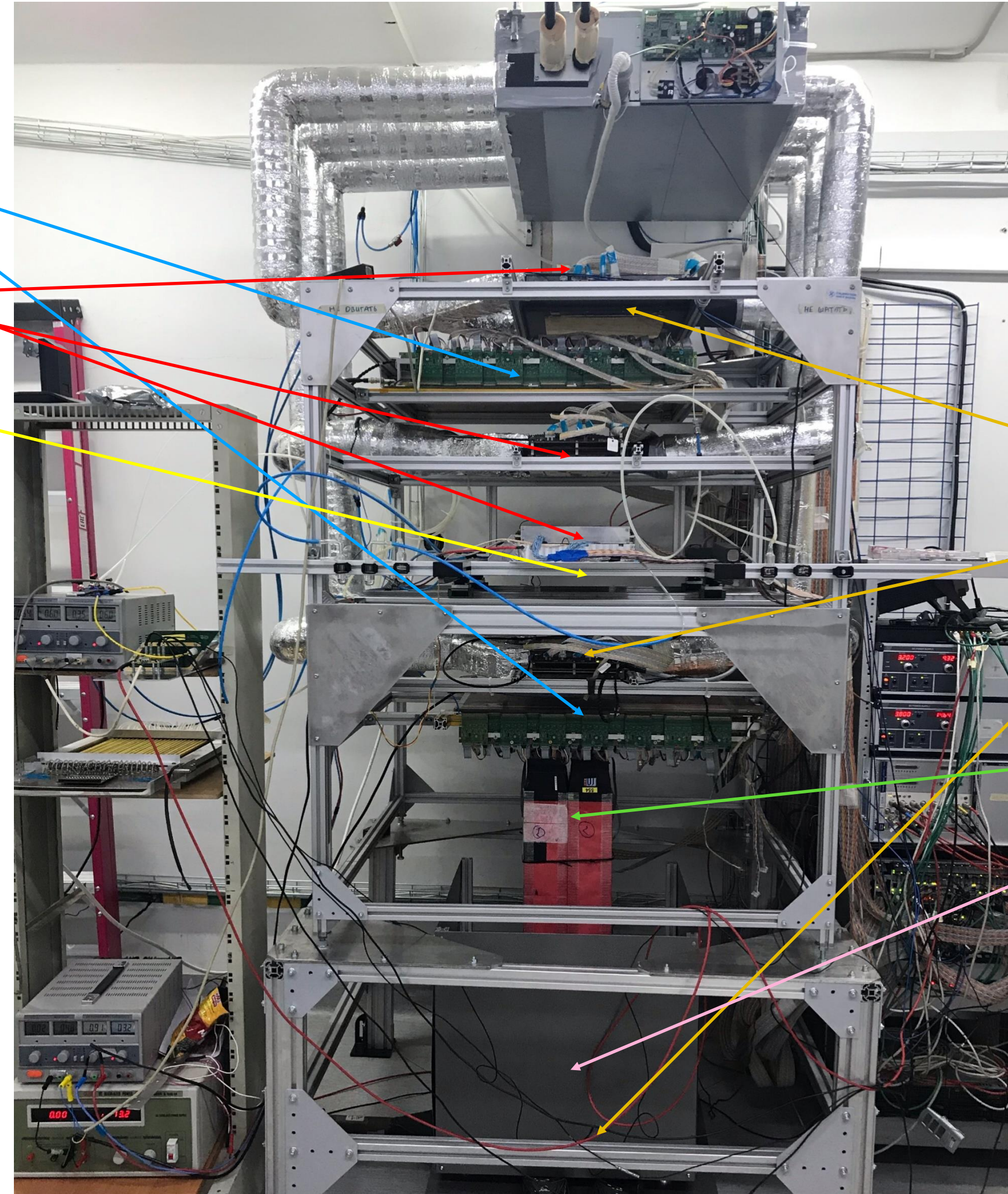
[Temur Enik (temur.enik@cern.ch)]

The purpose of the stand is testing straw-station and collaboration of all detectors

- two GEM detectors

- three silicon detectors

- two straw detectors



Trigger system:

- three scintillators

- Calorimeter - 396 mm

- Lead - 375 mm

- Stand (aluminum)

- Stand (steel)

MiniSPD project is an international collaboration

Cosmic rays

Testing on cosmic rays

Muons are the most numerous charged particles at sea level.

The mean energy of muons at the ground is ≈ 4 GeV.

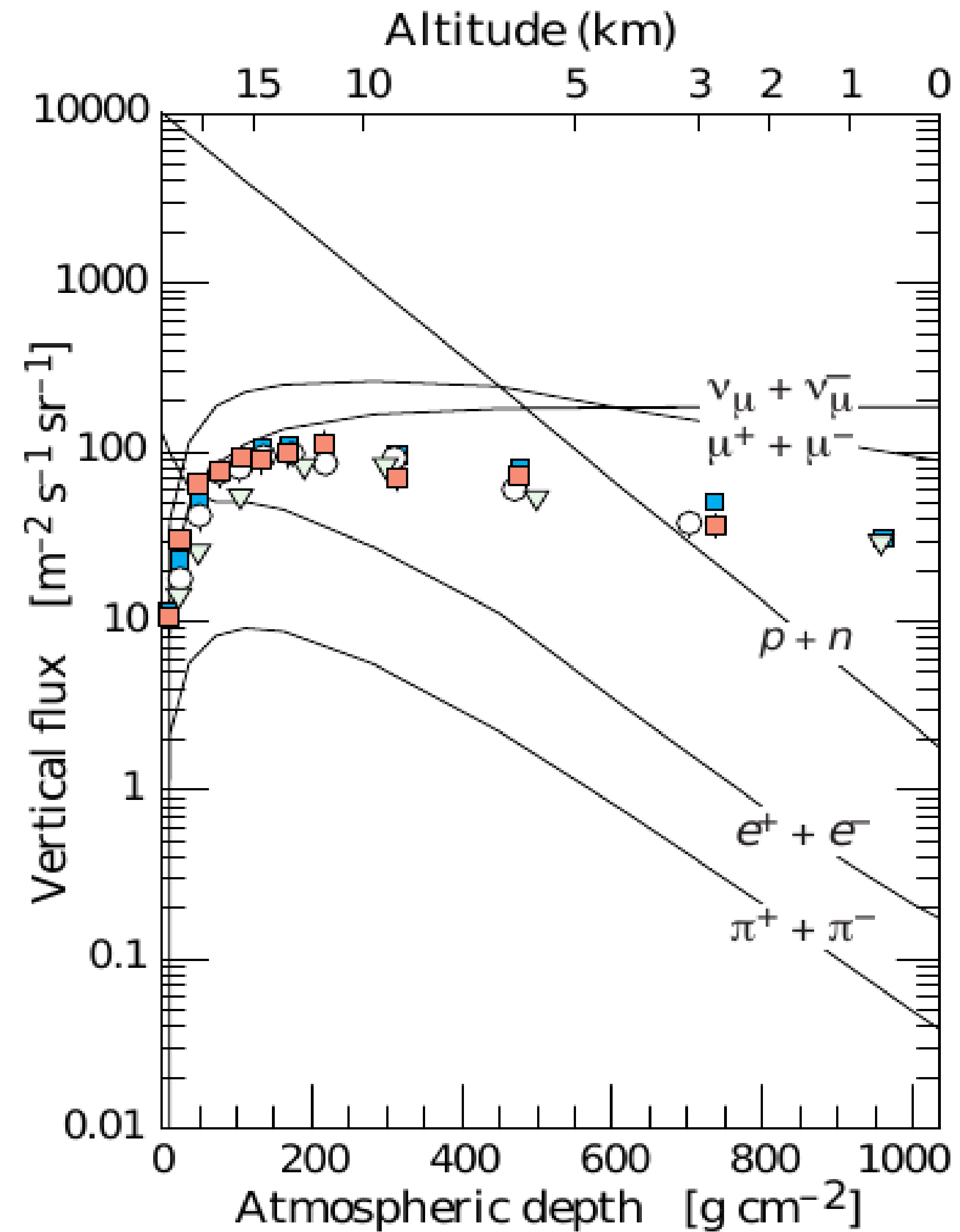
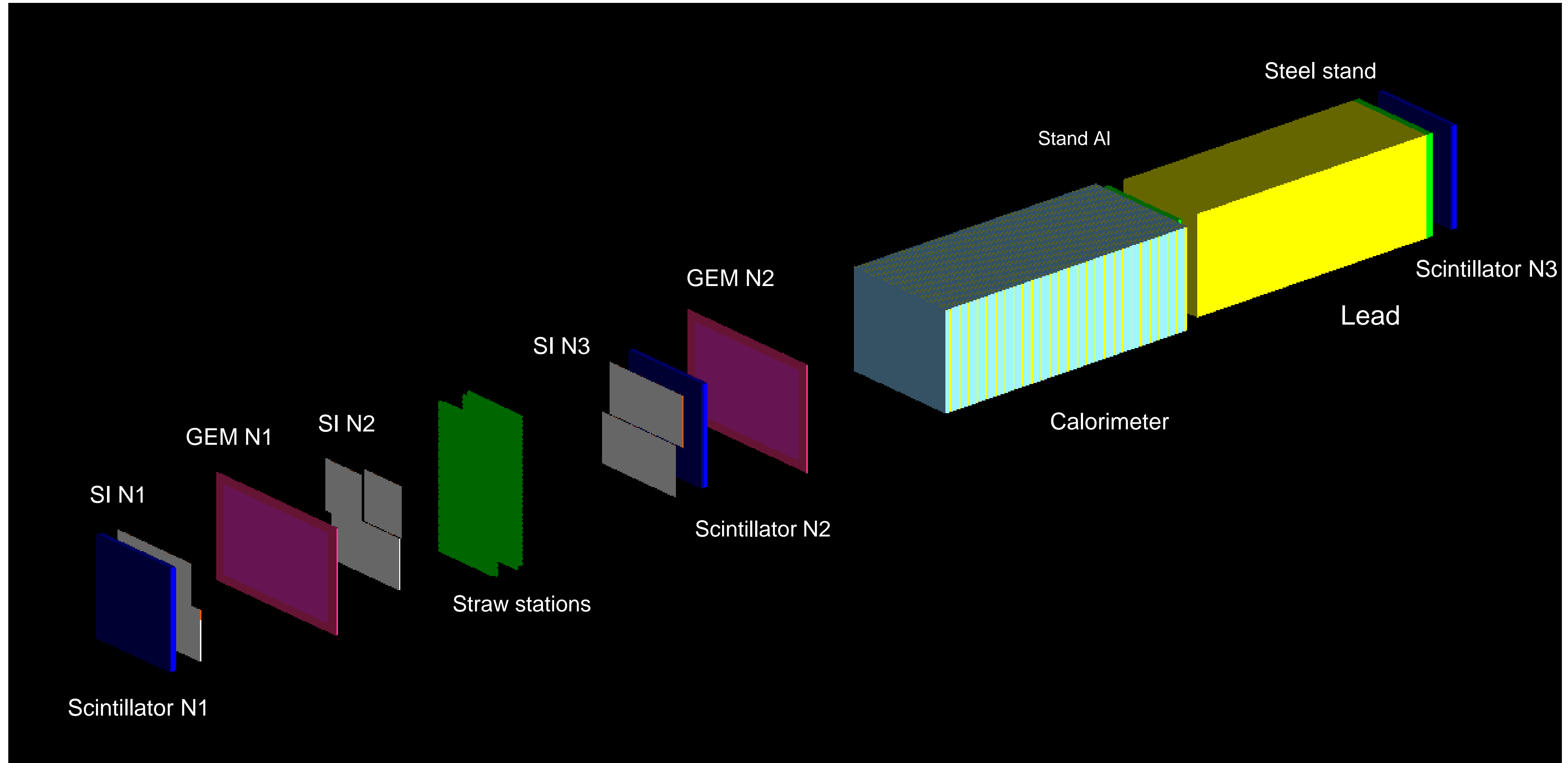


Figure 30.4: Vertical fluxes of cosmic rays in the atmosphere with $E > 1$ GeV estimated from the nucleon flux of Eq. (30.2). The points show measurements of negative muons with $E_{\mu} > 1$ GeV [46–51].

Simulation of stand MiniSPD

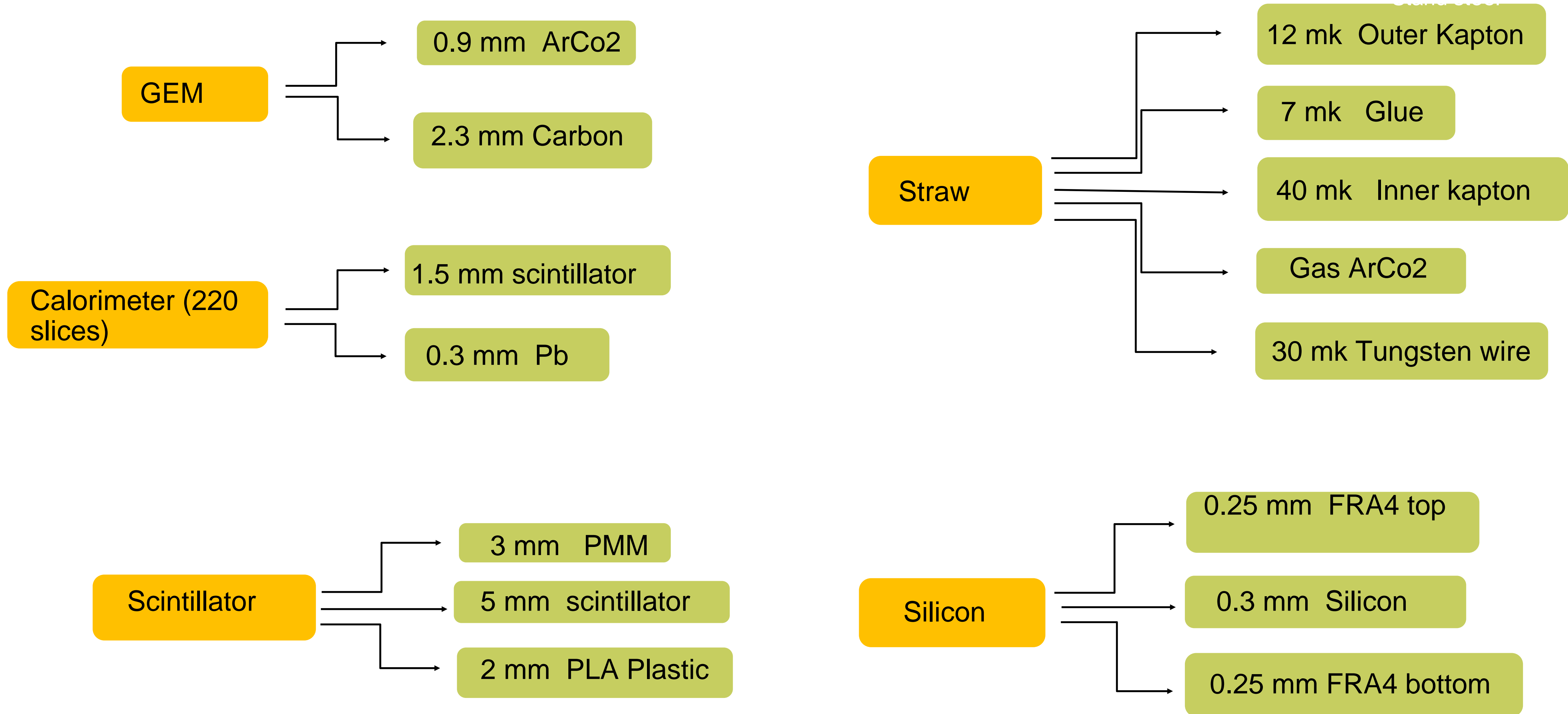
Git.Jinr: <https://git.jinr.ru/aivanov/MiniSPD.git>



Simulation of Stand MiniSPD

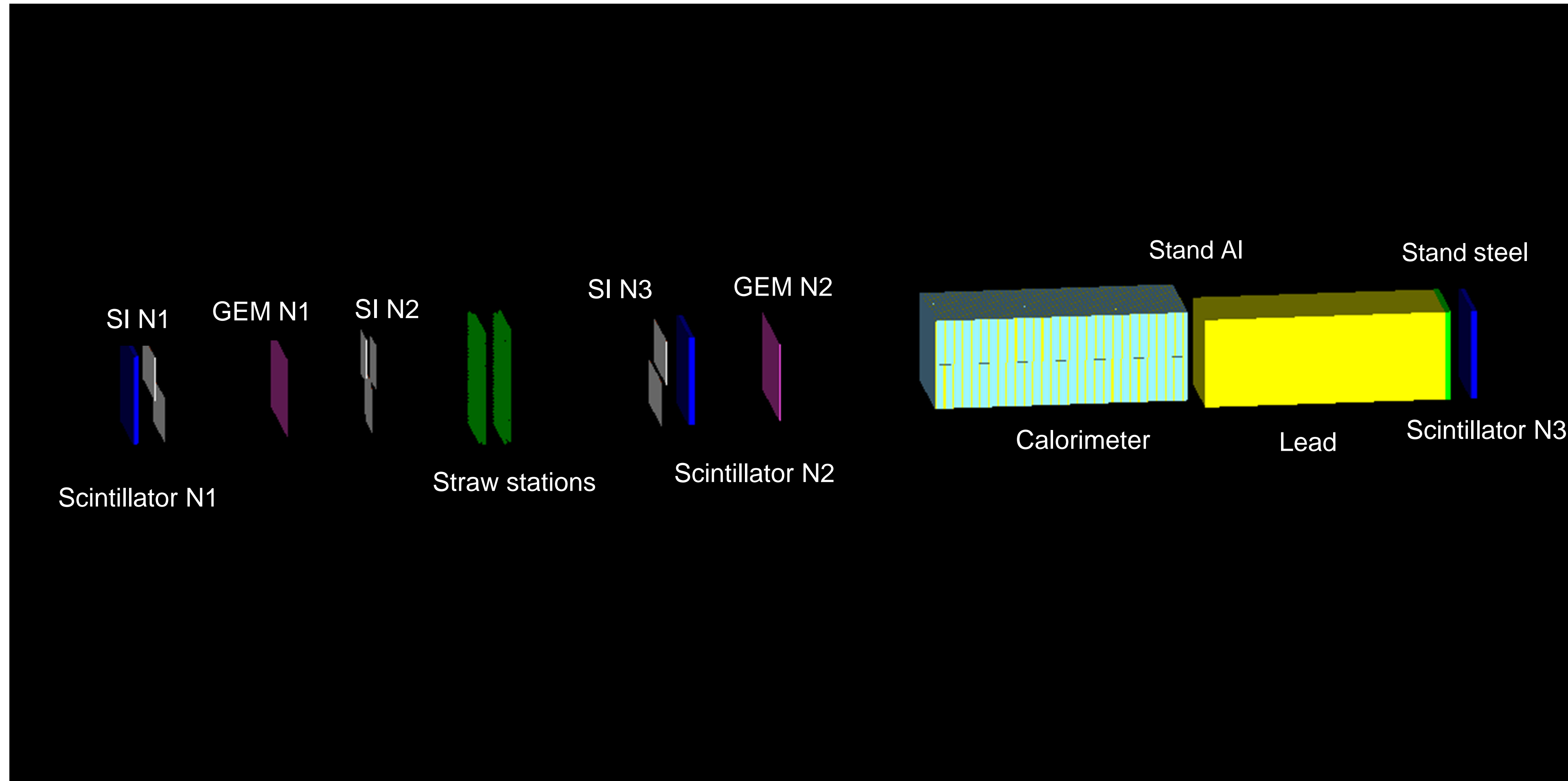
- the position of the detectors based on the last alignment (22.05.2020)

Quantity of materials of stand MiniSPD



Simulation of stand MiniSPD on time 09.11.2020

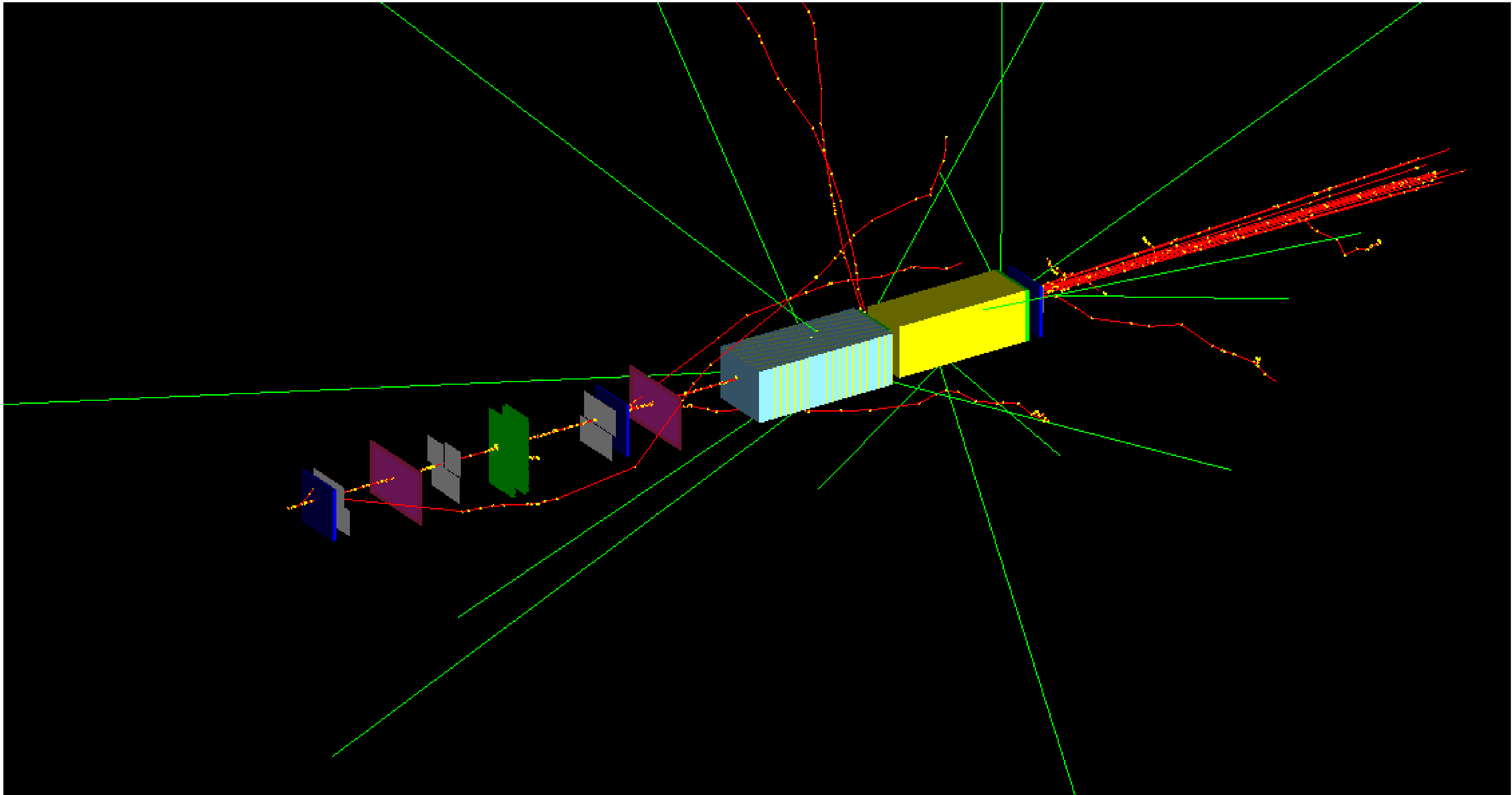
Starting conditions



Simulation settings:

- 10 000 events
- PV (10, 10, -80) mm
- point source
- e-, μ -, proton
- 100 MeV, 1, 10, 100 GeV
- material of World volume – Air

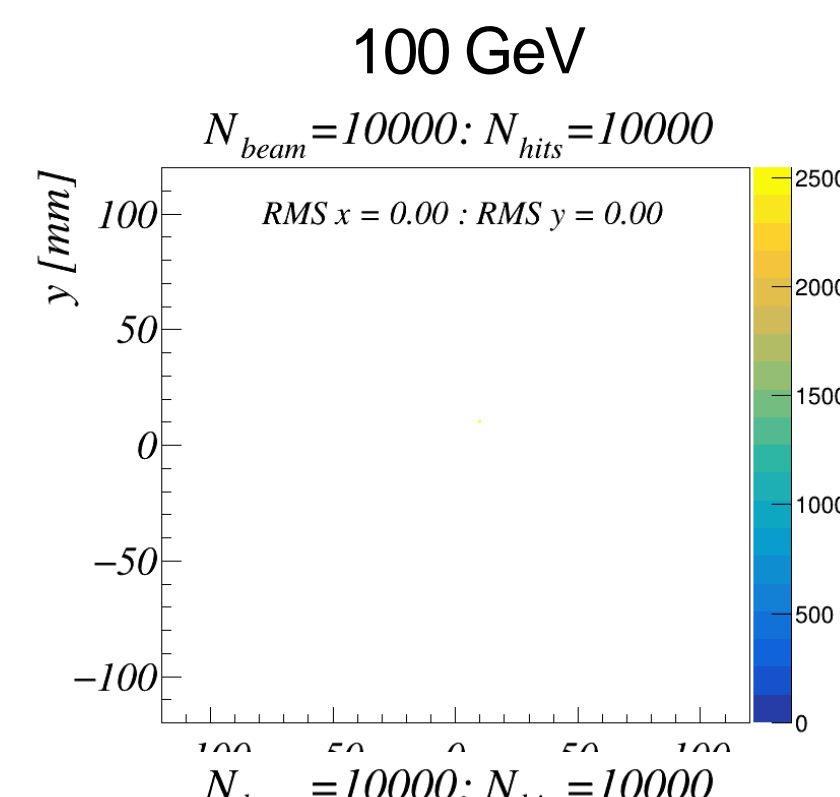
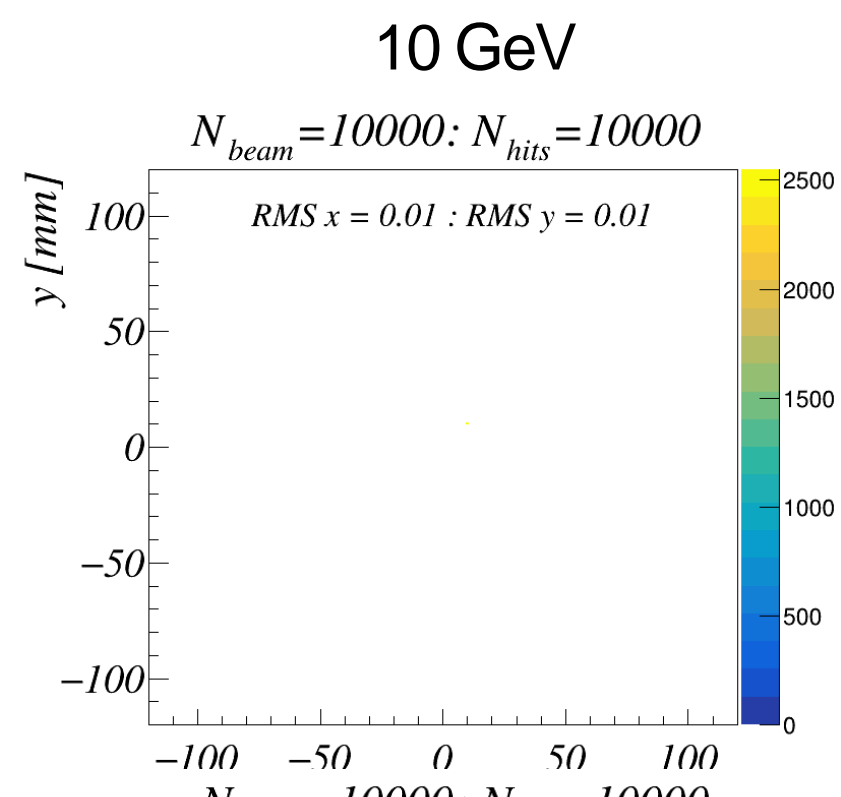
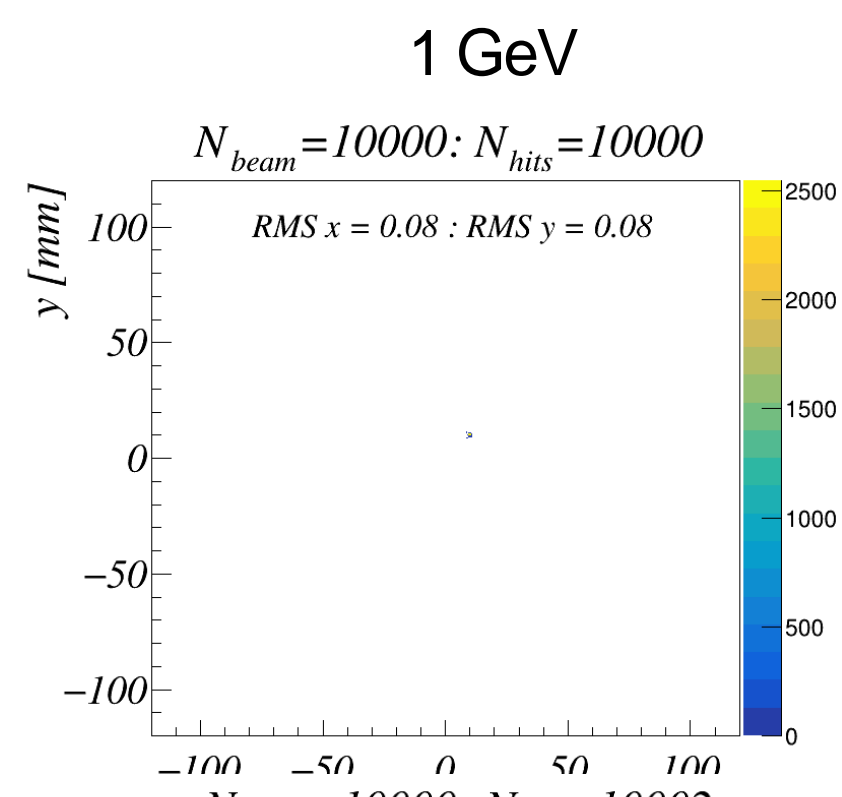
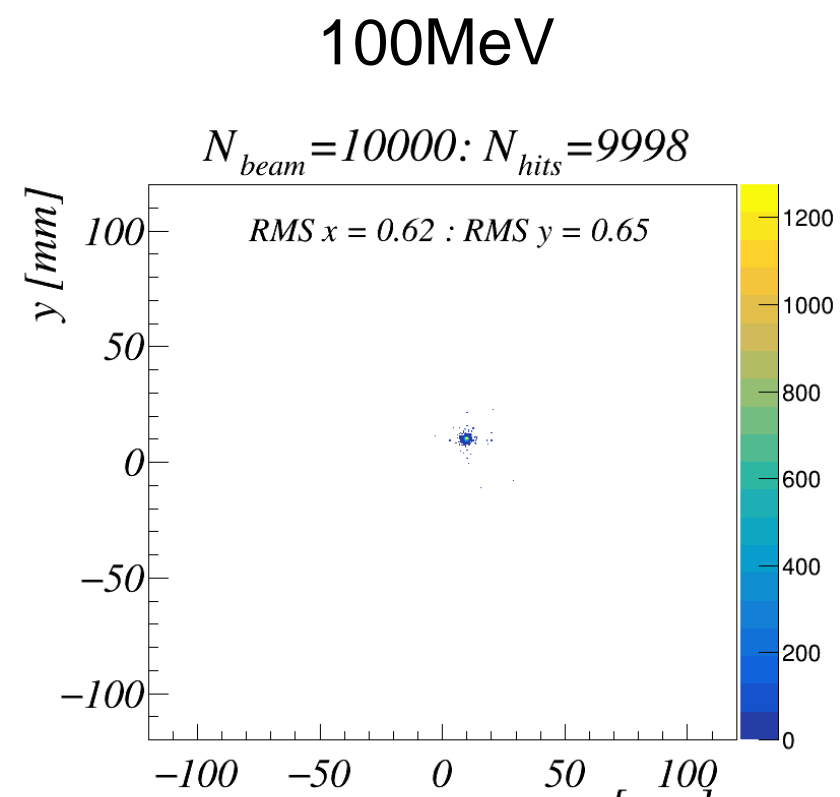
Simulation of stand MiniSPD



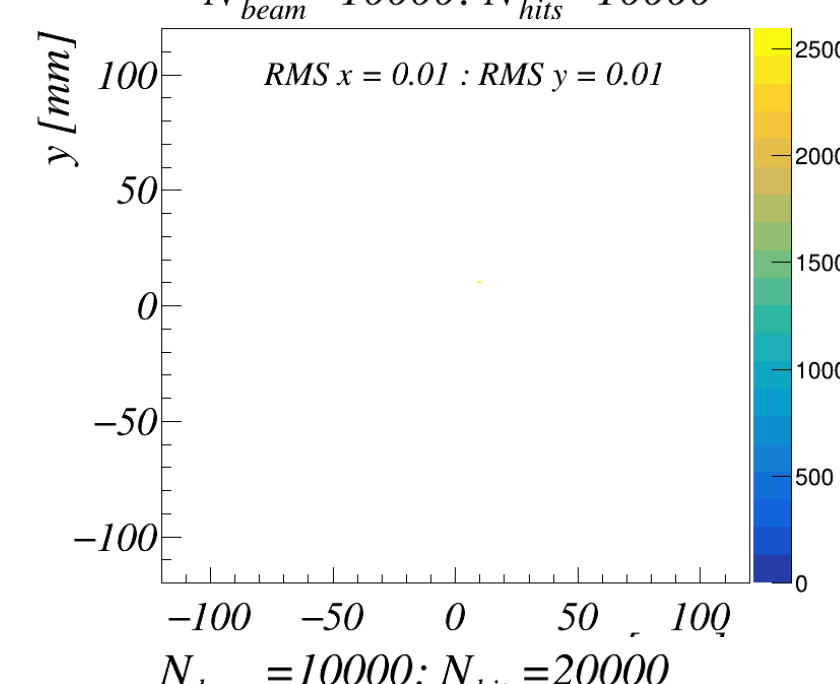
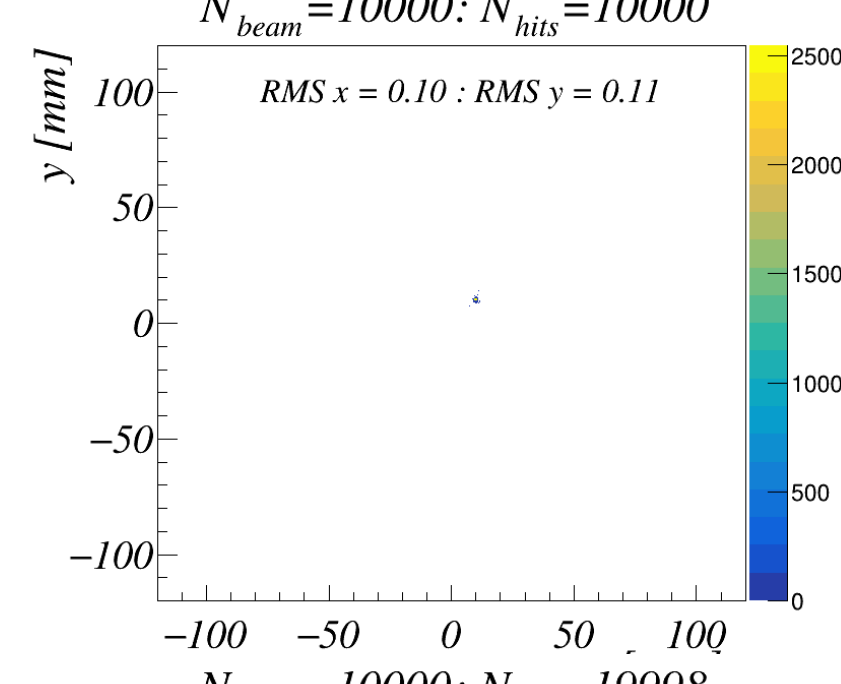
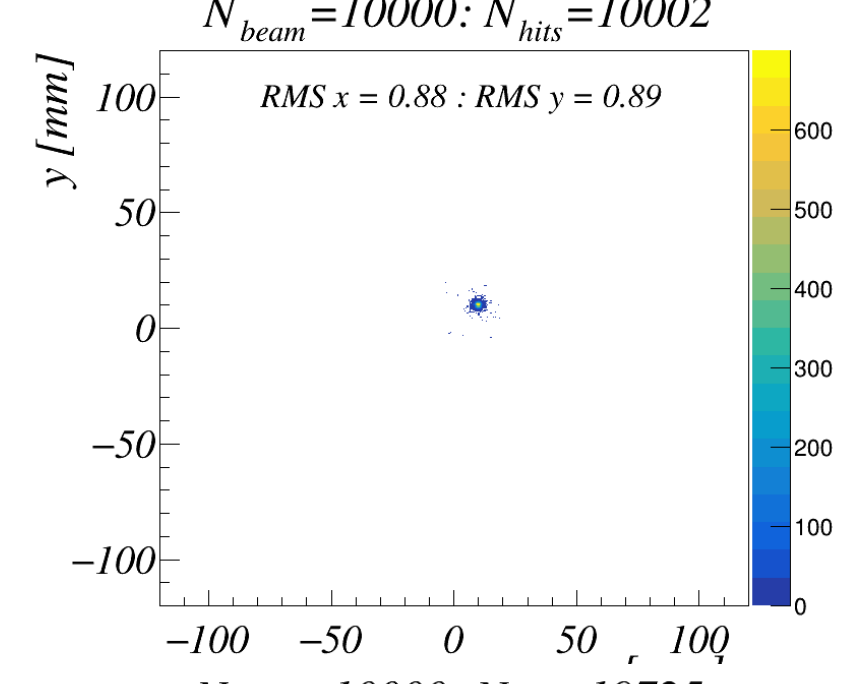
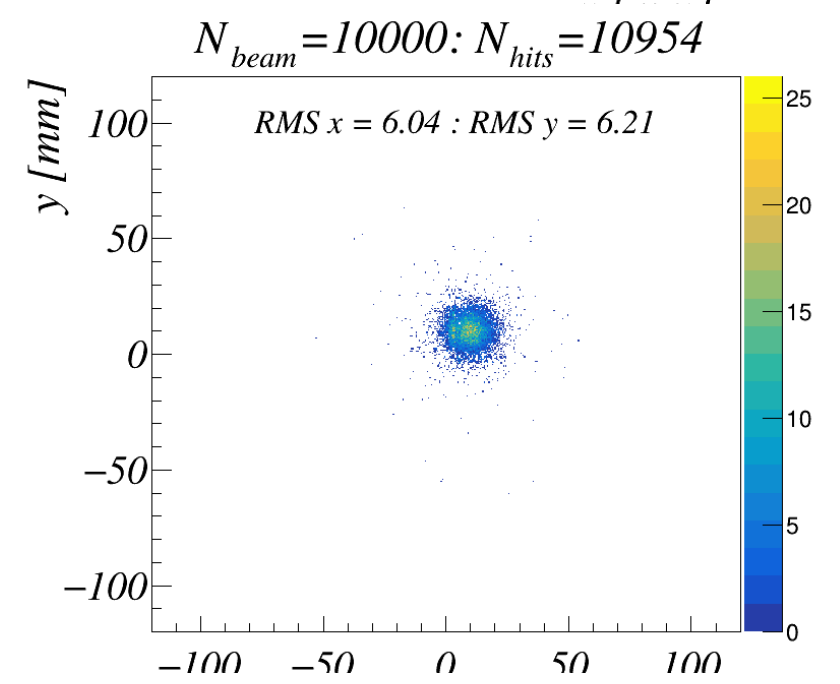
μ^- beam (10000 particles) with energy of 1 GeV

μ^- beams

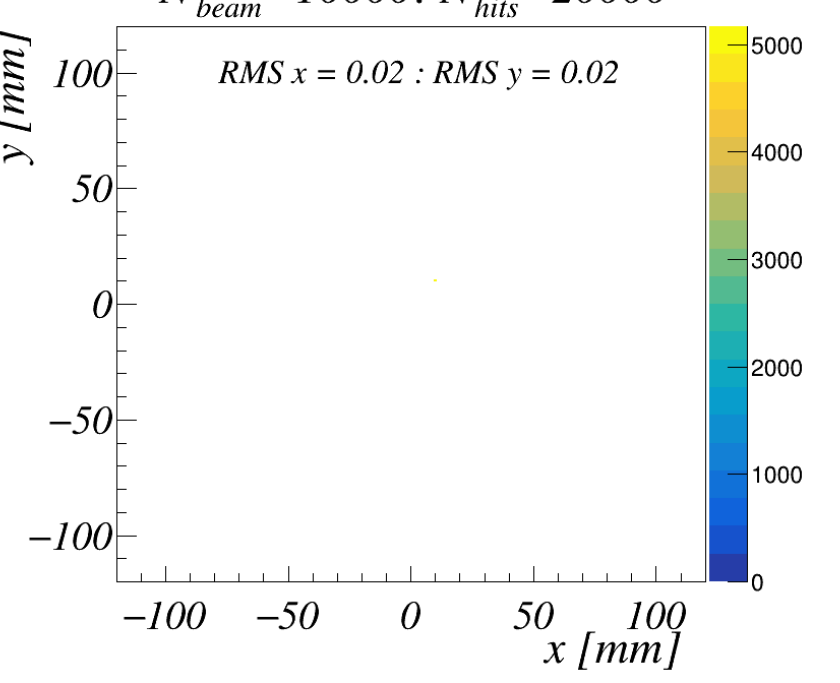
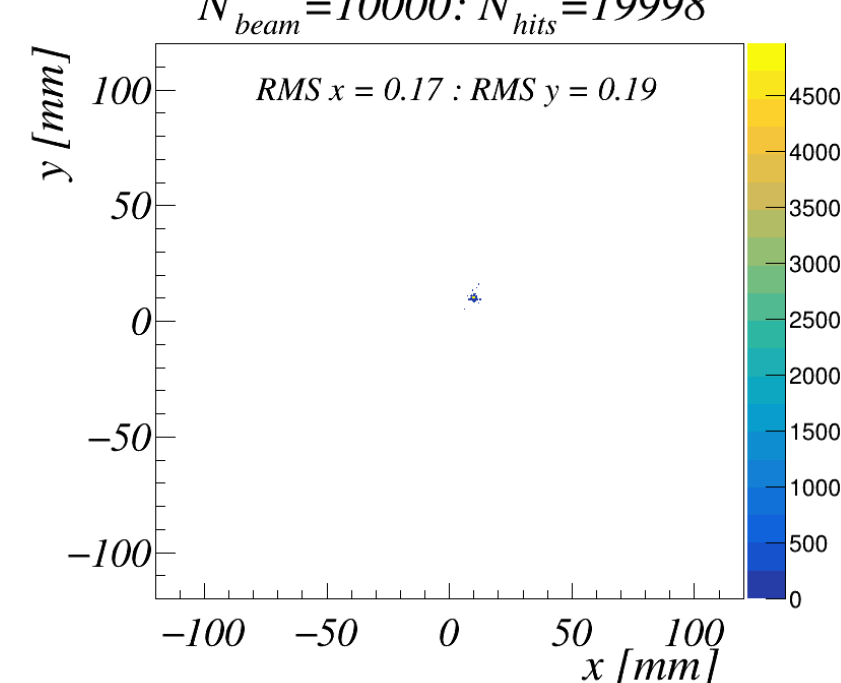
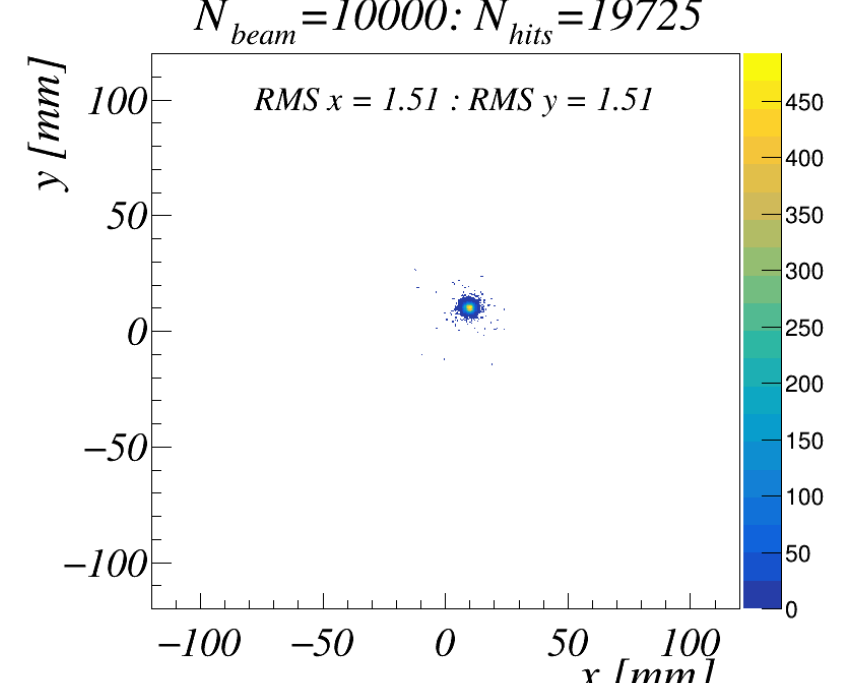
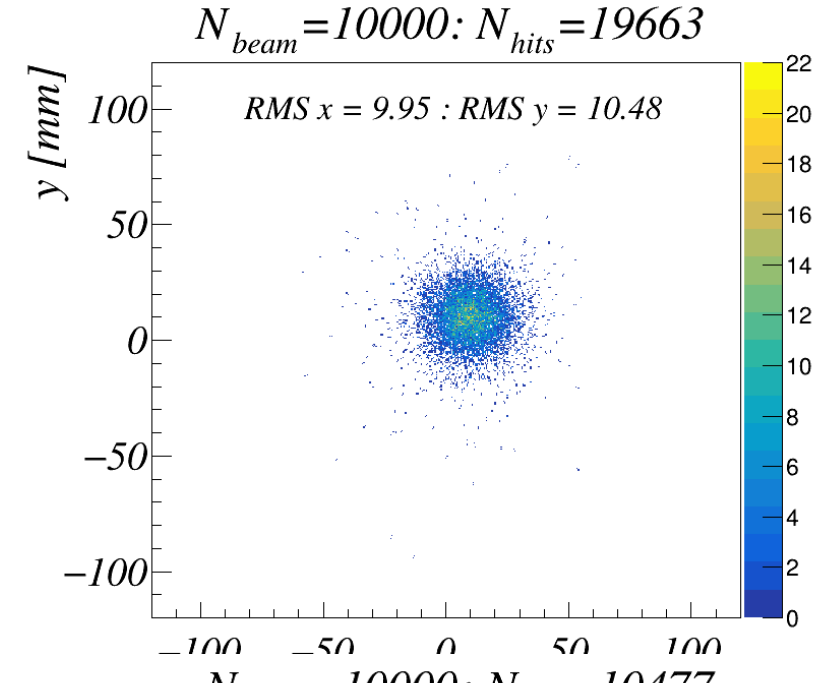
SI N1



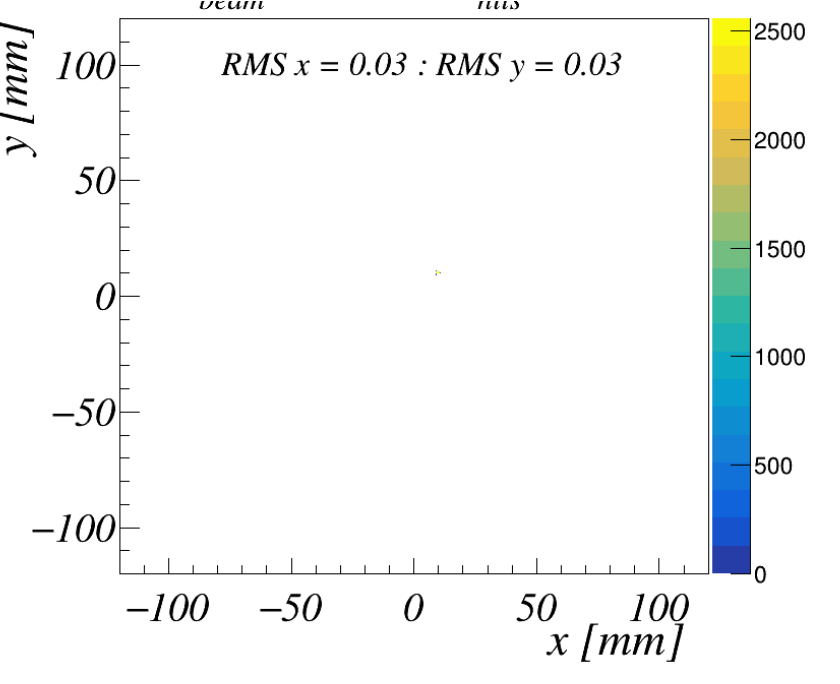
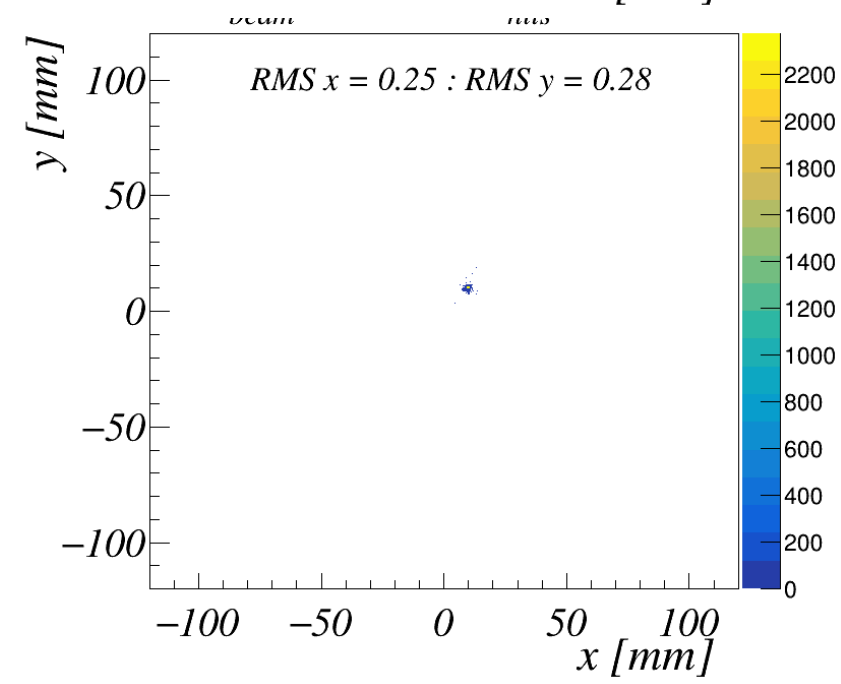
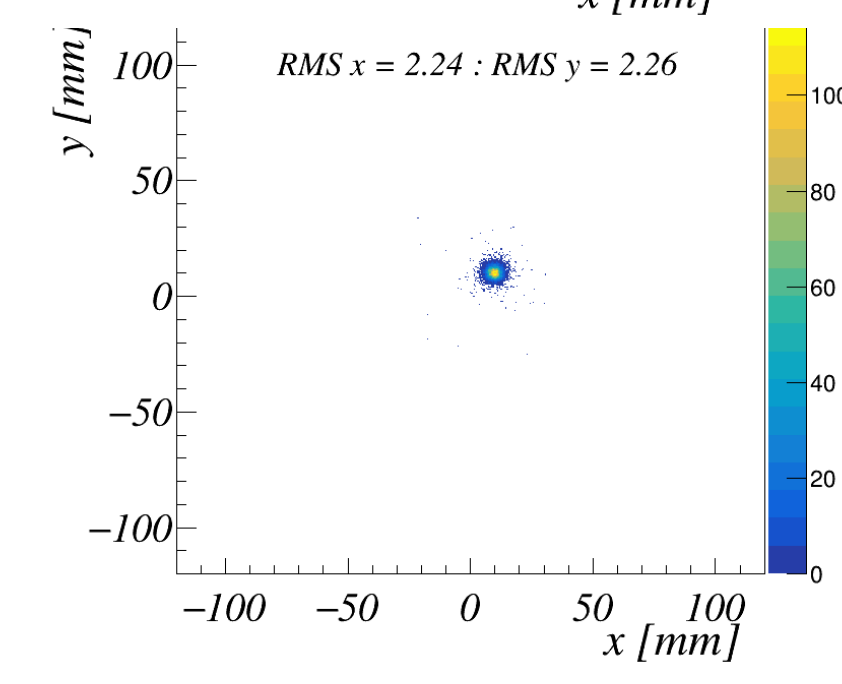
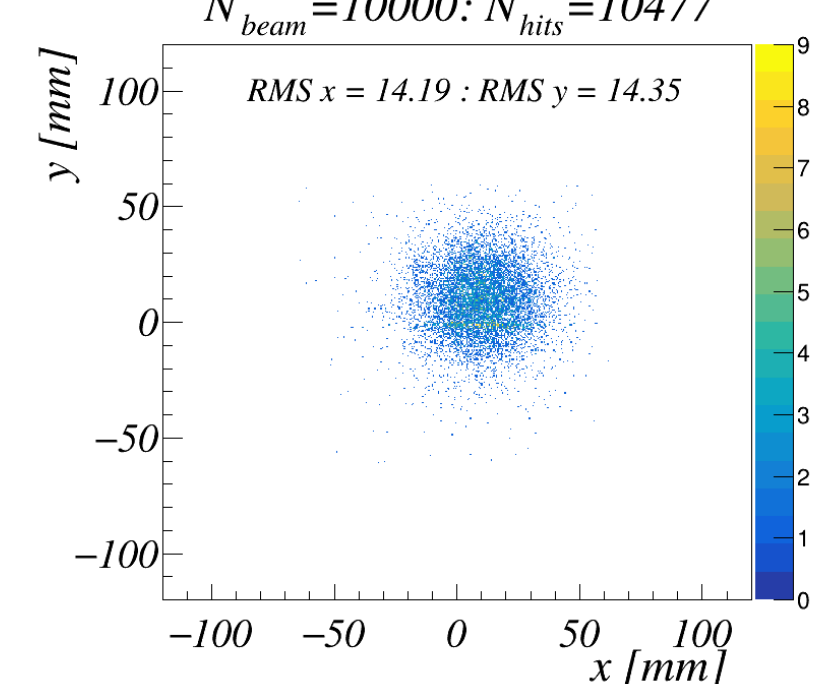
SI N2



Straw

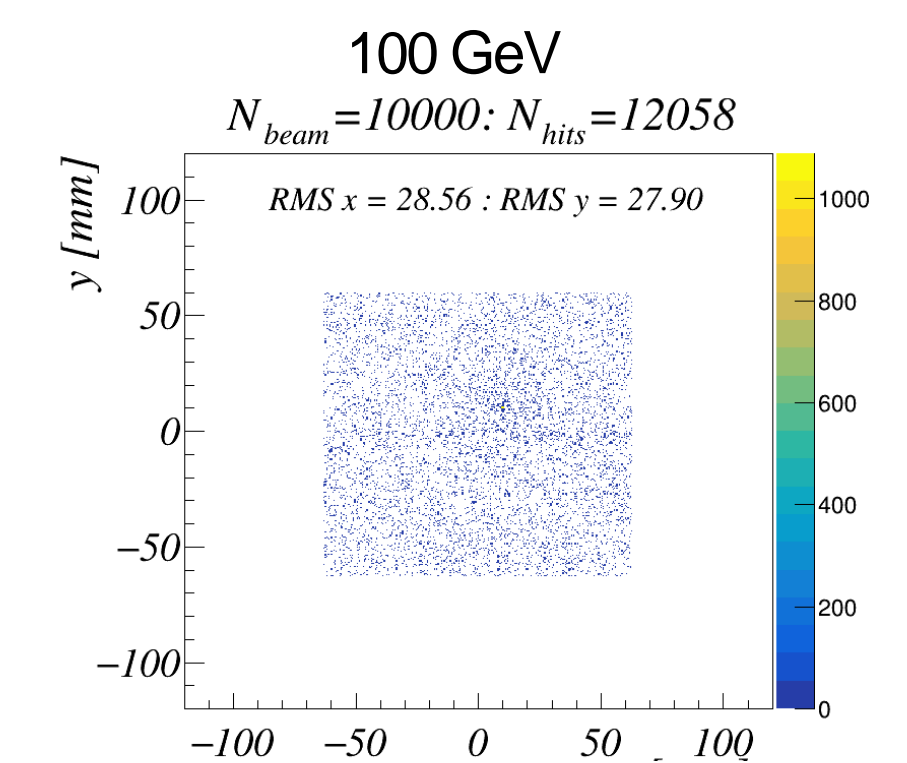
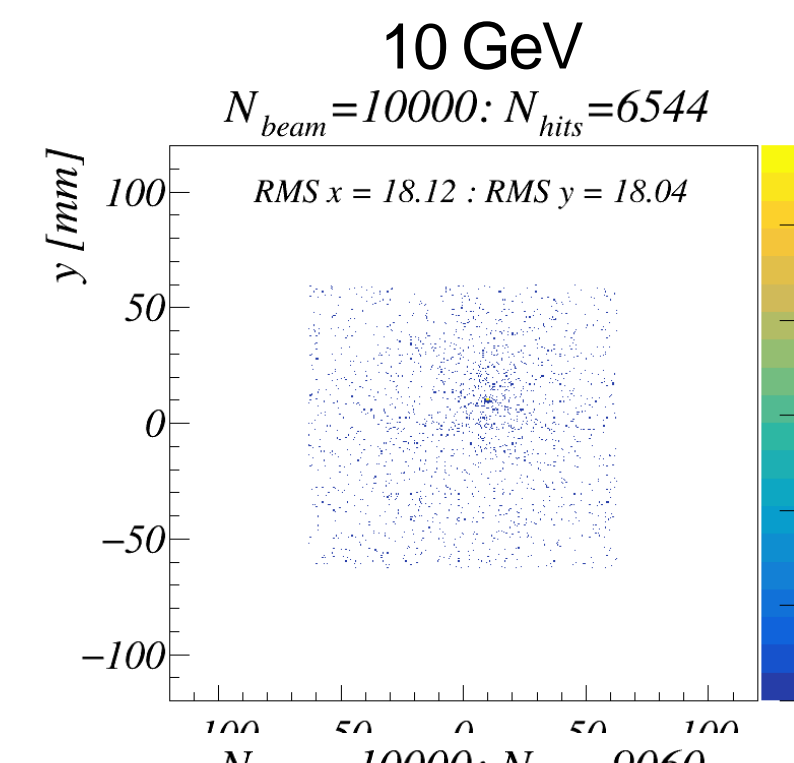
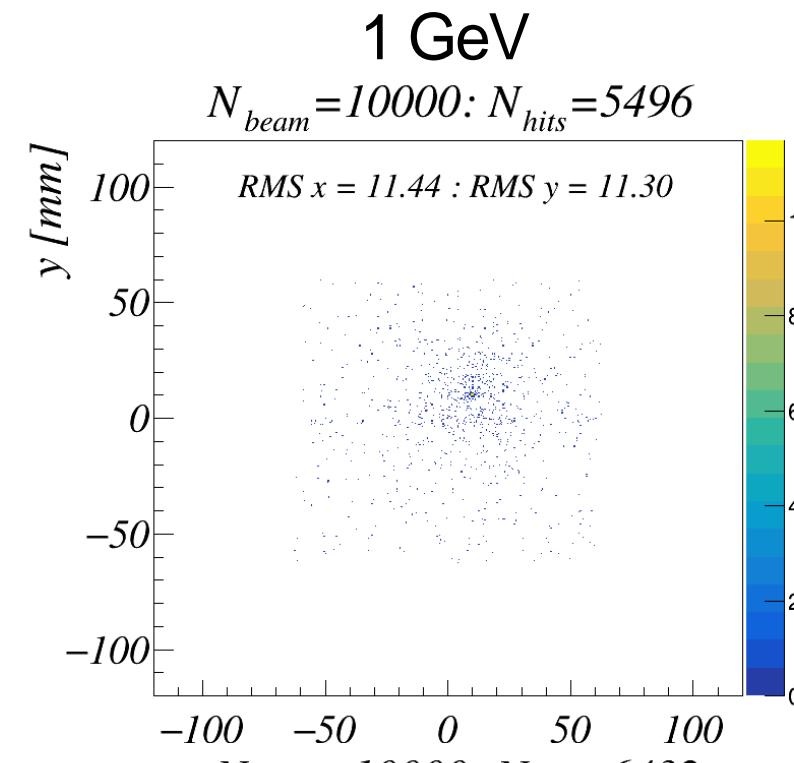
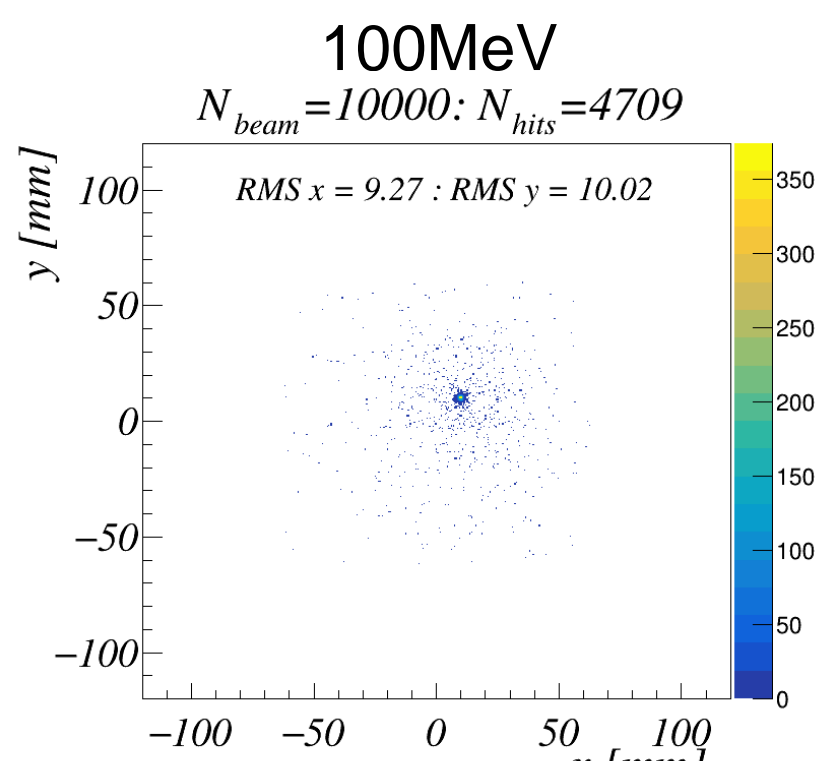


SI N3

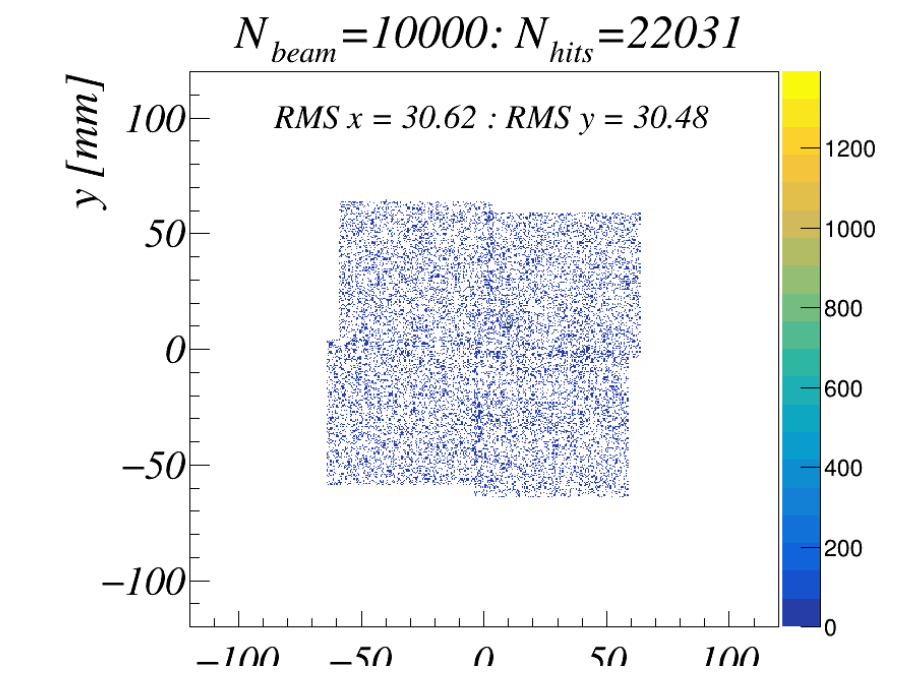
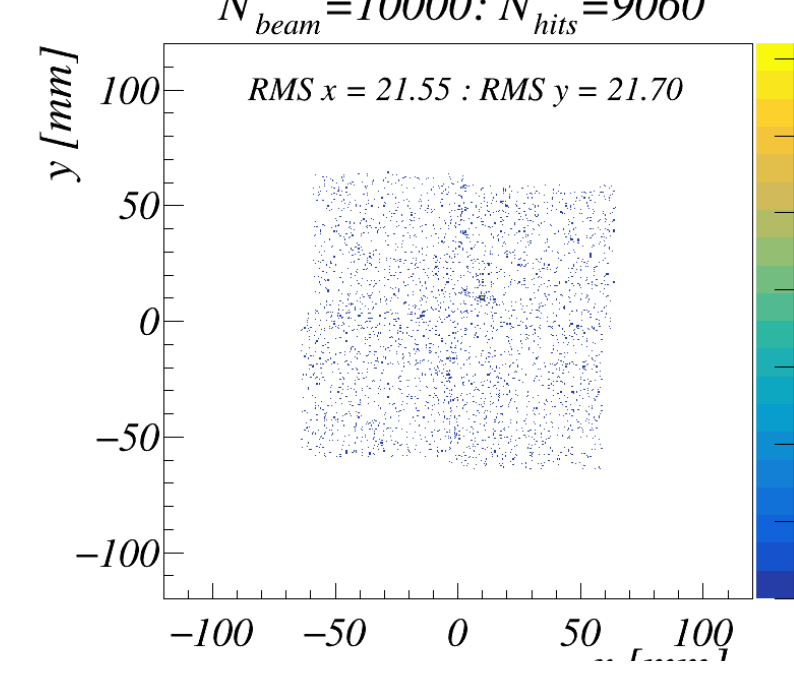
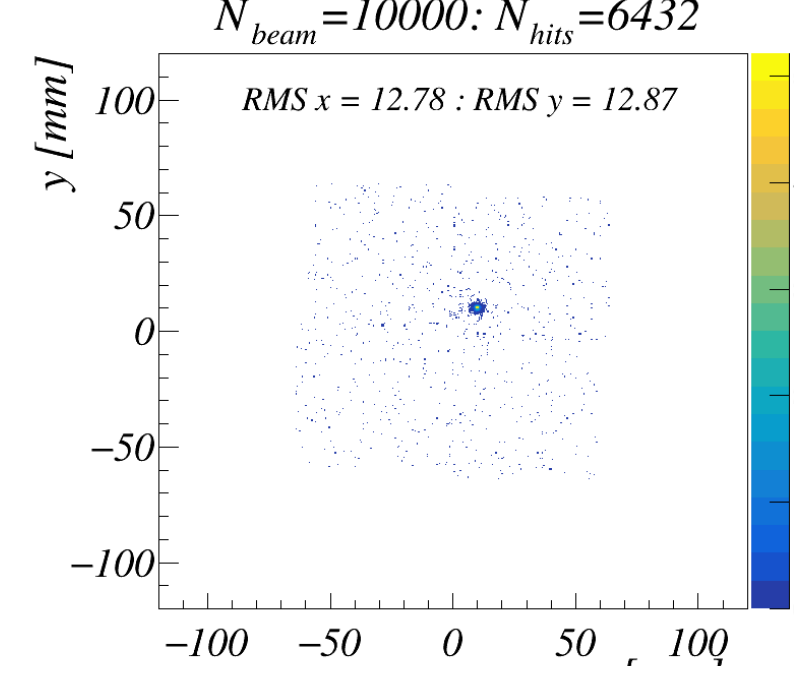
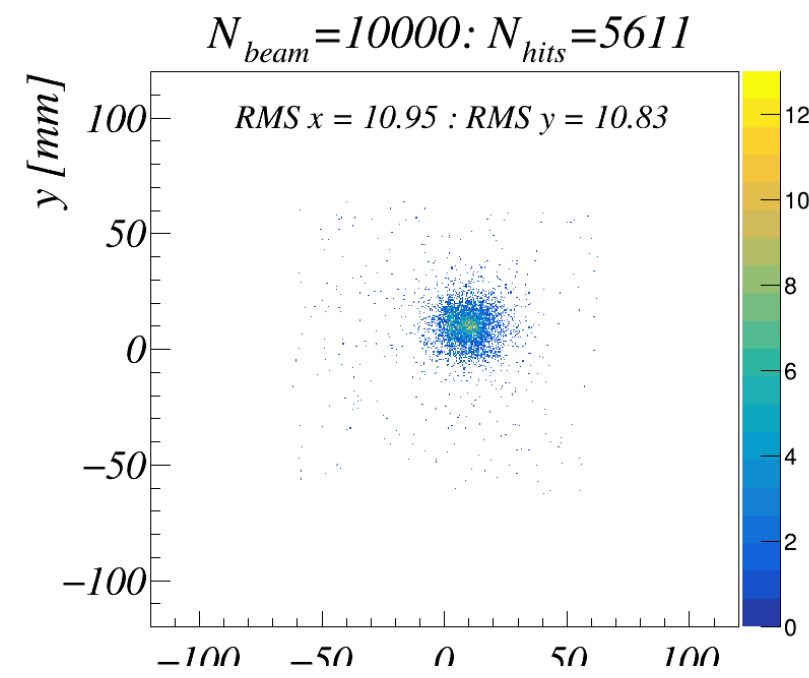


e- beams (+ shower e+e-)

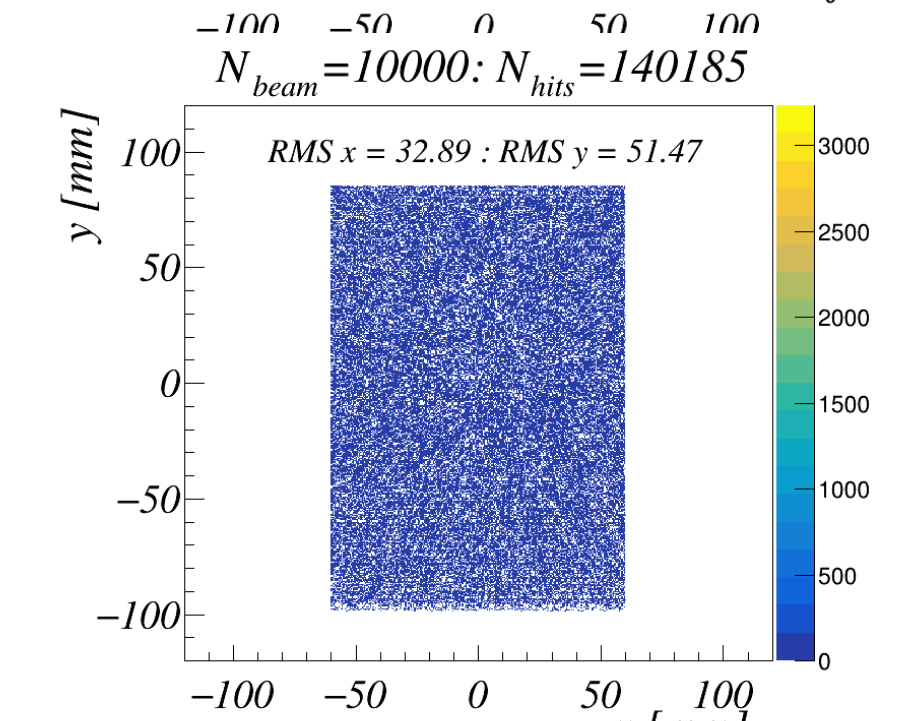
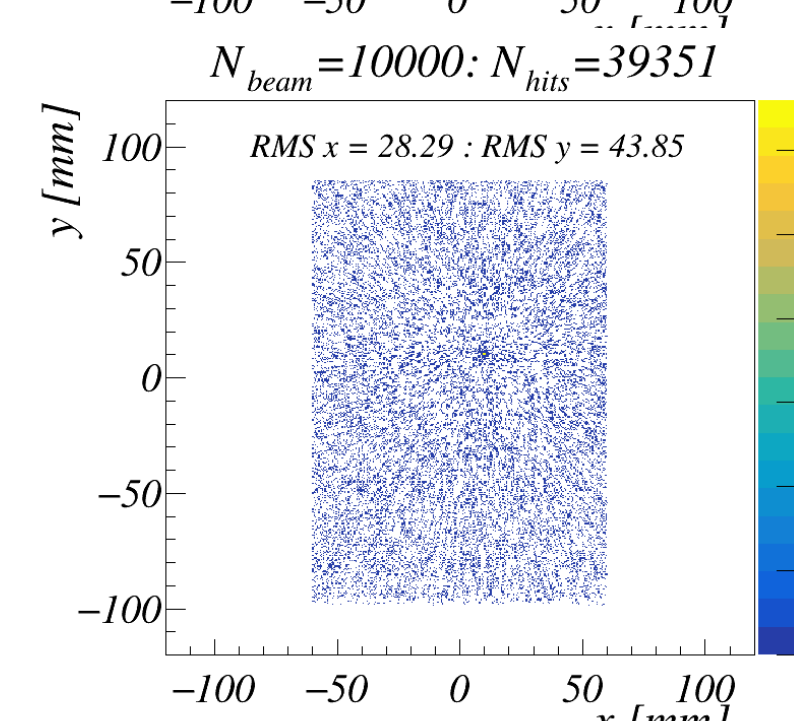
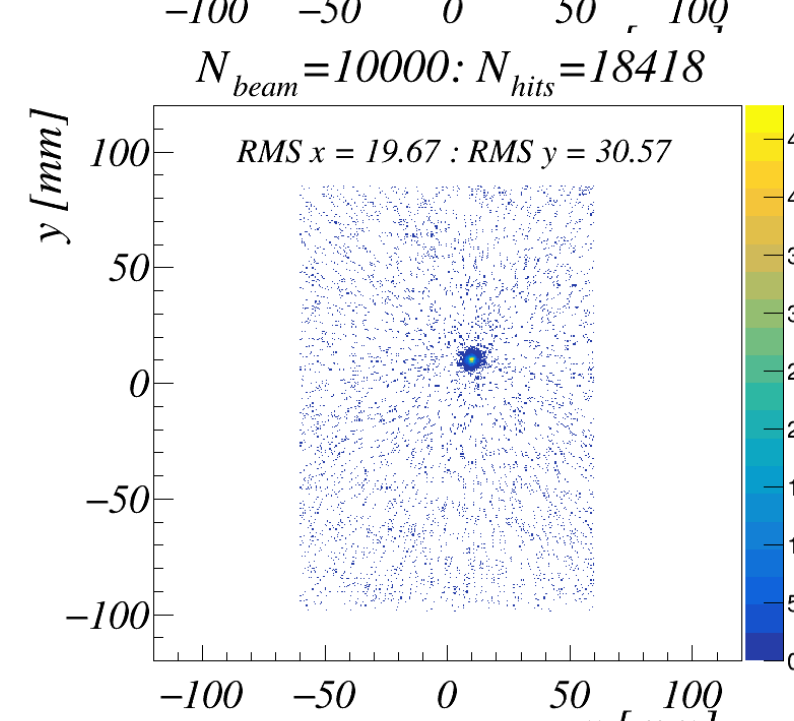
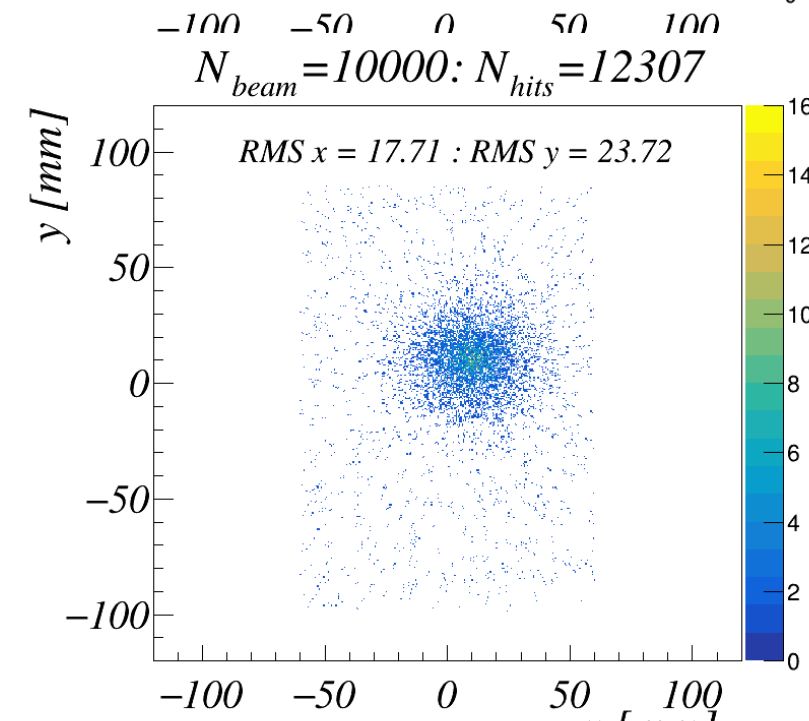
SI N1



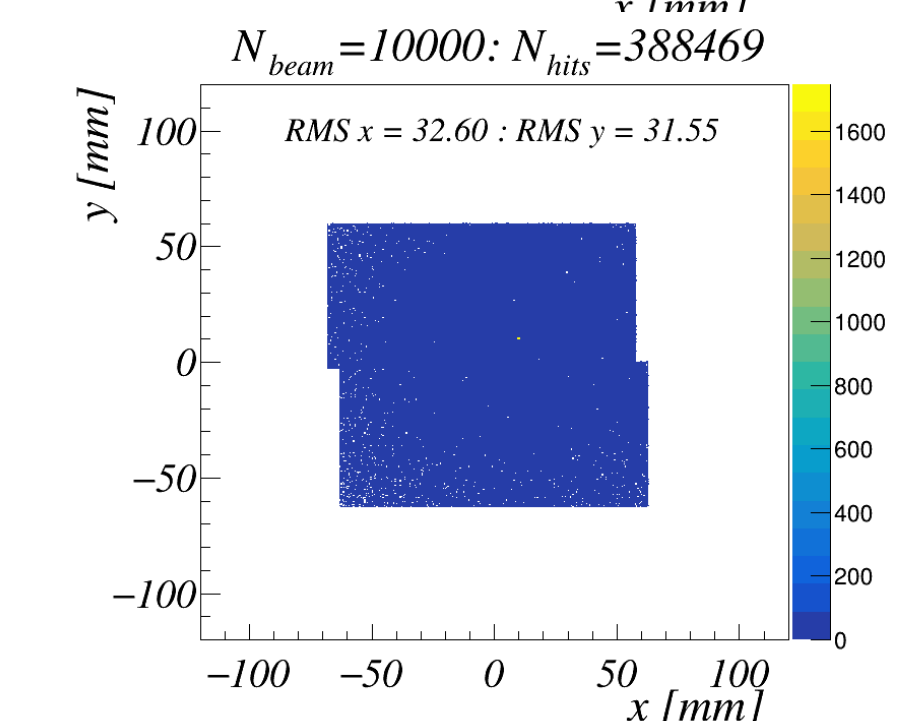
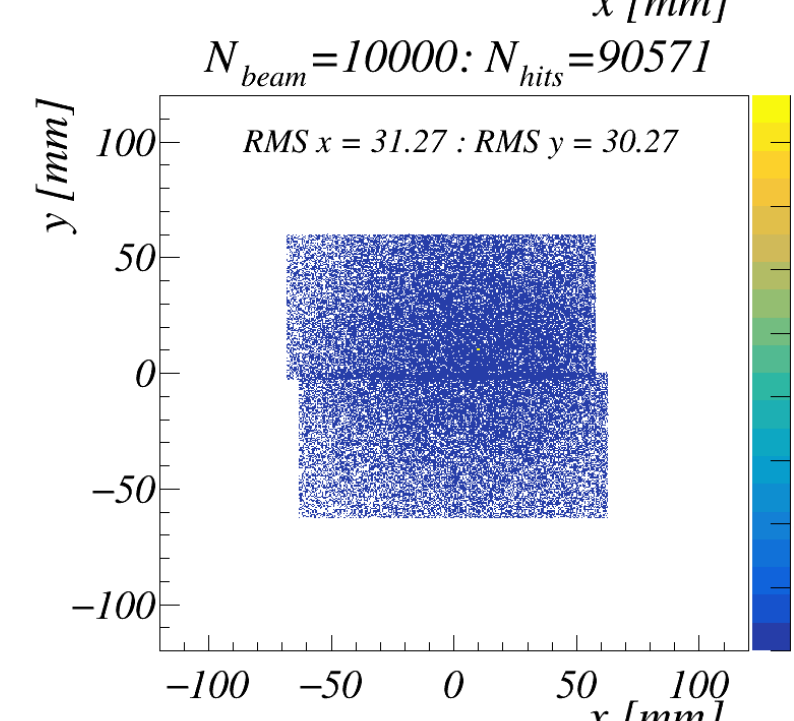
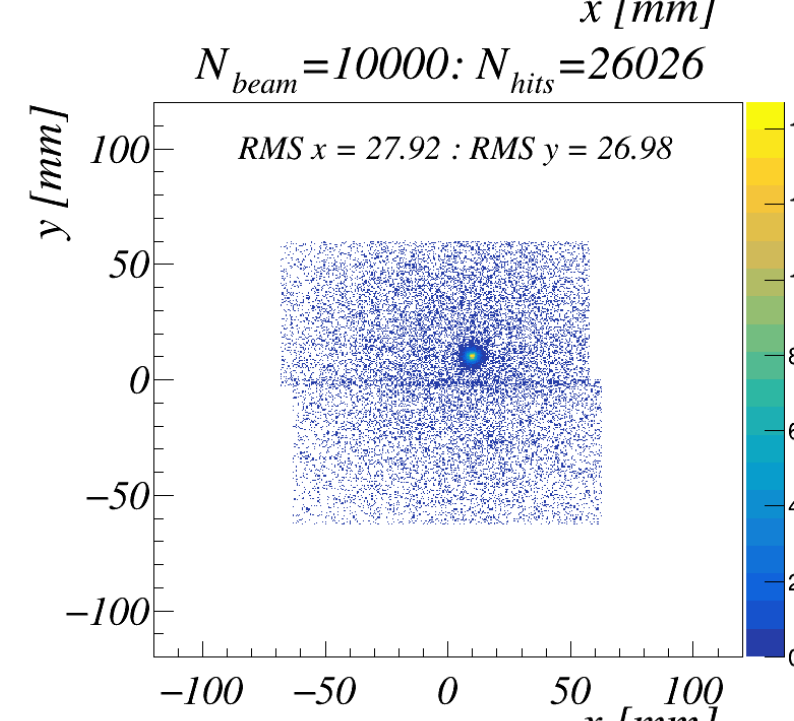
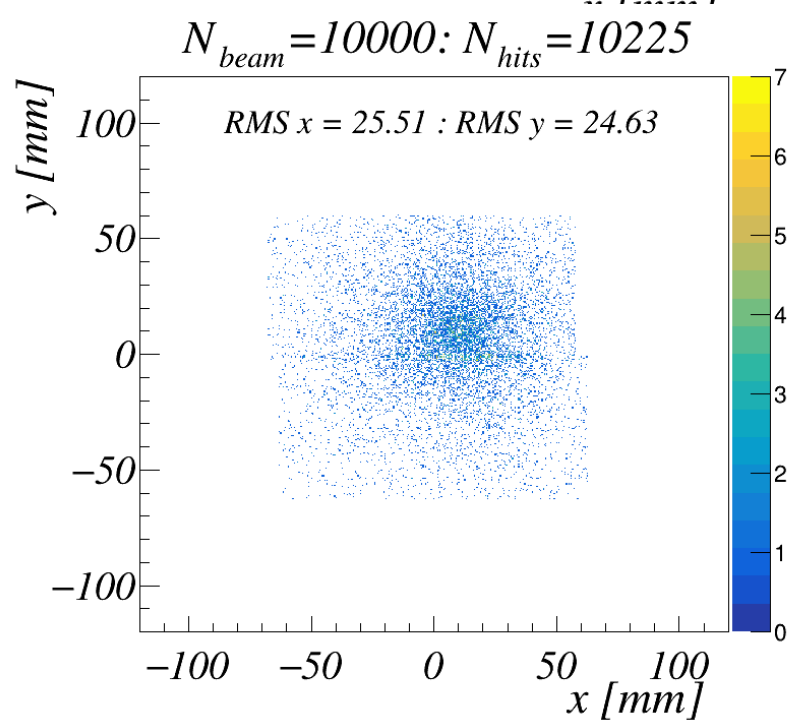
SI N2



Straw

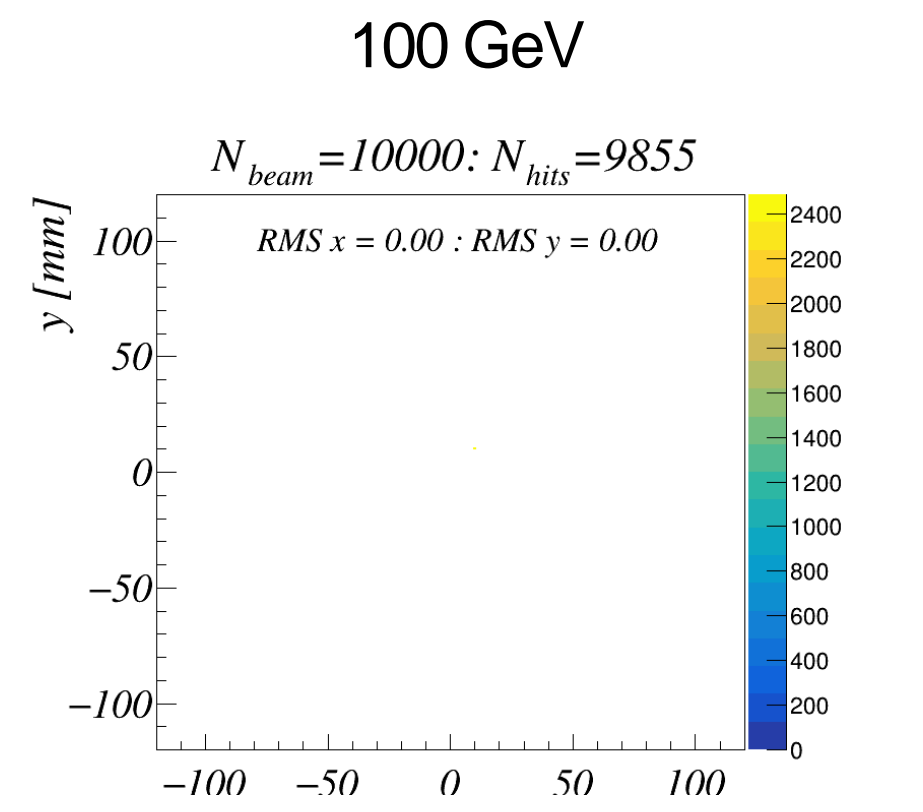
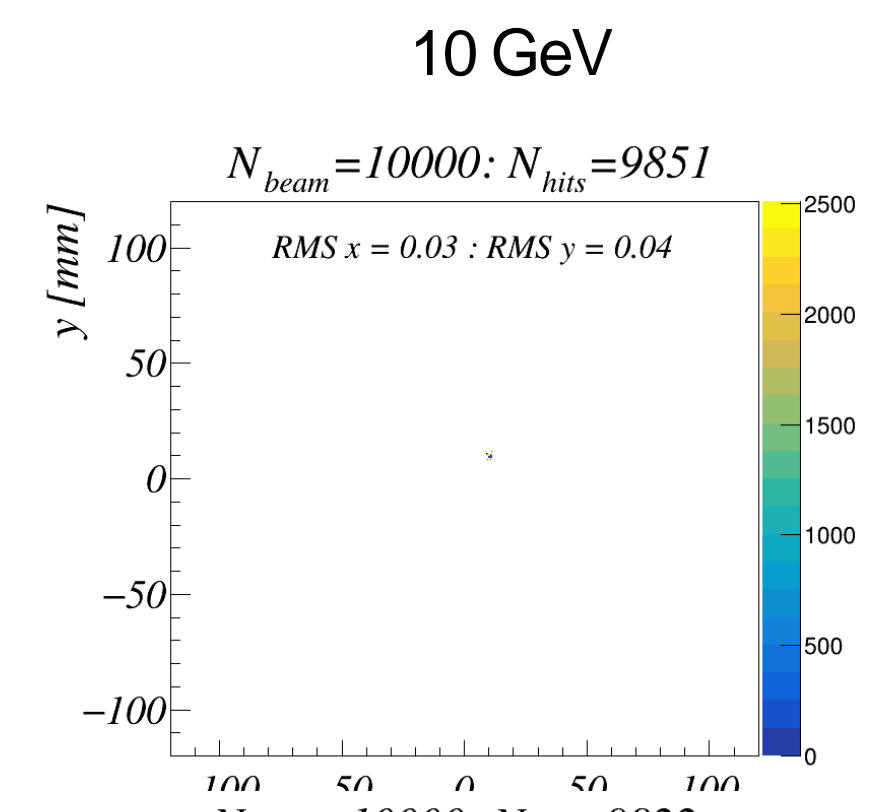
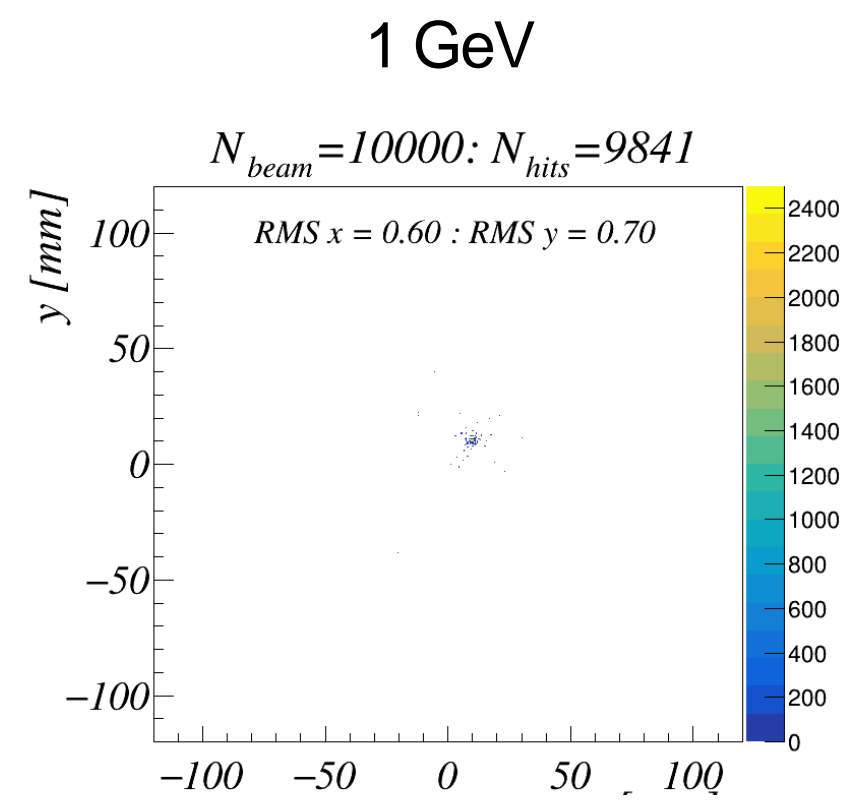
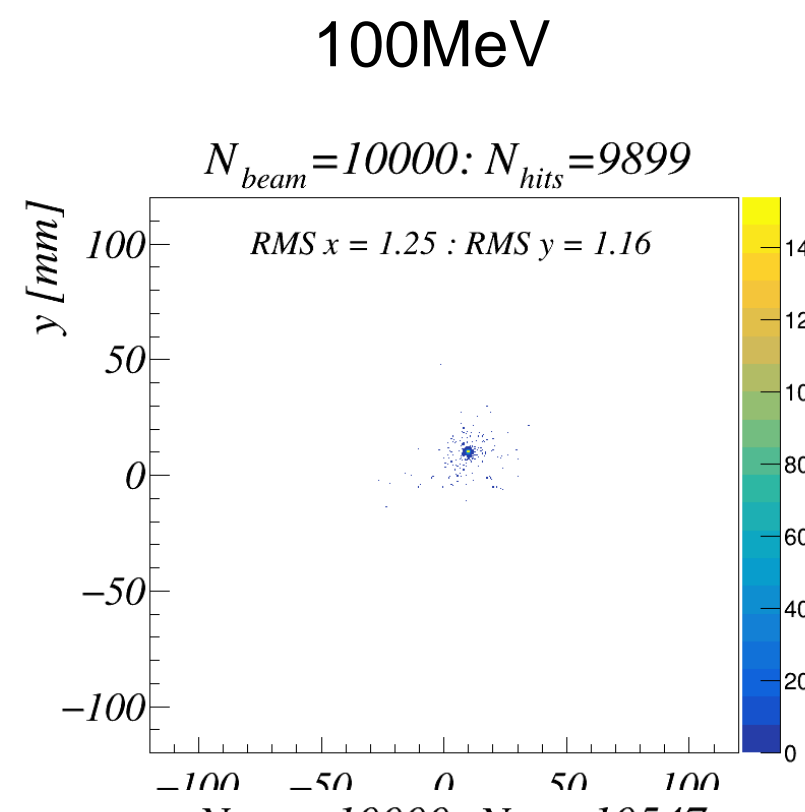


SI N3

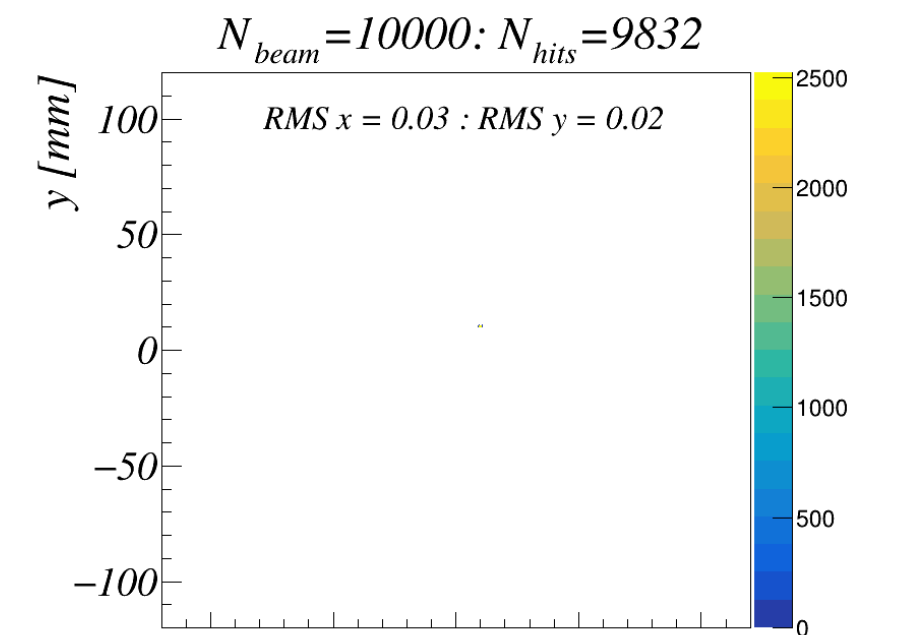
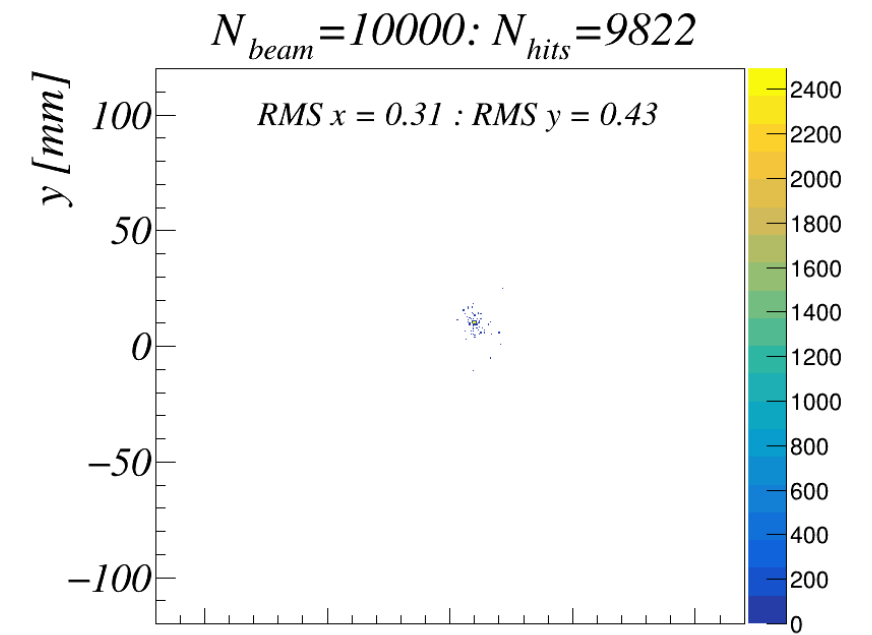
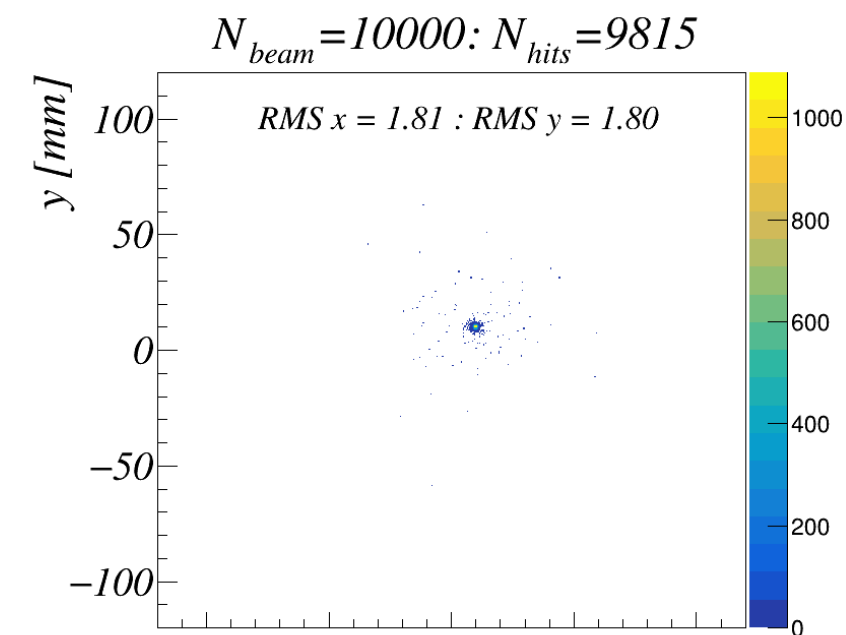
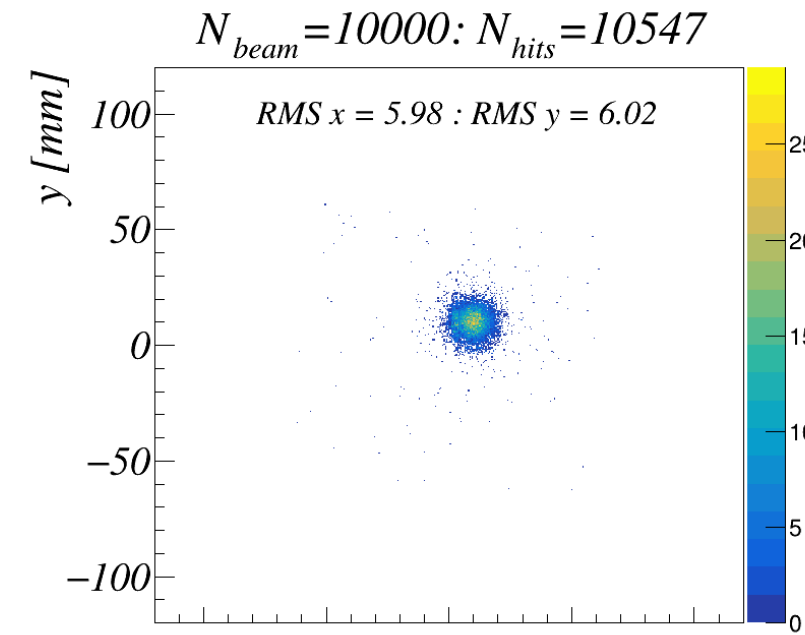


proton beams

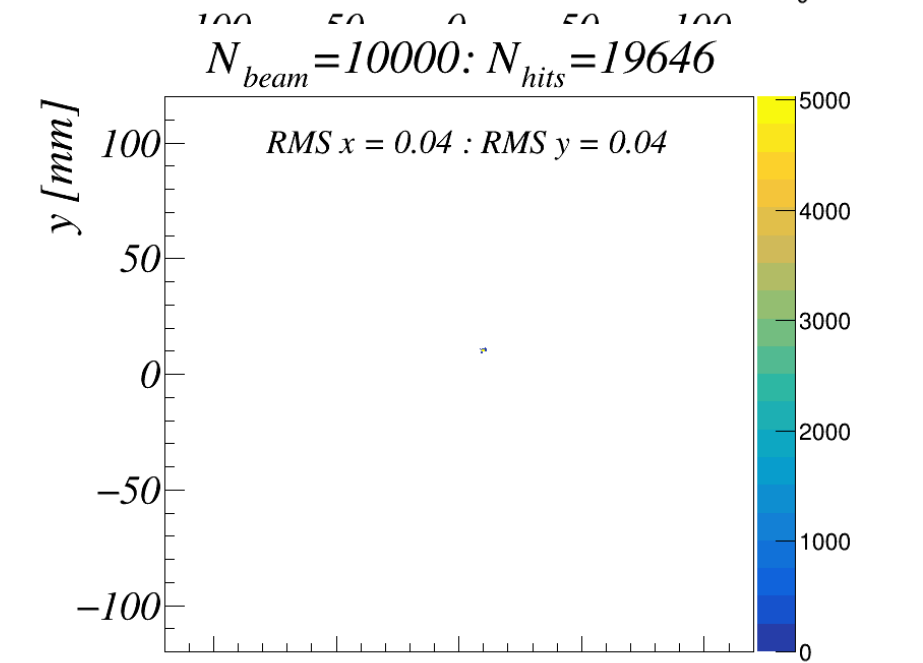
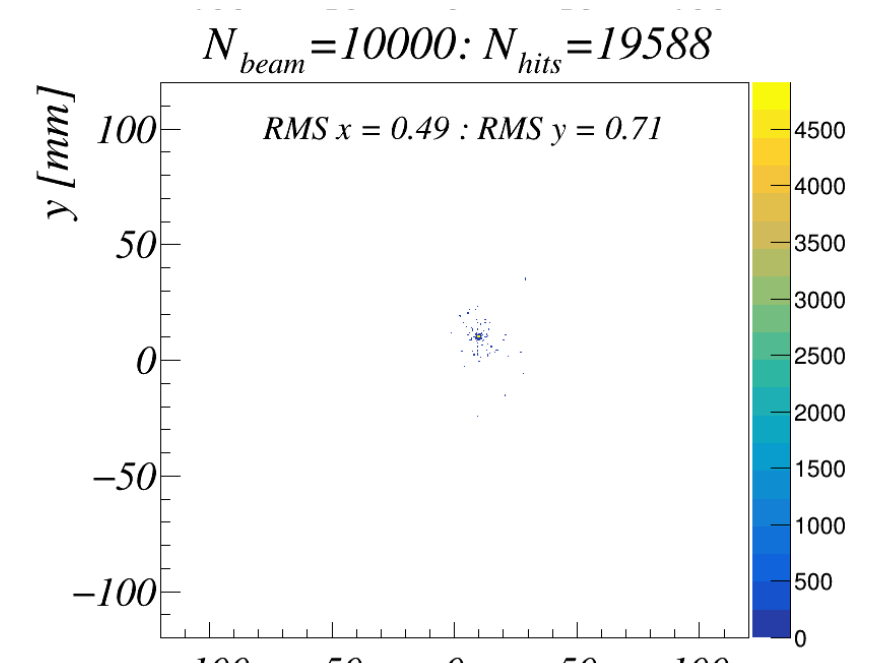
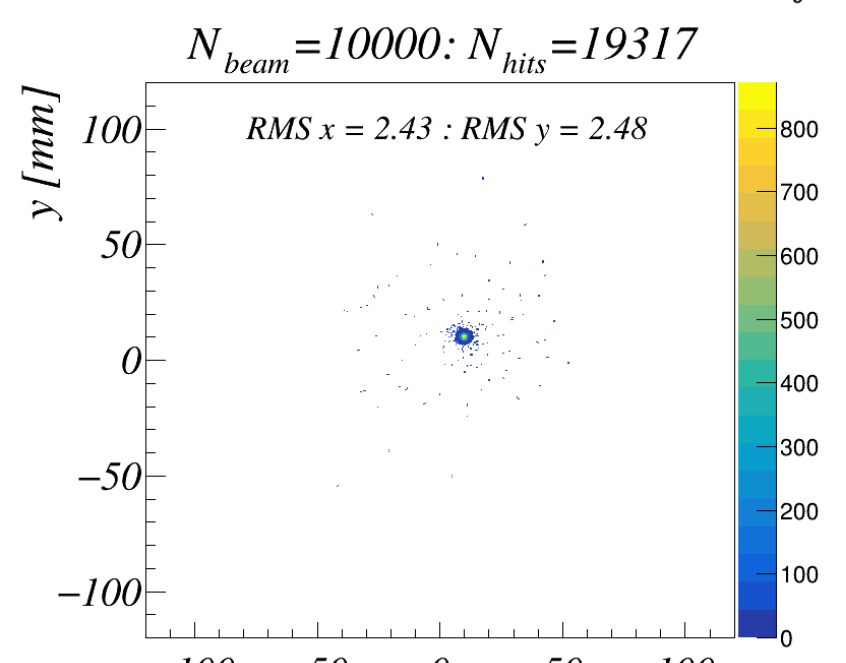
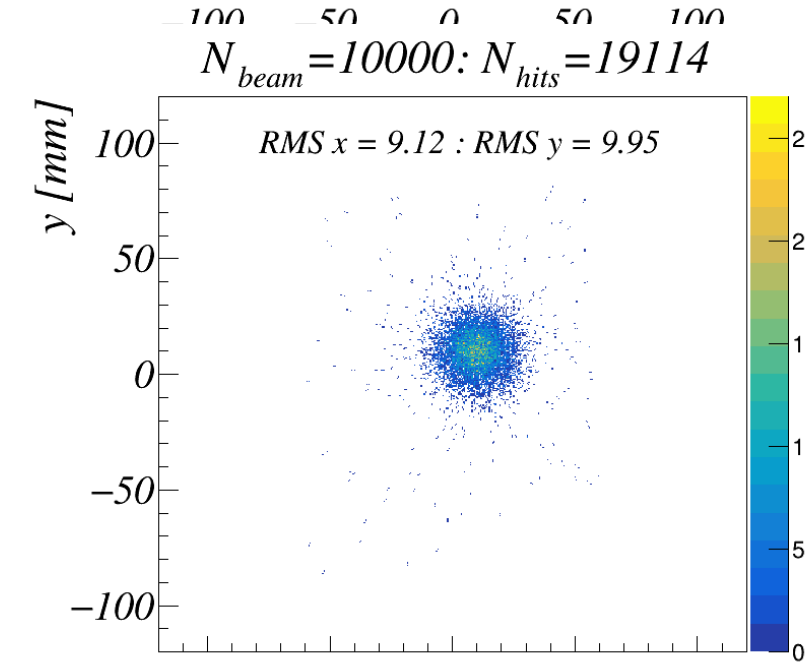
SI N1



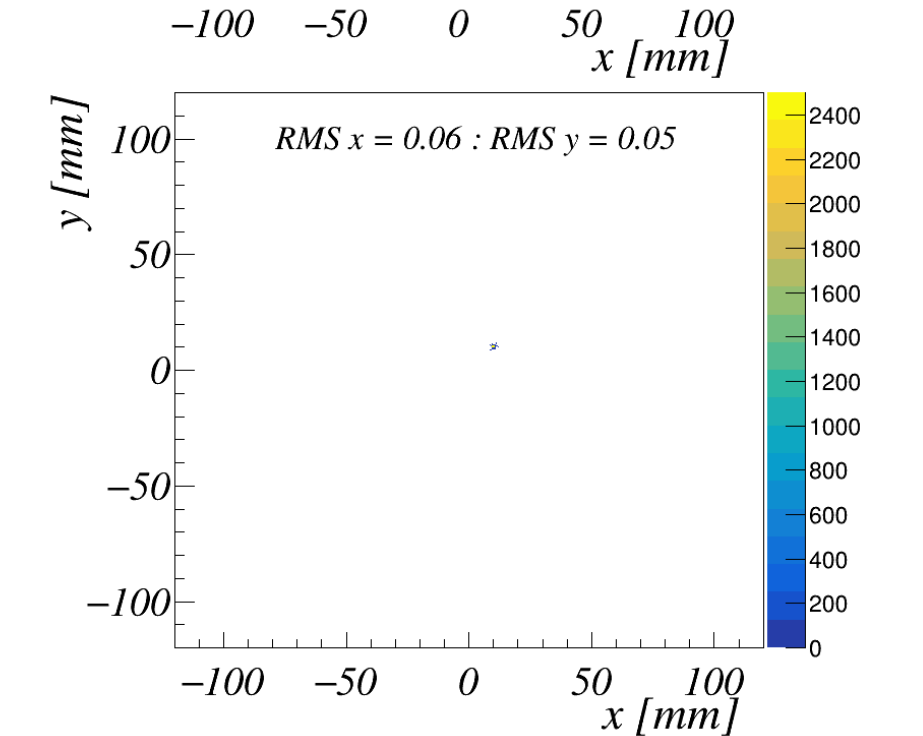
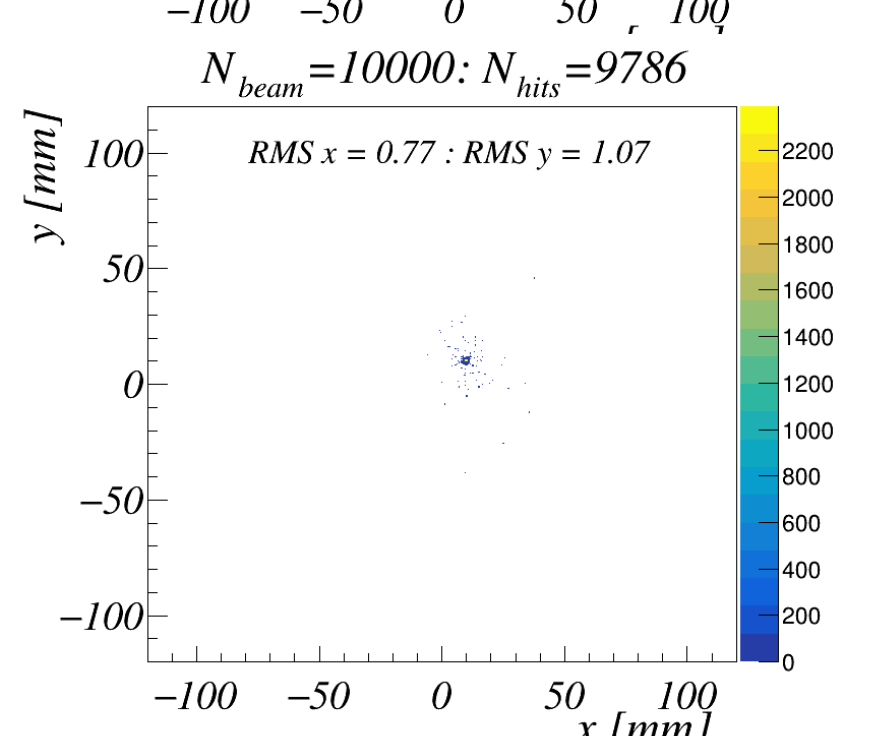
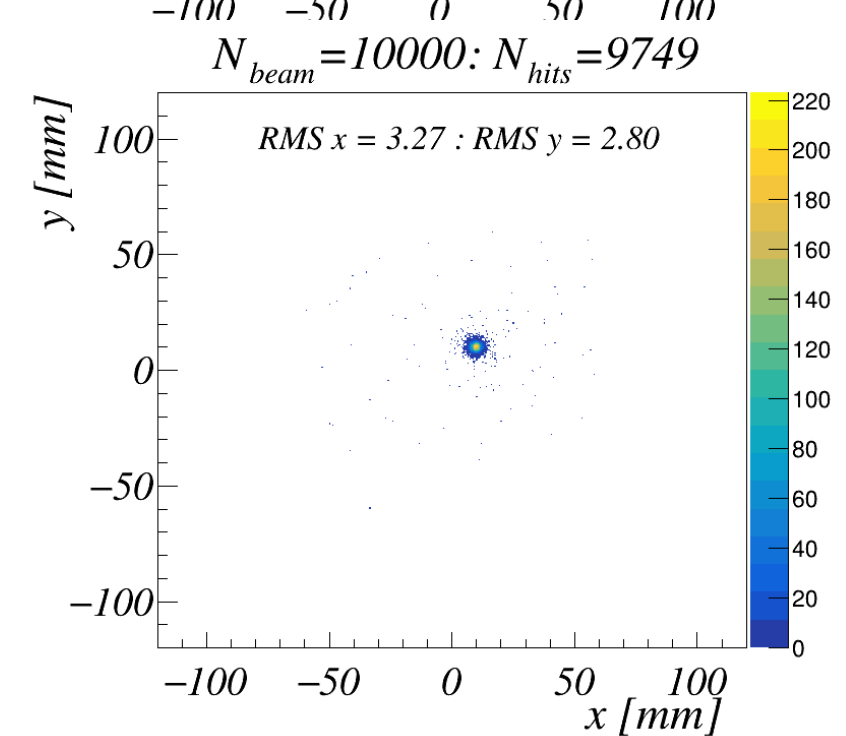
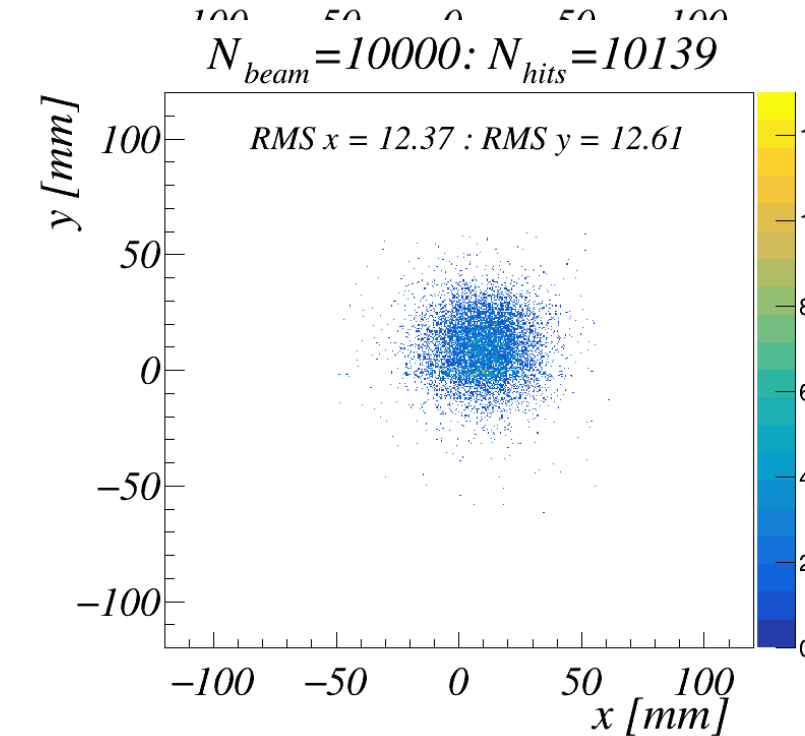
SI N2



Straw



SI N3



Conclusions

- at this stage of the work the simulation has given us an understanding of which kind of particles are best to test the stand on.
- have identified the range of energies should we need to work with

The model can help solve many tasks in the future.

Planned in the near future

- Take into account the cosmic ray flux angular distributions.
- Include RS in simulation

Thank you for your attention !