

Updates on the FTM test beam preparation and simulation

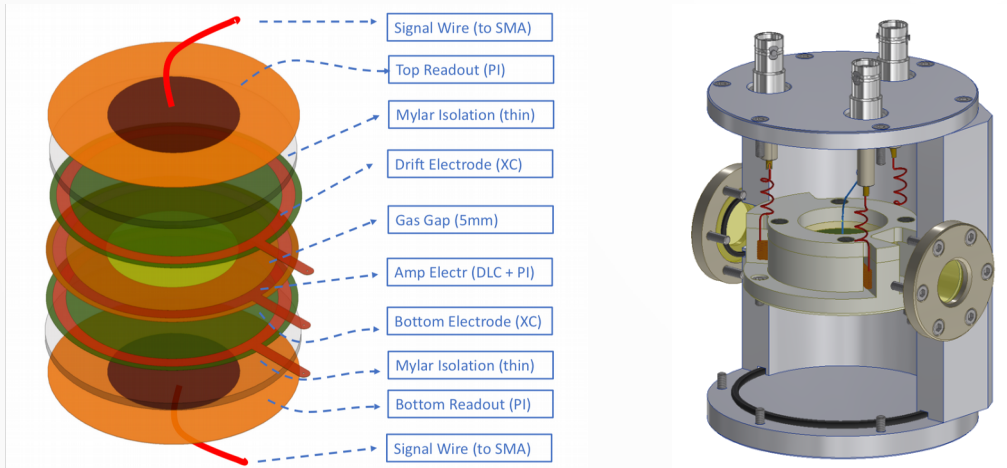
Antonello Pellecchia

28 February 2020

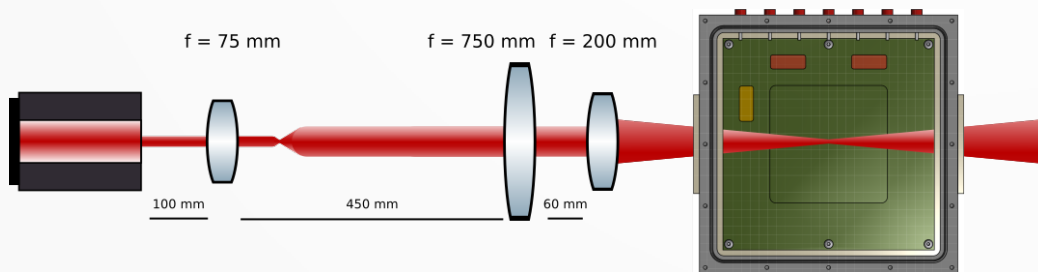
Topics

- Early tests in Bari on small-size FTM
- Test beam setup
- Preparation and simulations for the test beam

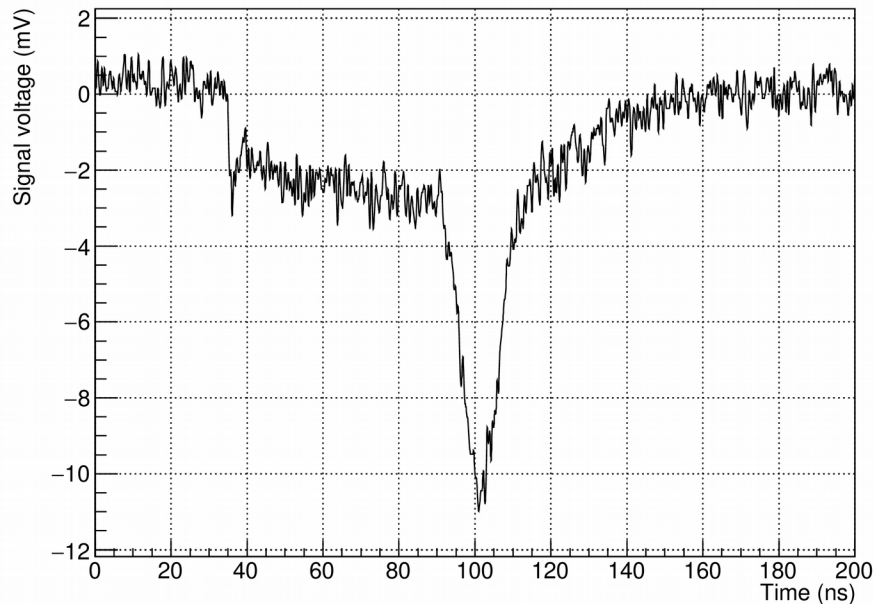
First tests on the small prototype



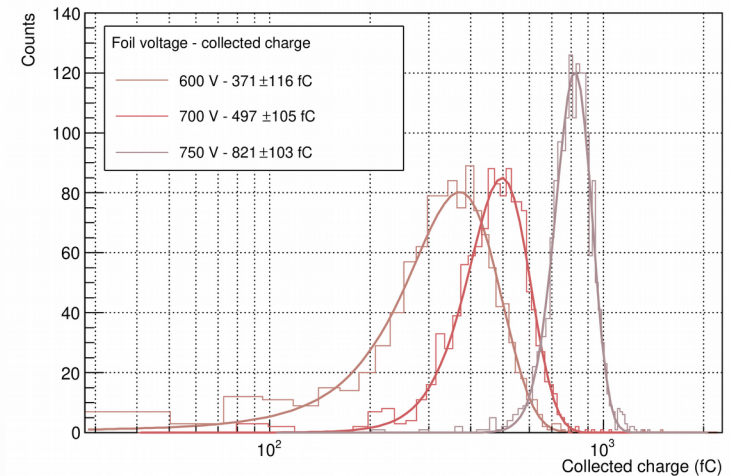
- Tests performed in the laser box in Bari
- Laser beam focused to 15 μm
- Signal readout with CIVIDEC 40dB amplifier + oscilloscope



First tests on the small prototype

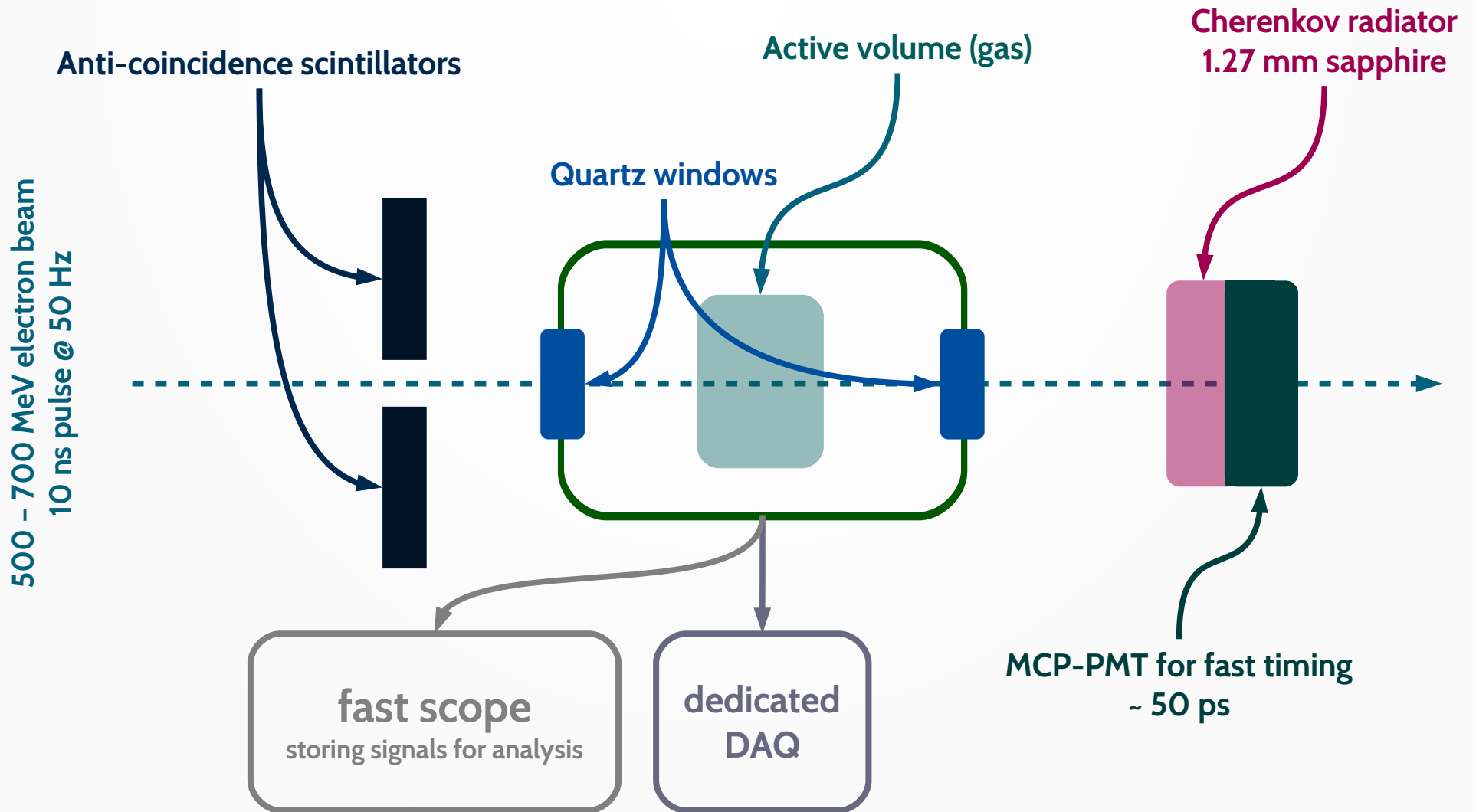


Example of acquired signal

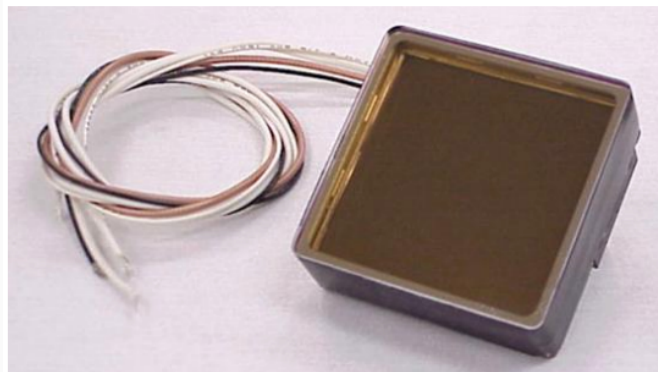


- Measured collected charge spectra
- No information on primary charge available
 - It was not possible to perform a gain calibration

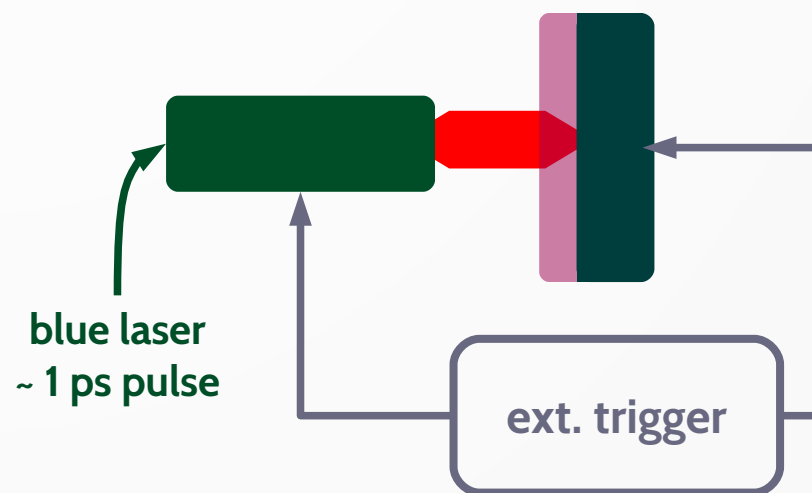
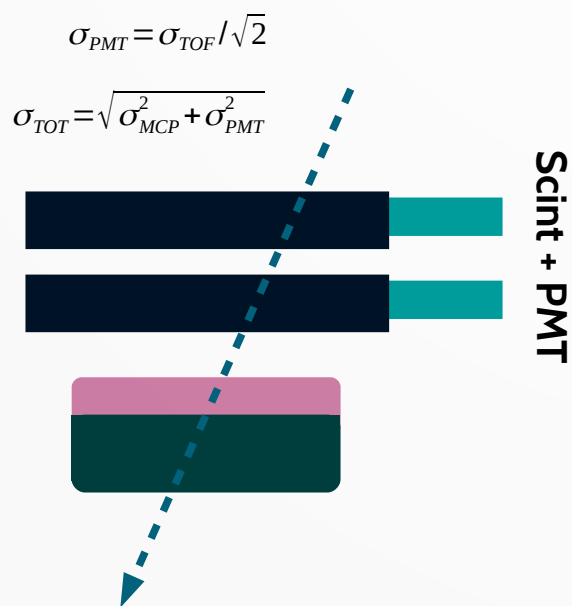
Tentative test beam setup (in progress)



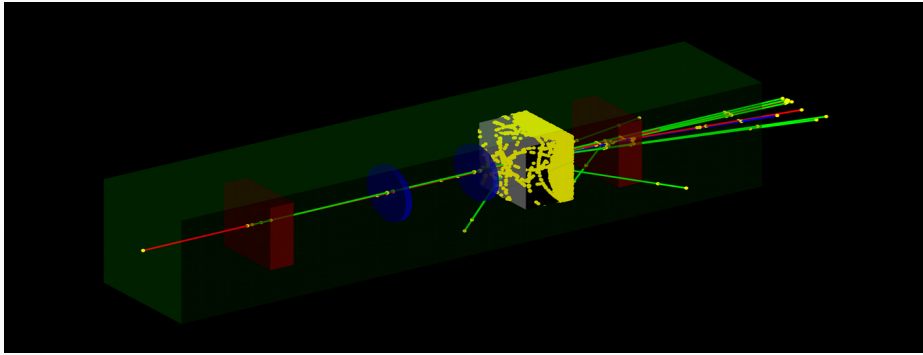
In preparation for the test beam



- The MCP-PMT has arrived
 - Planacom XP85012
- Two time resolution measurements in the next days:
 - Cosmic rays
 - With laser



Test beam simulation (in progress)



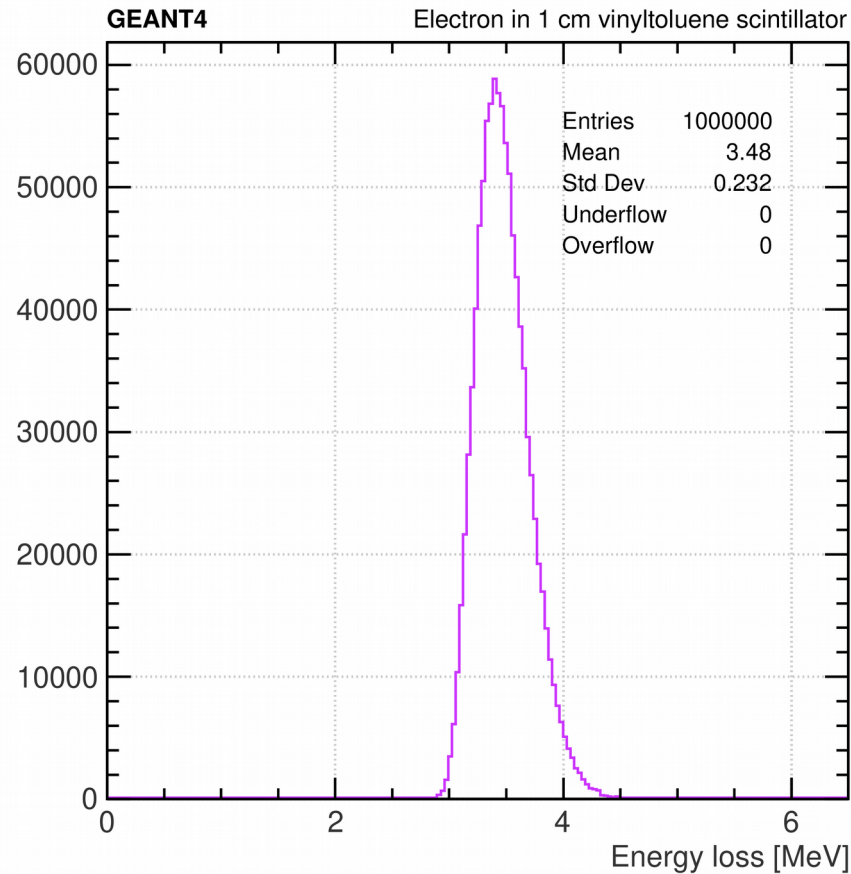
Source beam

- 500 MeV electrons
- Gaussian profile, 1 mm electron beam

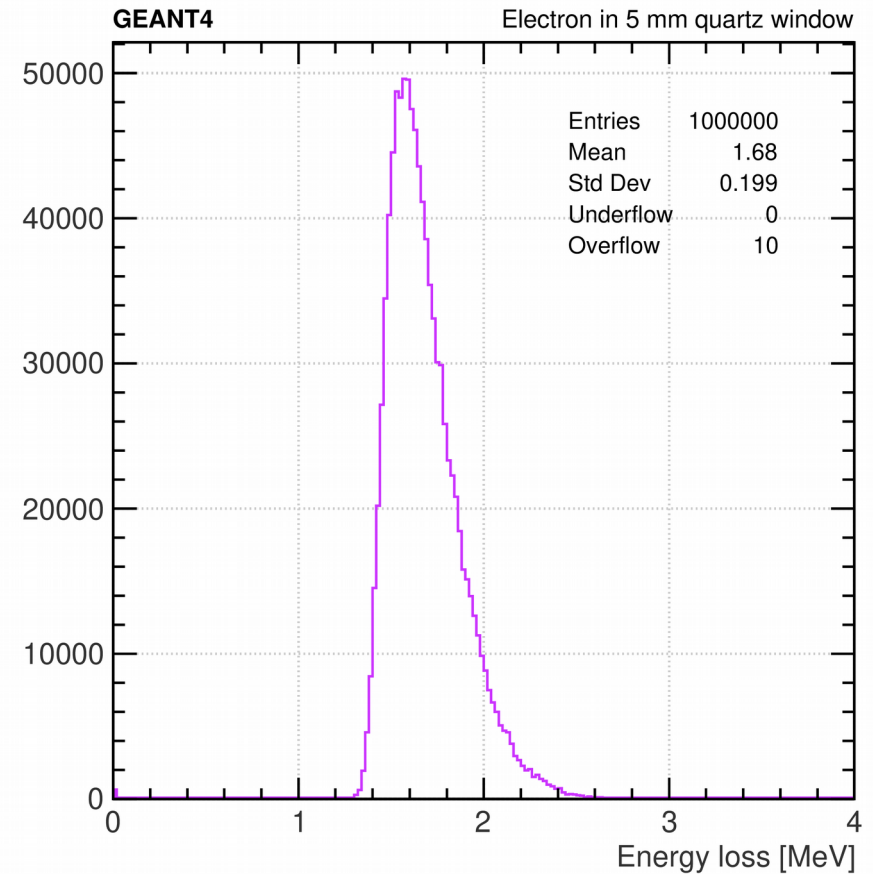
Simulated volumes

- 1 cm VT scintillator
- two 5 mm quartz windows for the energy loss inside the FTM
- 1.27 mm sapphire volume
 - Cherenkov yield
 - photon arrival times

Beam energy losses

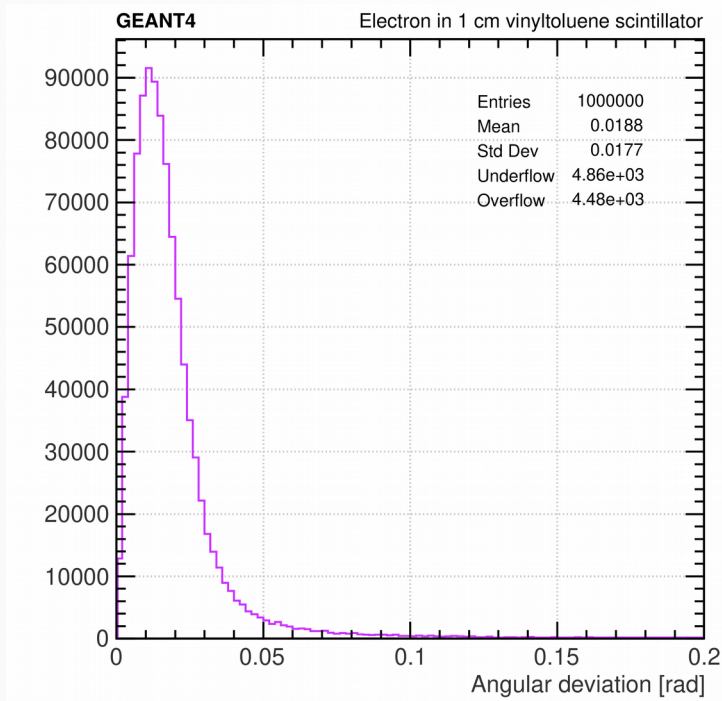


3.48 ± 0.23 MeV loss in scintillator

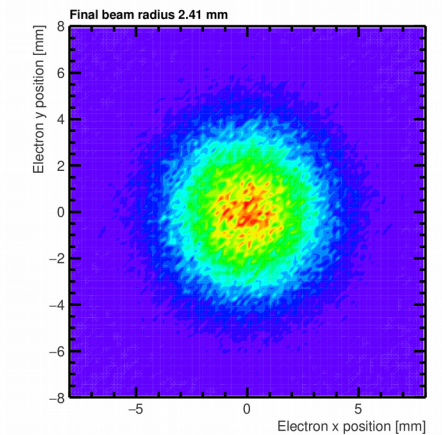
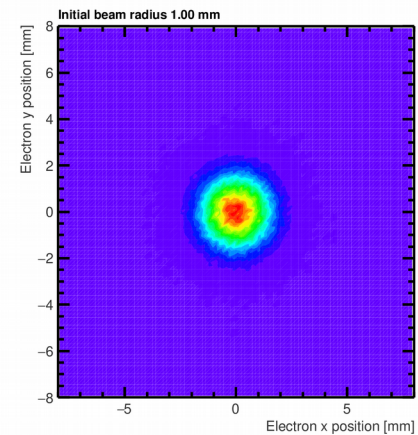
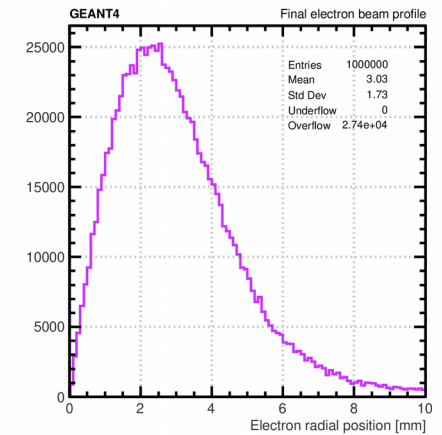
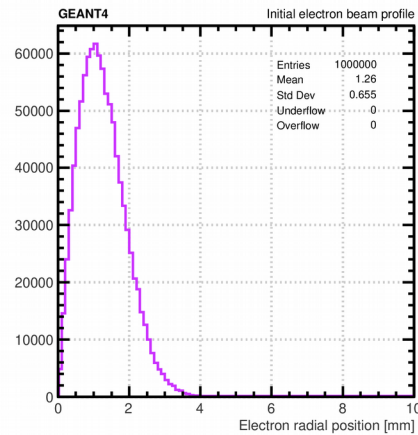


1.68 ± 0.2 MeV loss in each quartz window

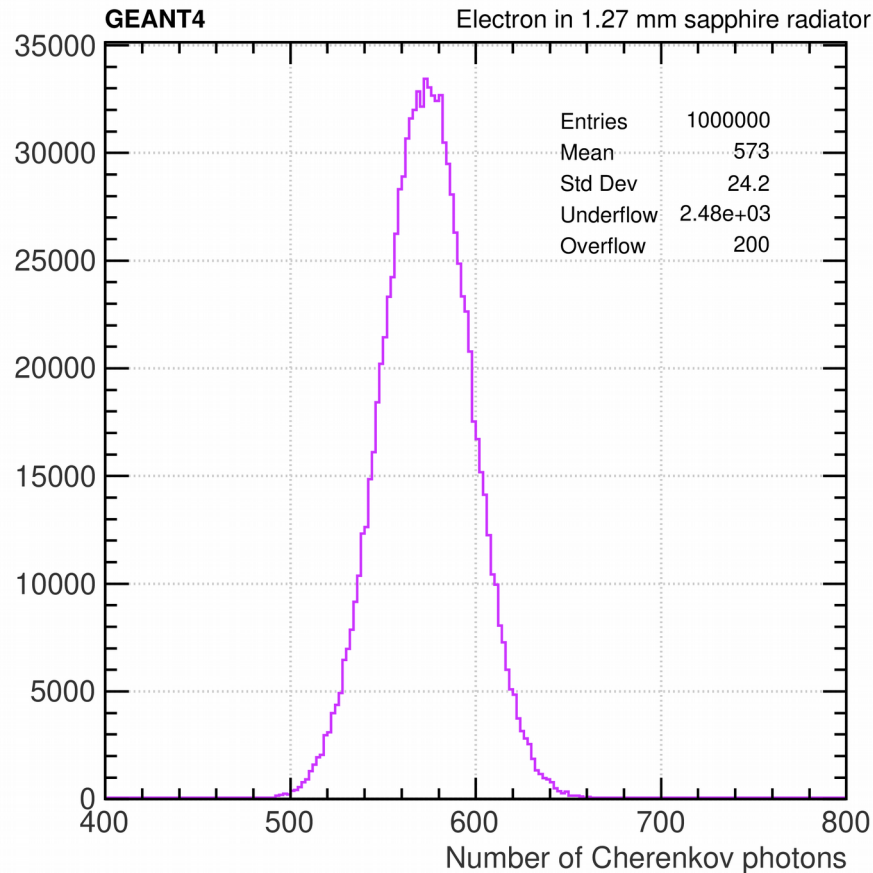
Beam deviation and angular divergence



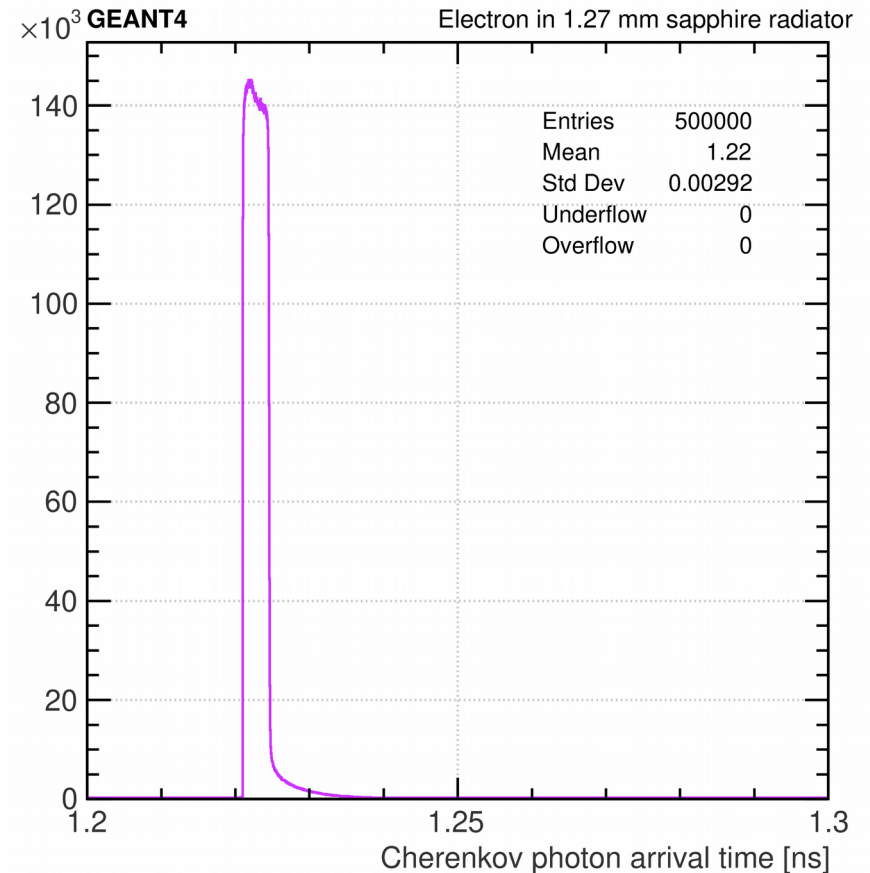
4° angular divergence



Cherenkov yield and arrival times



573 ± 24 Cherenkov photons



3 ps time window