# HiDRa Simulation & Analysis Updates

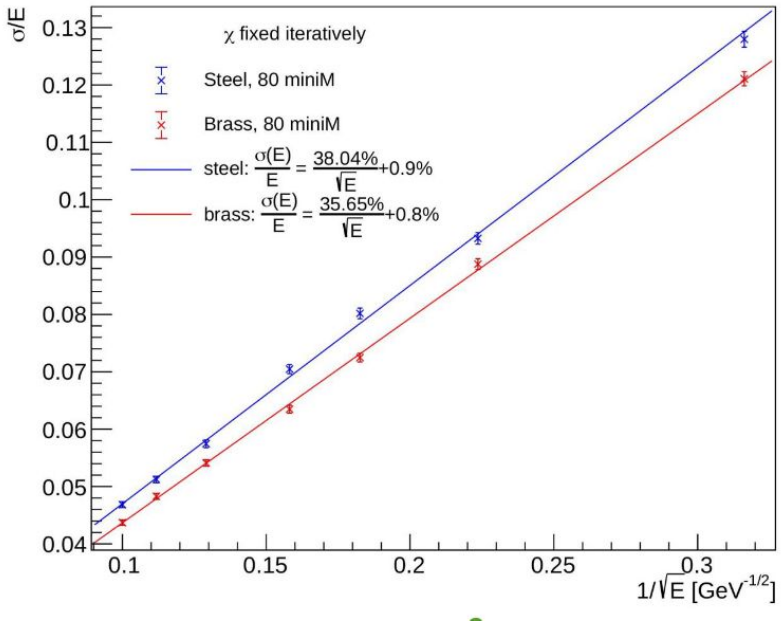
15/02/2023

Andrea Pareti - INFN and Universita’ di Pavia

# Recap

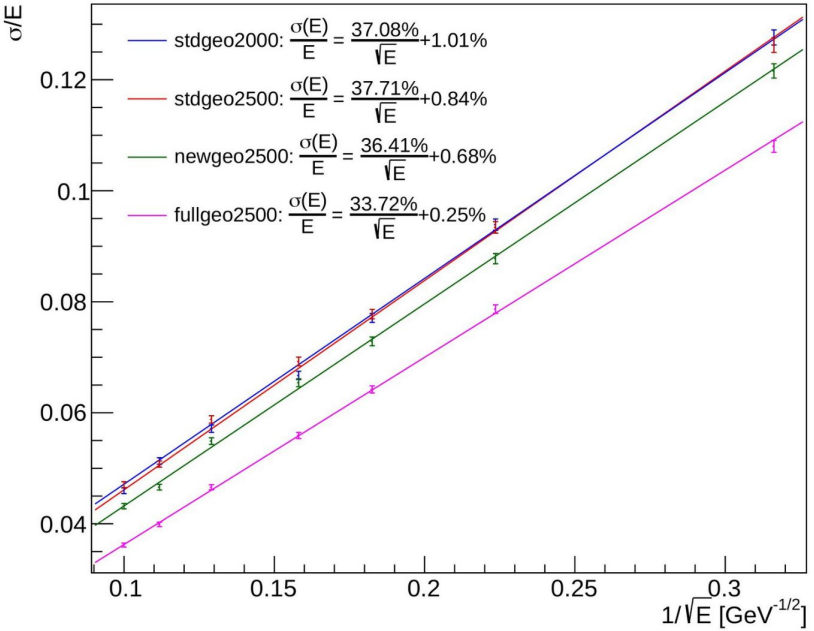
HiDRa Sim with 80 mini-modules and 2mm outer capillary diameter

Pion resolution in [10, 100] GeV Range




Impact of Calo Geometry, from 84 to 120 and 480 mini-modules (Steel, 2mm capillaries)

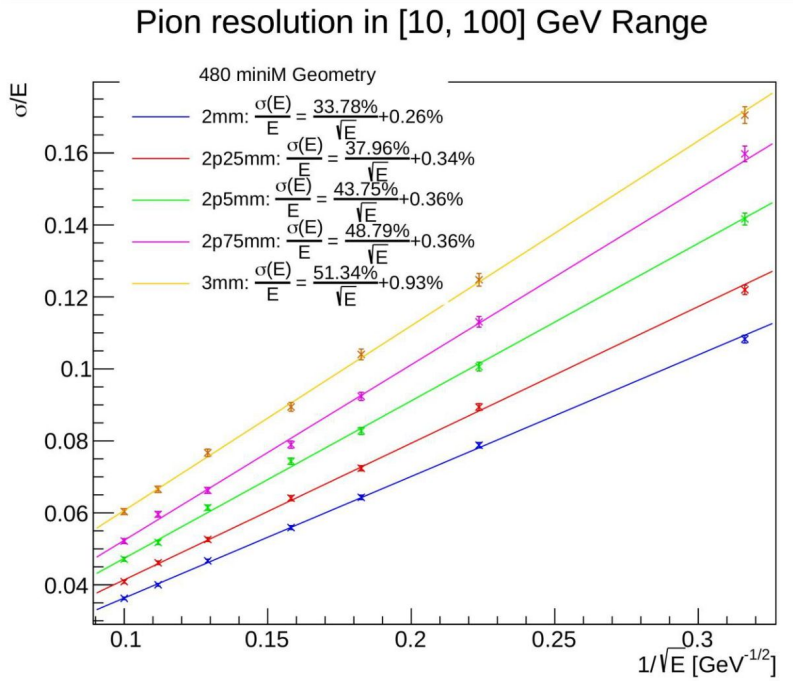
Pion resolution in [10, 100] GeV Range

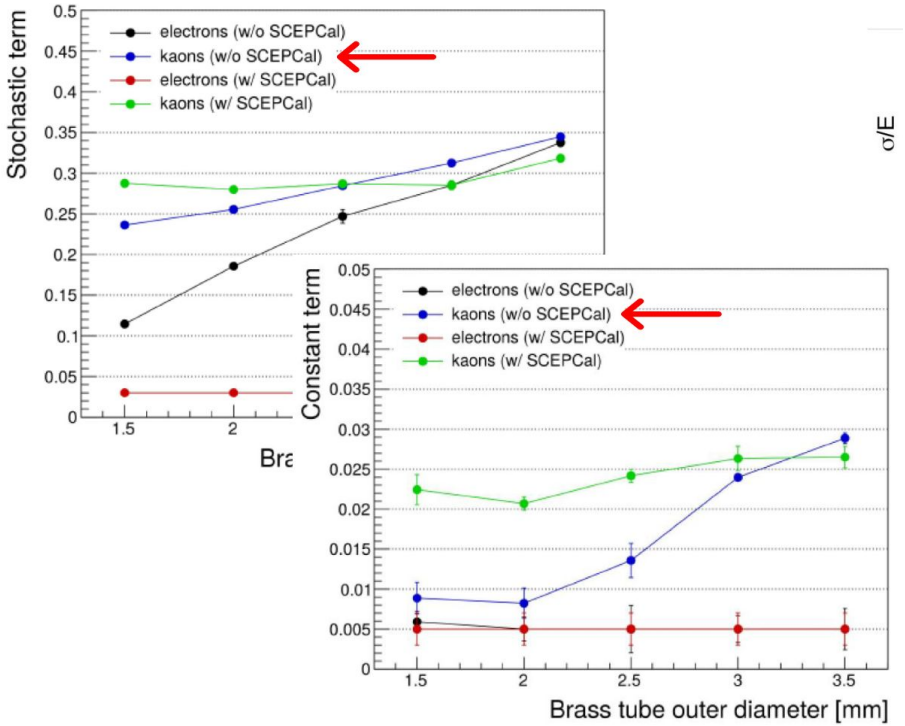


# Recap

Fixing Steel absorber and 480 miniM, change capillary outer radius

Results from Marco Lucchini (INFN & UniMiB)

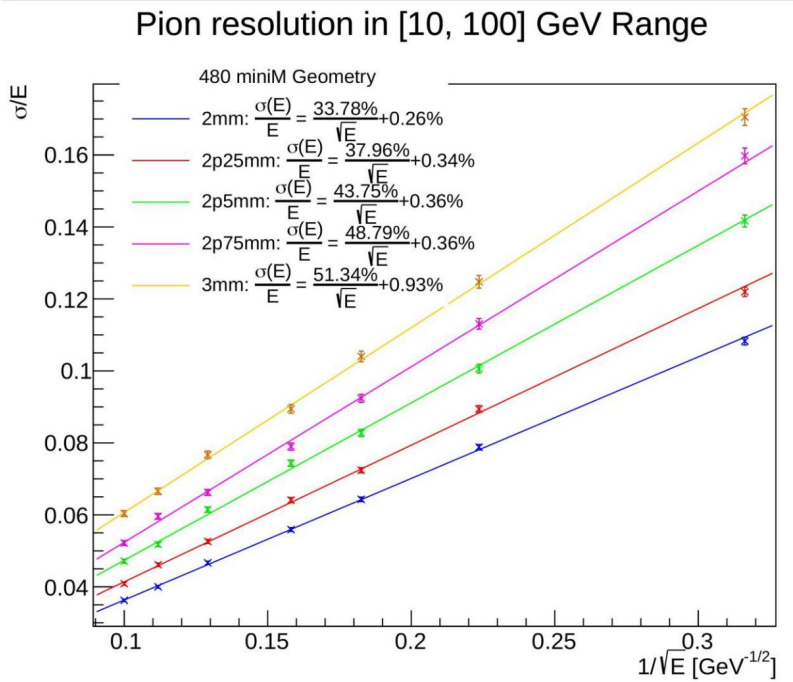


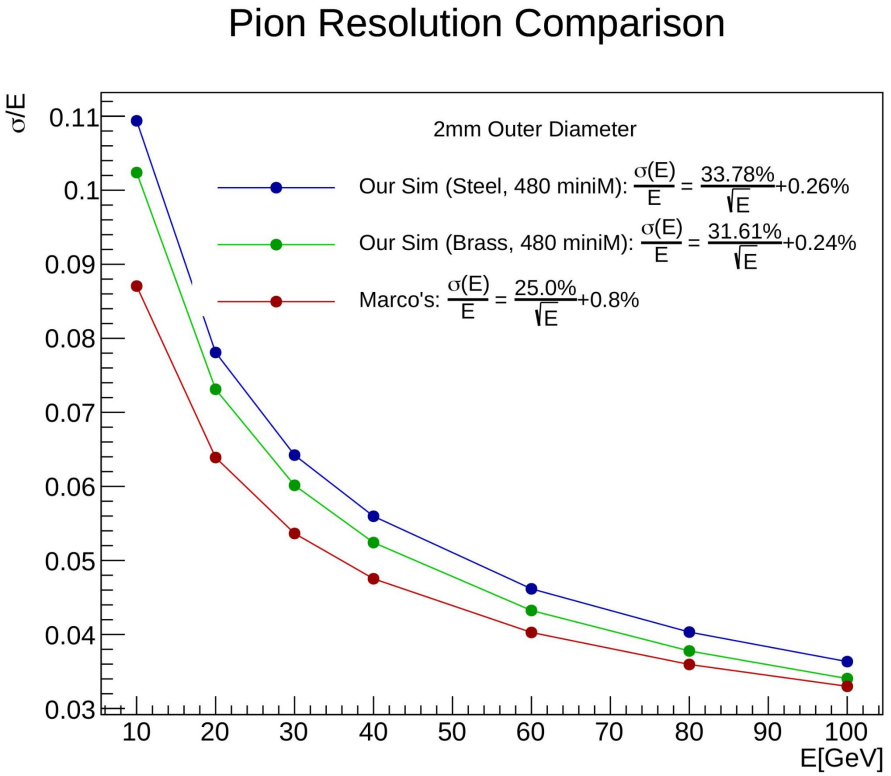



# Recap

Fixing Steel absorber and 480 miniM, change capillary outer radius

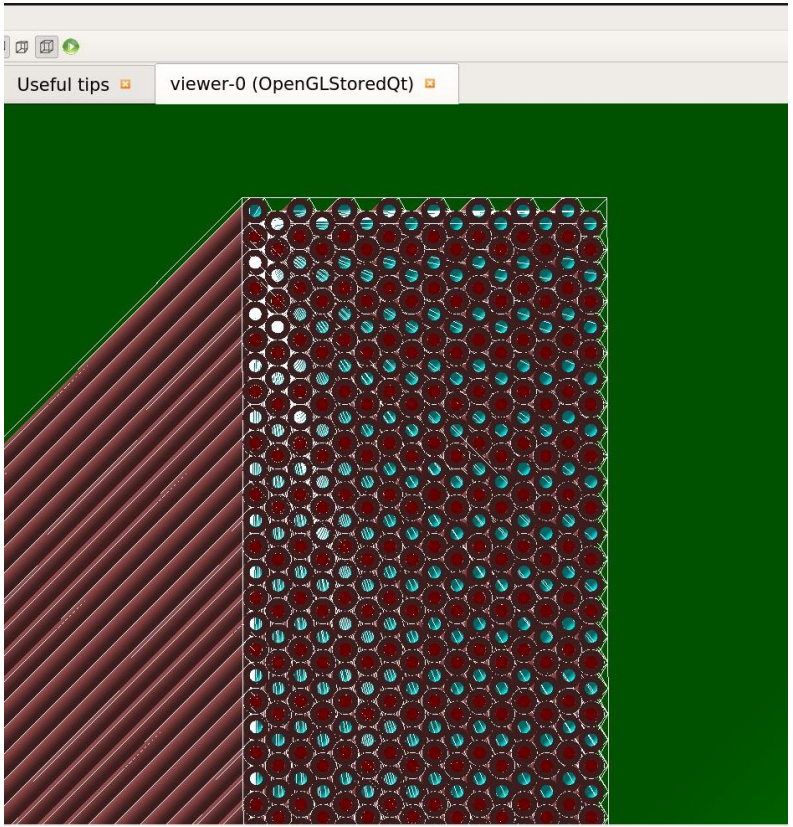
Results from Marco Lucchini (INFN & UniMiB)



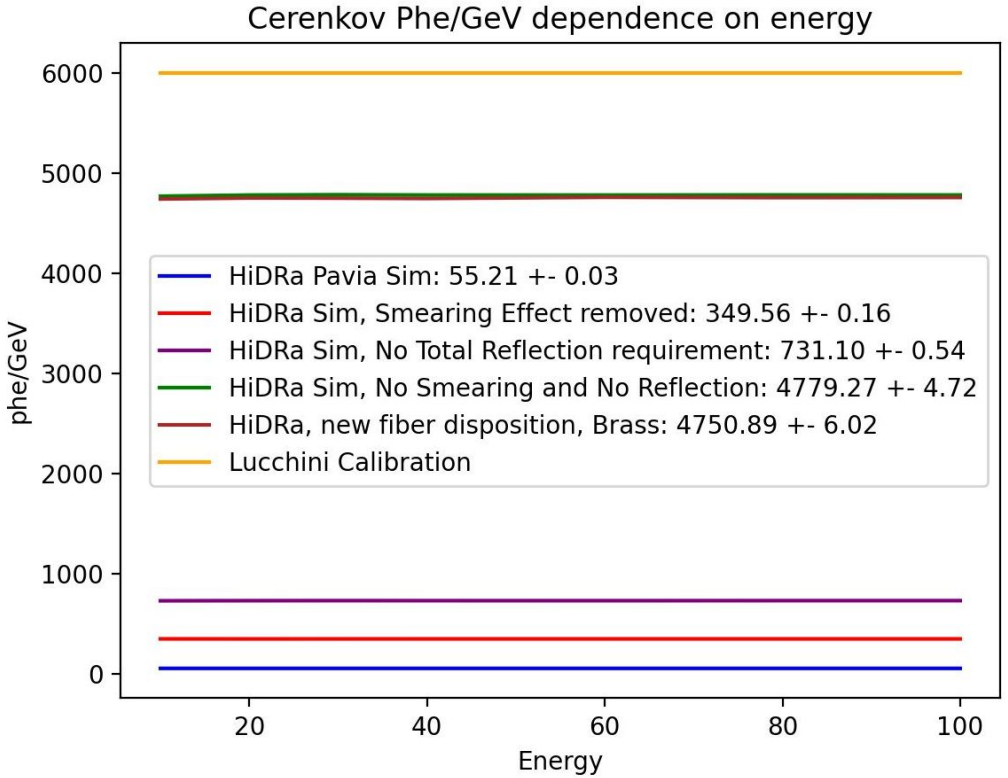
# Simulation Comparison

- Implemented Marco's Fiber disposition



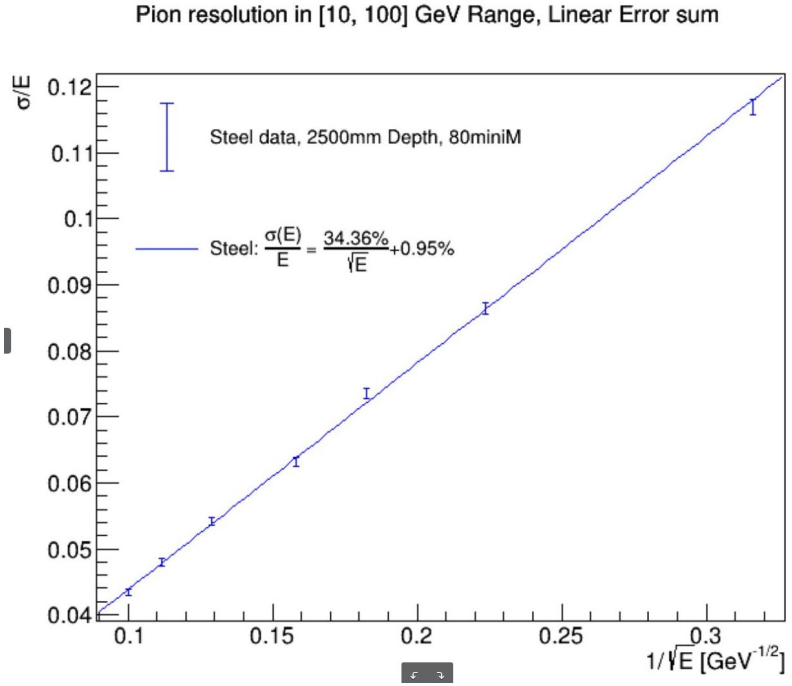
# Simulation Comparison

- Implemented Marco's Fiber disposition
- Studied Optical photons propagation inside the Cerenkov fibers.
  Marco's Sim doesn't consider
  - Possonian Smearing Effect
  - Total Reflection inside fibers

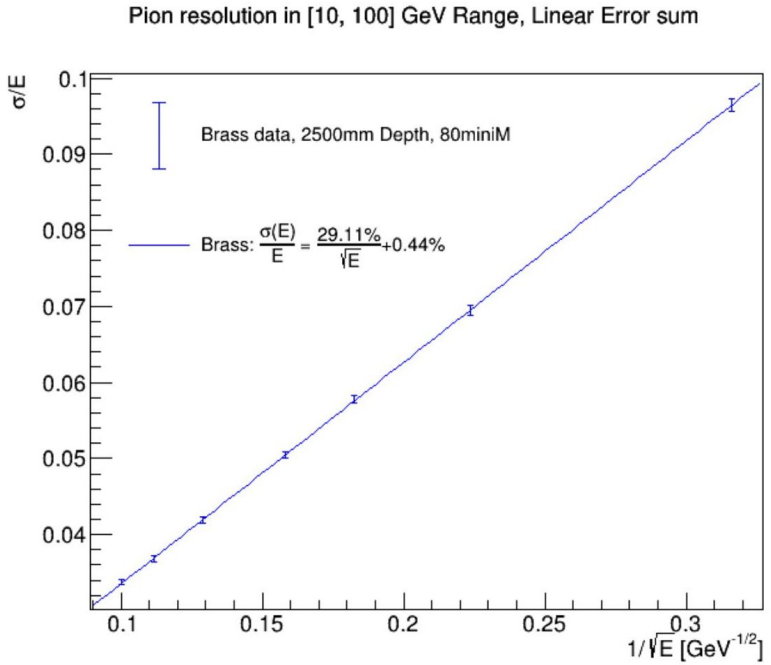


# Simulation Comparison

Standard HiDRa, without Smearing and Total Reflection

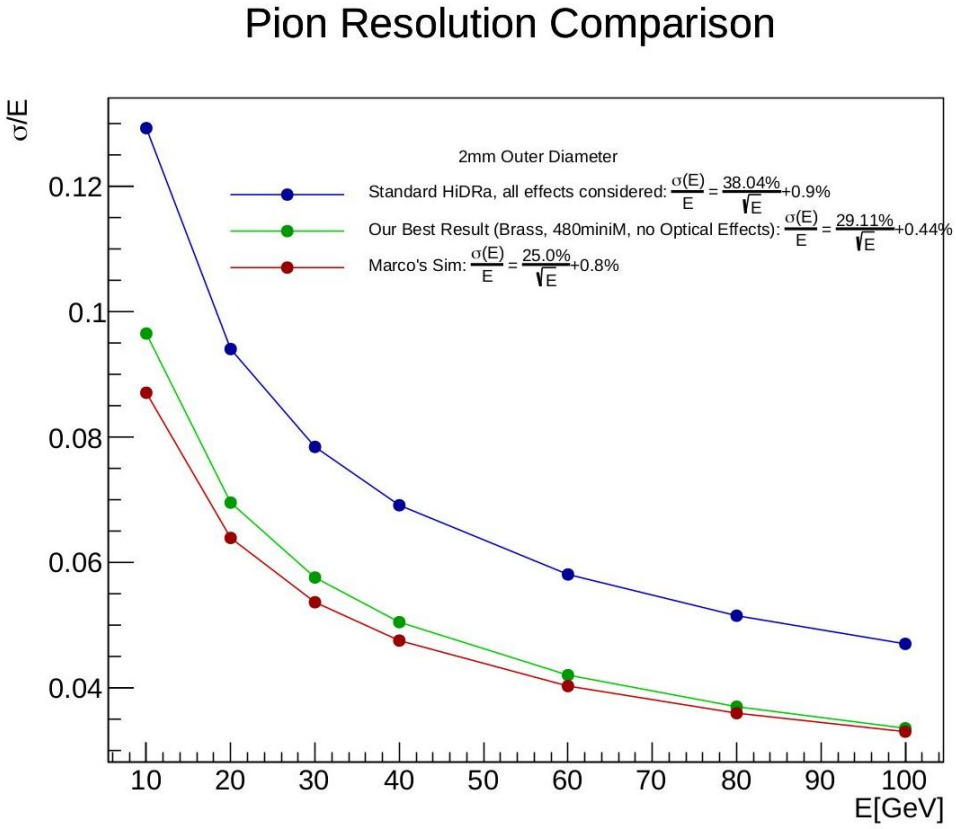



Our “Best case scenario”: brass absorber, 480miniM, alternative fiber disposition and nor Smearing neither Total Reflection



# Simulation Comparison

- Implemented Marco's Fiber disposition
- Studied Optical photons propagation inside the Cerenkov fibers.
  Marco's Sim doesn't consider
  - Possonian Smearing Effect
  - Total Reflection inside fibers
- ROOT Fit extracts different sampling and constant terms, but resolutions are now closer



# Simulation Comparison

- Implemented Marco's Fiber disposition
- Studied Optical photons propagation inside the Cerenkov fibers.
  Marco's Sim doesn't consider
  - Possonian Smearing Effect
  - Total Reflection inside fibers
- ROOT Fit extracts different sampling and constant terms, but resolutions are now closer

Useful exercise to understand the importance of optical effects in the simulation, and of the Cerenkov photon yield