A first Monte Carlo simulation for RAP

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MC: beam and geometry

Monte Carlo simulation program using GEANT 3.21/13 to:

- optimize geometry of the resonant detector
- study energy loss and evaluate ΔT
- evaluate perturbations due to cryostat, beam spread, etc.
- evaluate necessity of auxiliary detectors (front and/or back)
- First version with tentative geometry and beam parameters, different options can be added and studied

✓ 510 MeV/c e^- beam

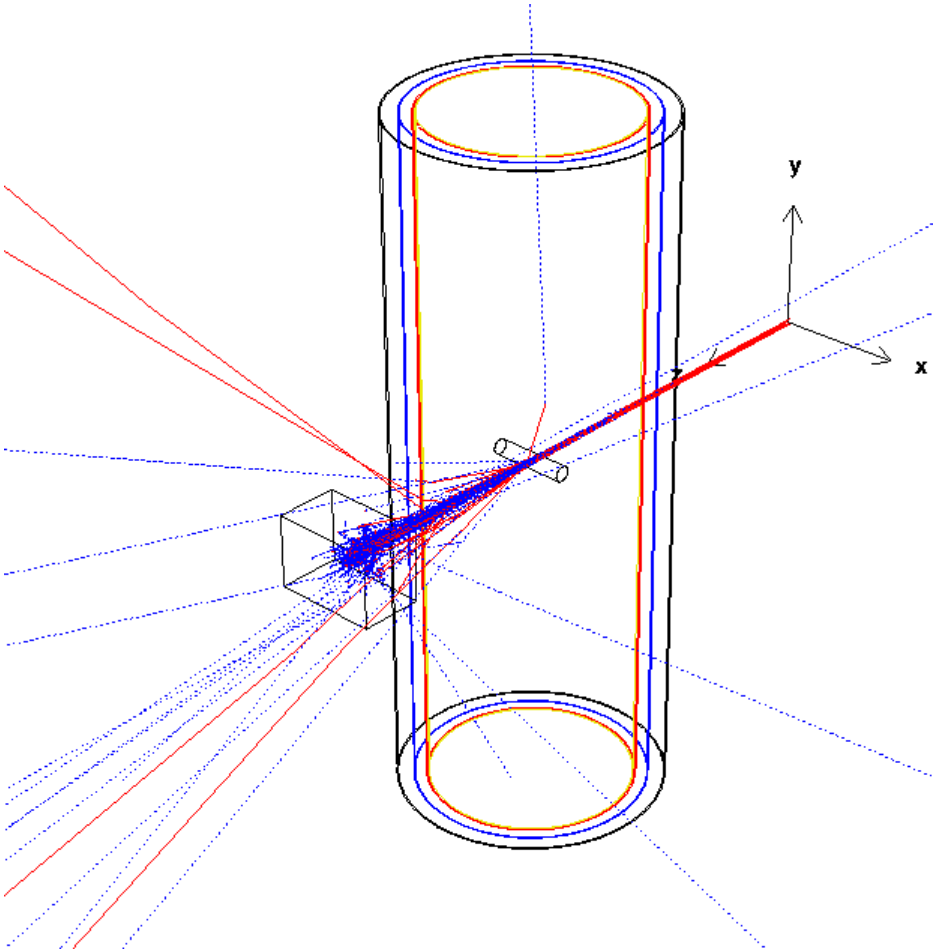
✓ Cryostat

✓ Aluminum antenna

? Back detector

? Front detector

MC: geometry



- ‘big’ cryostat (780 mm useful space):

  4 Al screens, 1+5+5+6 mm

- Cylindrical Aluminum antenna:

  d = 6 cm, L = 30 cm

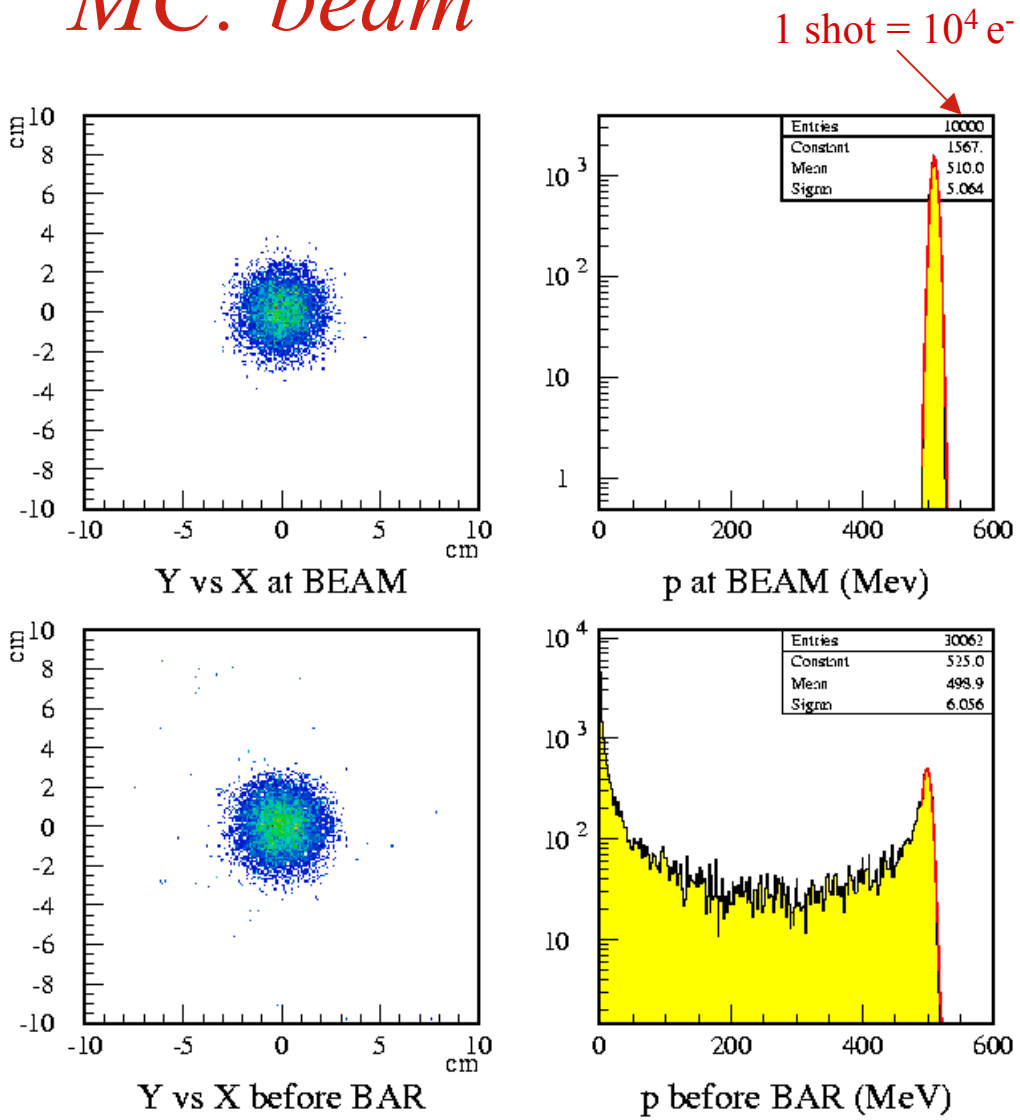
- Lead/Scintillating fiber calorimeter (KLOE prototype):

  40 cm × 28 cm × 24 cm (15 X_0)

MC: beam

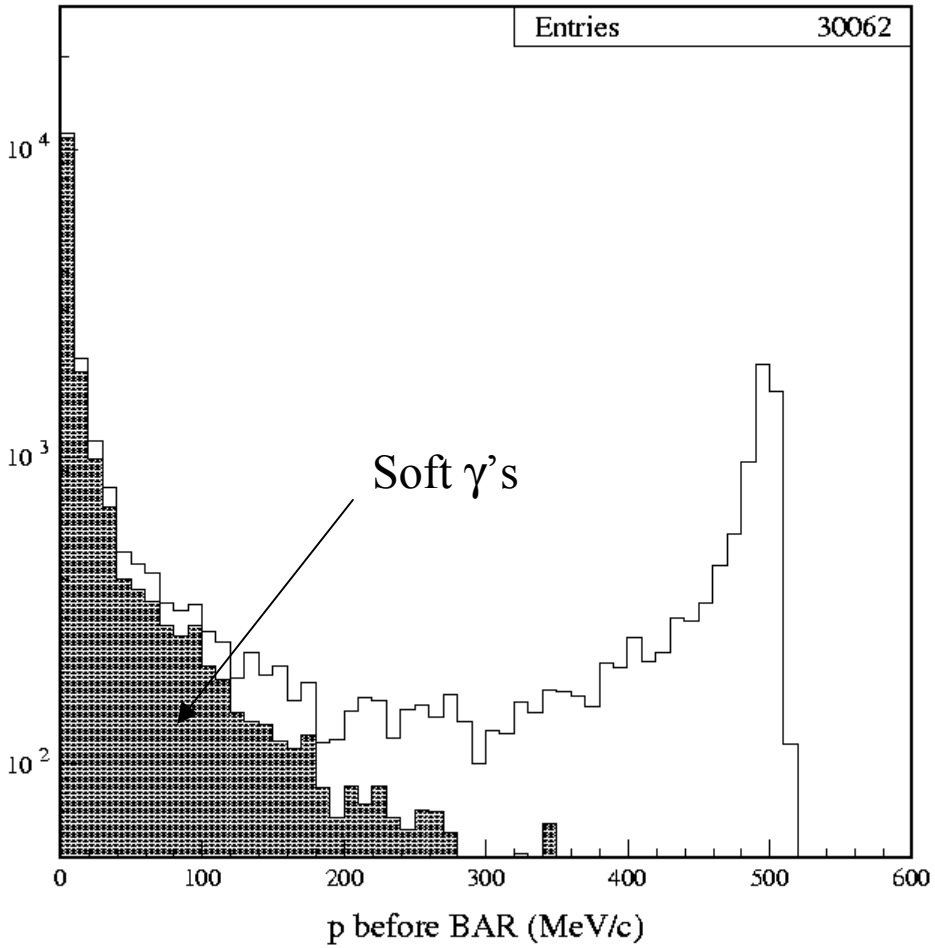
- Generated e^- beam:
  - $p = 510$ MeV/c
  - $\sigma_p = 5$ MeV/c
  - emittance = 10^{-5} rad·cm

- Beam spread due to cryostat (before entering the bar)

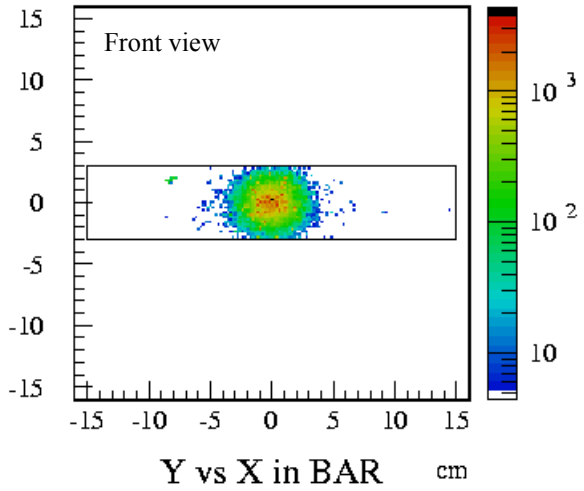


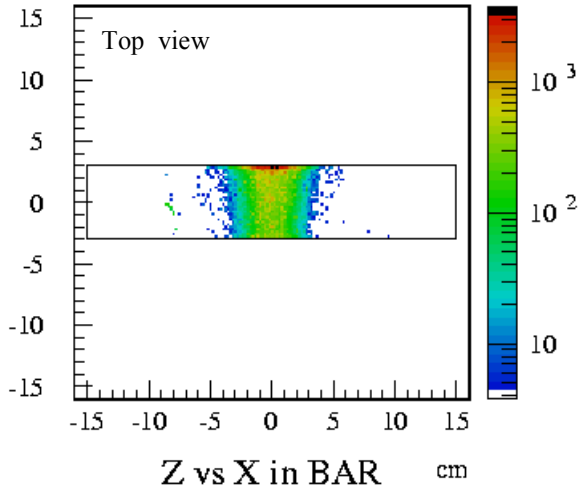
MC: beam

Beam spread due to cryostat
(before entering the bar)



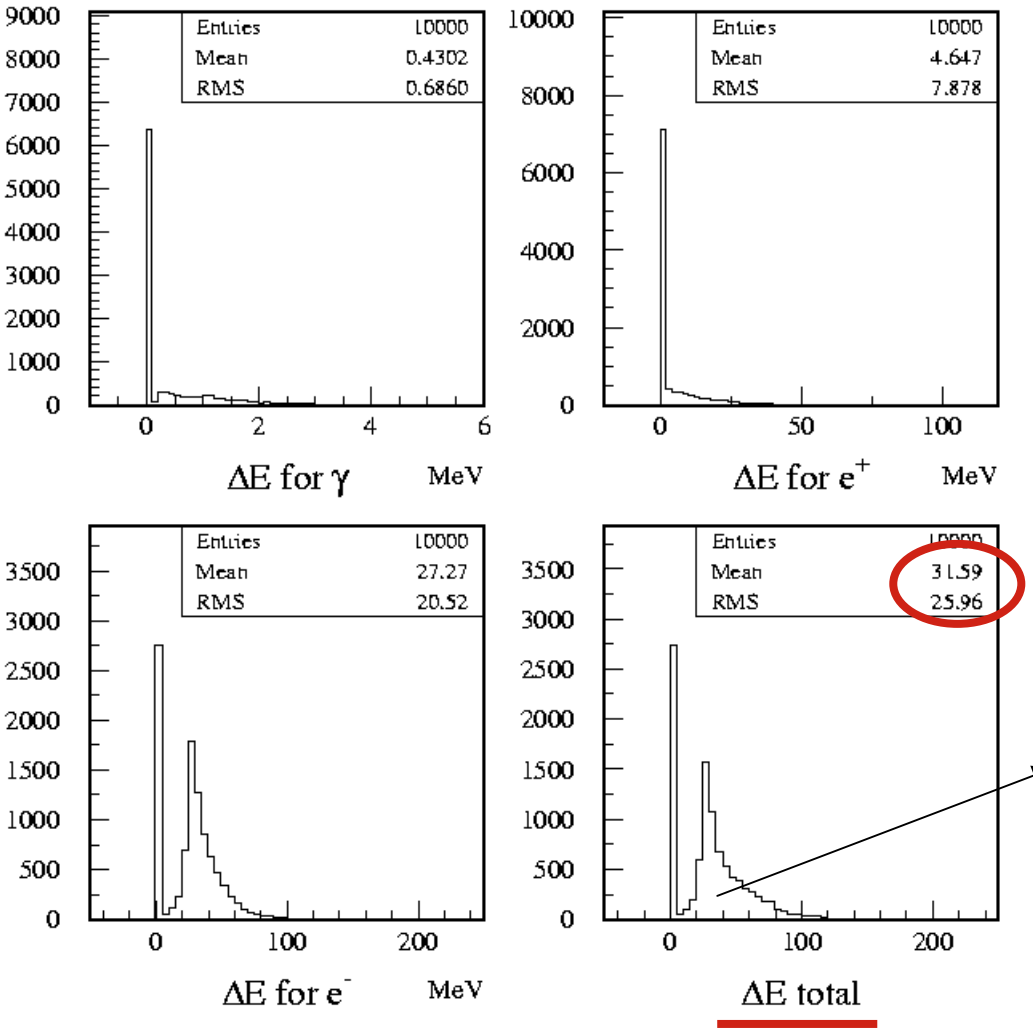
MC: bar





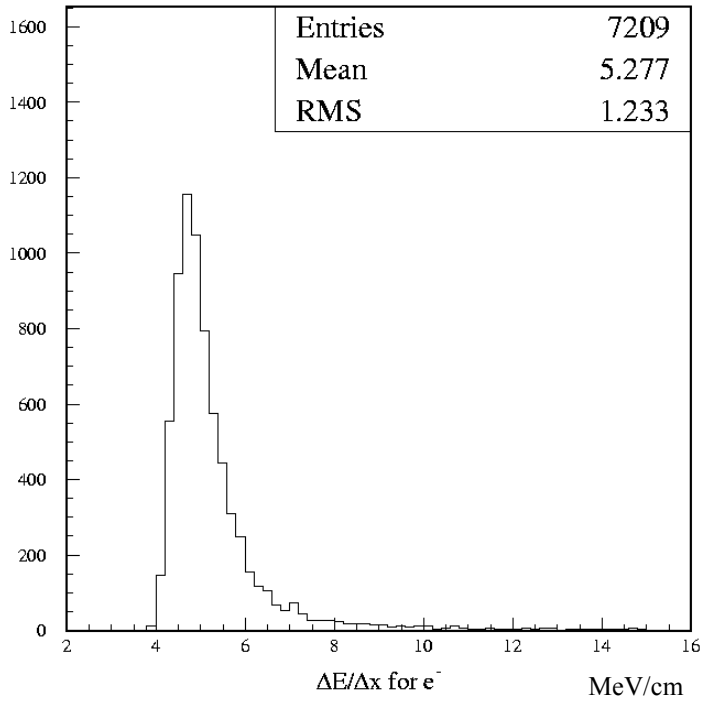
Particles crossing the bar

MC: ΔE in bar

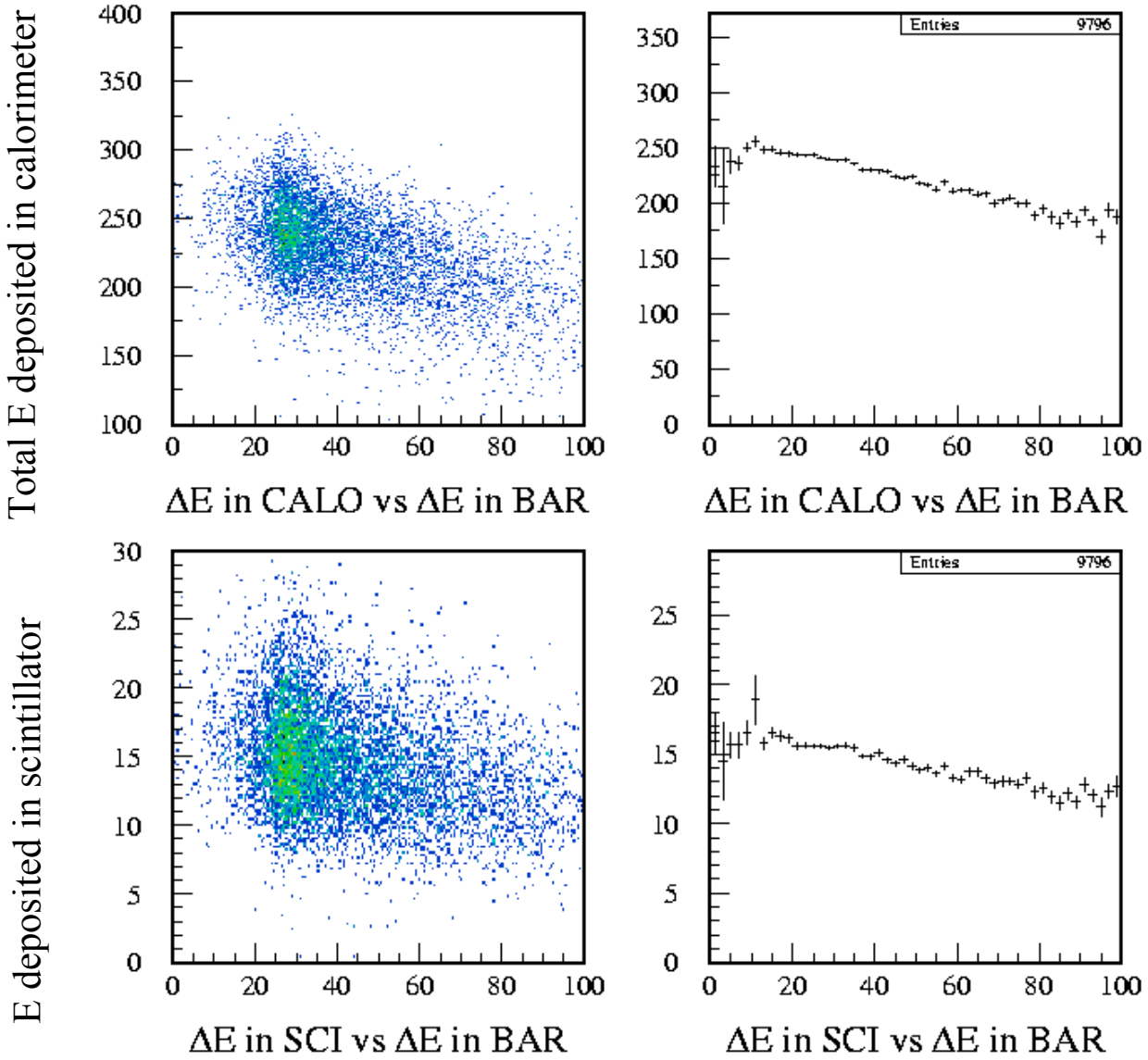


∫ = Total energy lost in bar
(for 10^4 electrons) = 418 GeV

MC: ΔE/Δx in bar



MC: ΔE in bar & BACK detector



MC: ΔE in bar & BACK detector