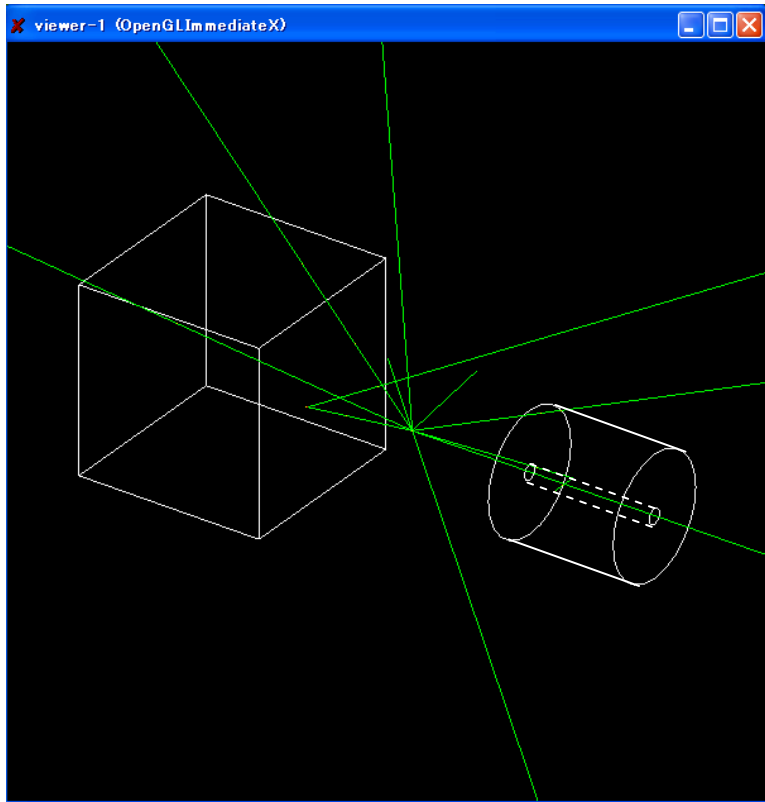


Monte Carlo ゼミ

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Practice1:

Interaction of photon with materials



- Detector
 - Plastic scintillator
 - Position $(x, y, z) = (-10\text{cm}, 0, 0)$
 - Volume $10.\text{cm} \times 10.\text{cm} \times 10.\text{cm}$
 - Density 1.032 g/cm^3
 - Ge crystal
 - Position $(x, y, z) = (10\text{cm}, 0, 0)$
 - Volume $R_{\min} = 0.4\text{cm}, R_{\max} = 3.25\text{cm}, Z/2 = 3.47\text{cm}$
- Physics
 - Transportation
 - EMProcess
 - Decay process
- Primary Generation
 - Generate γ ray from $(0, 0, 0)$ isotropically in 3D space
 - $E_{\gamma} = 1\text{MeV}$
- Sensitive Detector
 - Plastic scintillator, Ge crystal
 - Measure energy deposit.
- Show energy deposit spectra of each detector.
- Compare the ratio of Compton scattering and photo electric effect ($\sigma_{\text{Compton}} \propto Z, \sigma_{\text{photo}} \propto Z^5$)

Practice2:

$\Delta E, E$ counter (particle identification)

- When you measure ΔE and total kinetic energy, you can identify the particle
 - ΔE depends on β
 - $E_{\text{Kin}} = \frac{1}{2} mv^2$
- Detector
 - Thin counter (Plastic scintillator)
 - Position (x, y, z)=(2.5cm, 0, 0)
 - Volume 10cm(W) \times 10cm(H) \times 1cm(T)
 - Thick counter (Plastic scintillator)
 - Position (x, y, z)=(25cm, 0, 0)
 - Volume 10cm(W) \times 10cm(H) \times 40cm(T)
- Physics process (**Do Not include decay**)
 - Transportation
 - EMProcess
- Primary Generation
 - Generate π^+, K^+, p in order
 - E_{kin} 20MeV~400MeV
 - Beam direction (1,0,0)
- Sensitive Detector
 - Thin counter
 - Thick counter
- **Make a scattering plot (2-dim histogram) between ΔE (thin counter) and total E (thick counter)**

