EM plugin status

MCS model update
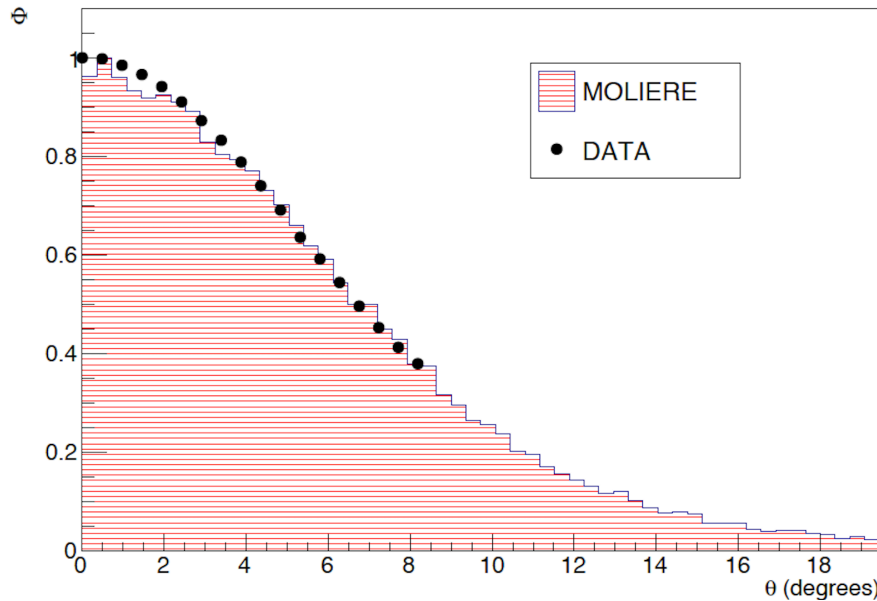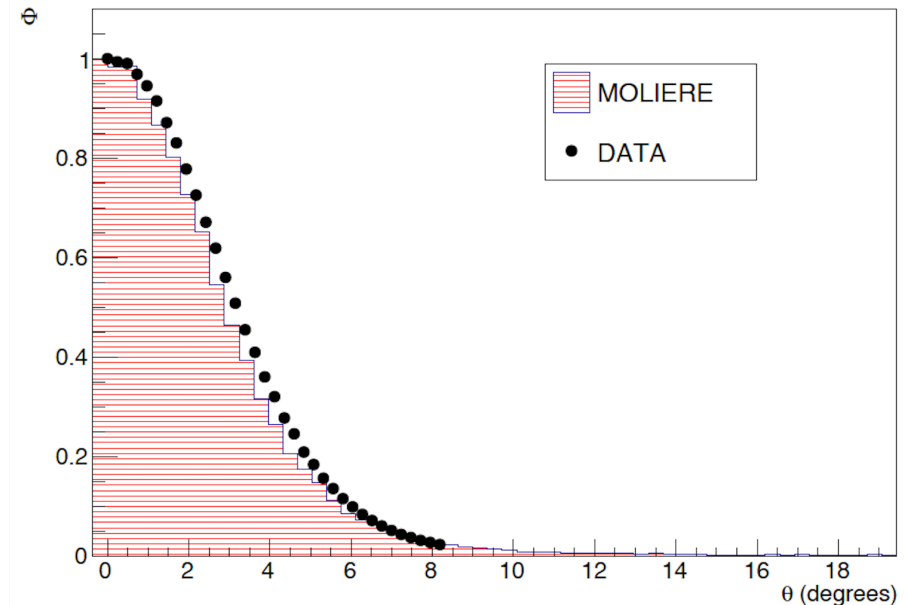
- New multiple scattering model (Al Beteri et al.) → take into accounts the not gaussian tails at low energy

- Tested with Al, Cu, Gold thin targets against experimental data and with thick water target against FLUKA

- Still missing: step limiter implementation
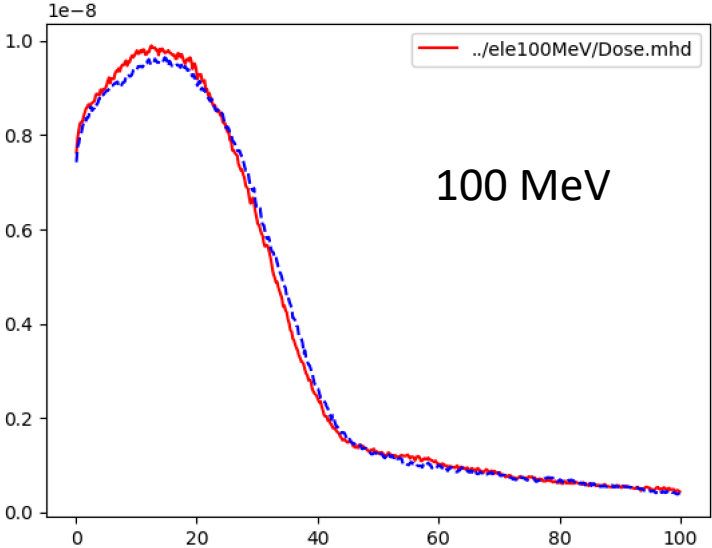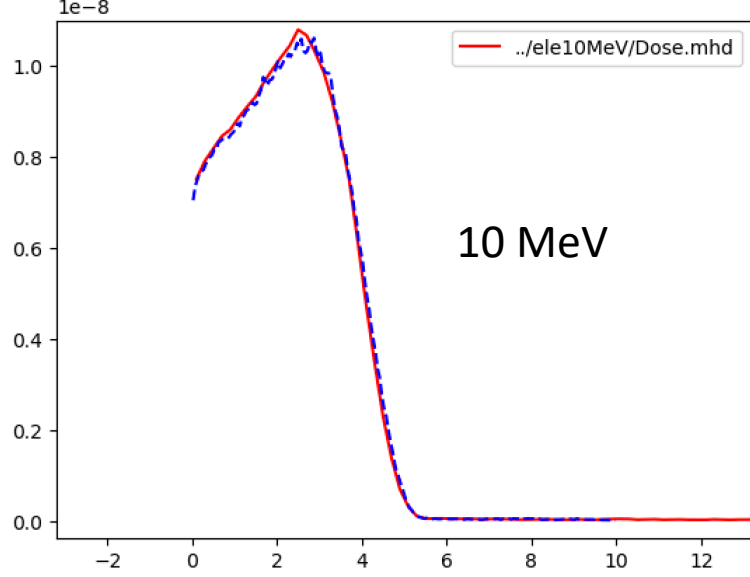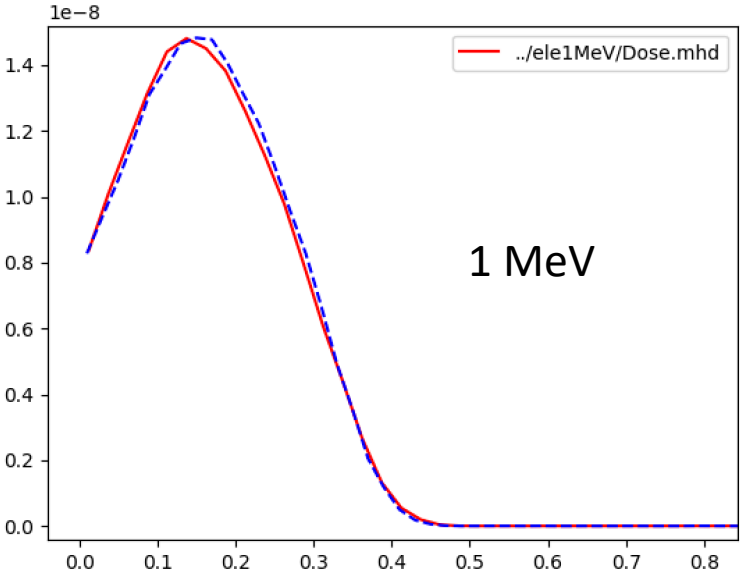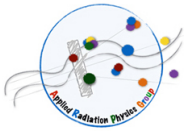

13 MeV electrons on 174.5 g/cm^2 Cu

20 MeV electrons on 86.4 g/cm^2 Cu

DDD electrons

1 MeV

10 MeV

100 MeV
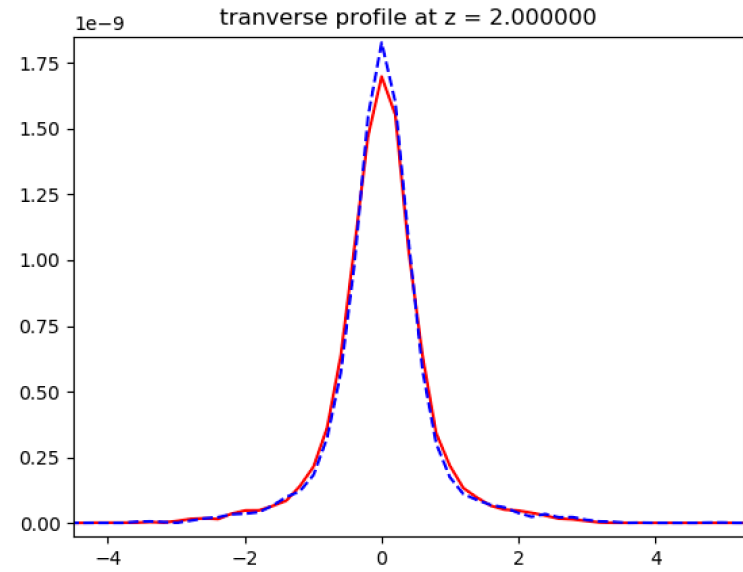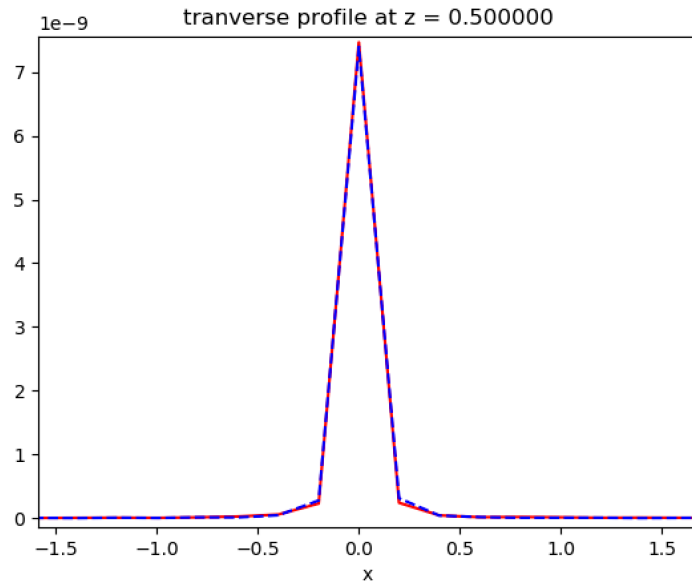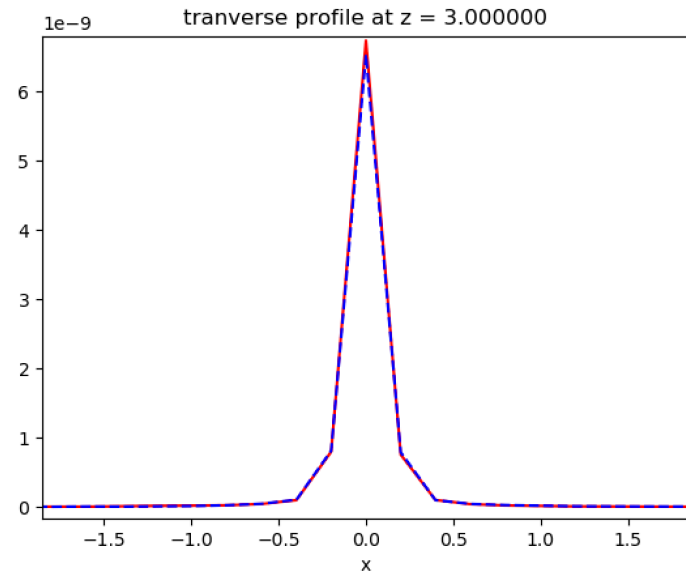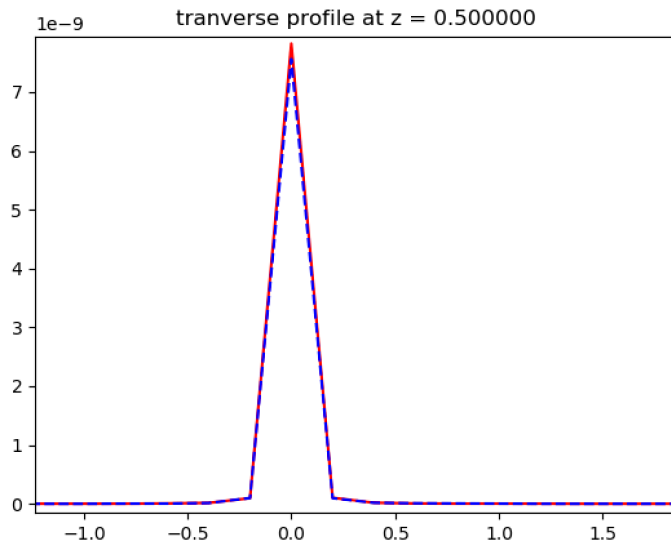
FRED

FLUKA

Lateral profiles (x) electrons 1 MeV

FRED
FLUKA

Lateral profiles (x) electrons 10 MeV

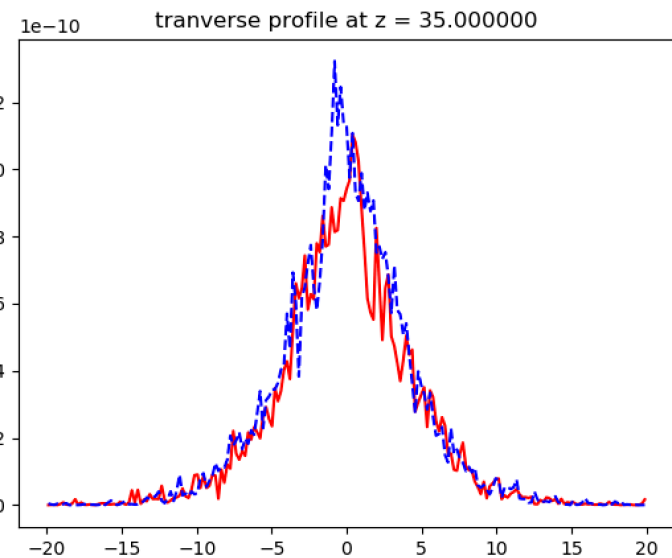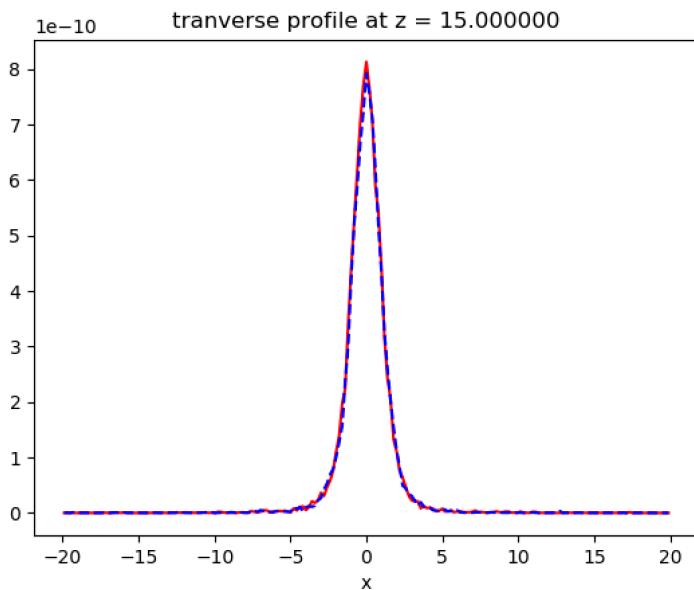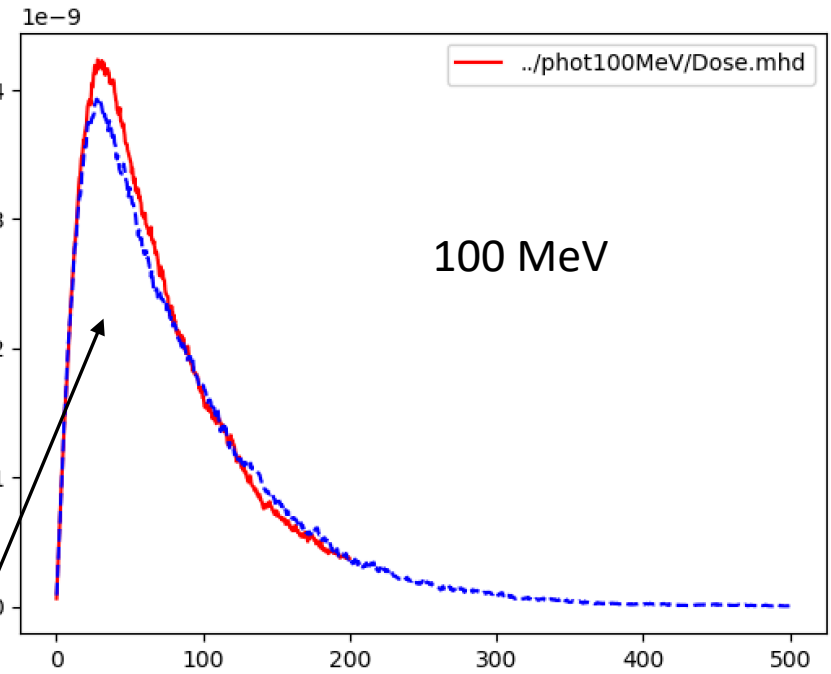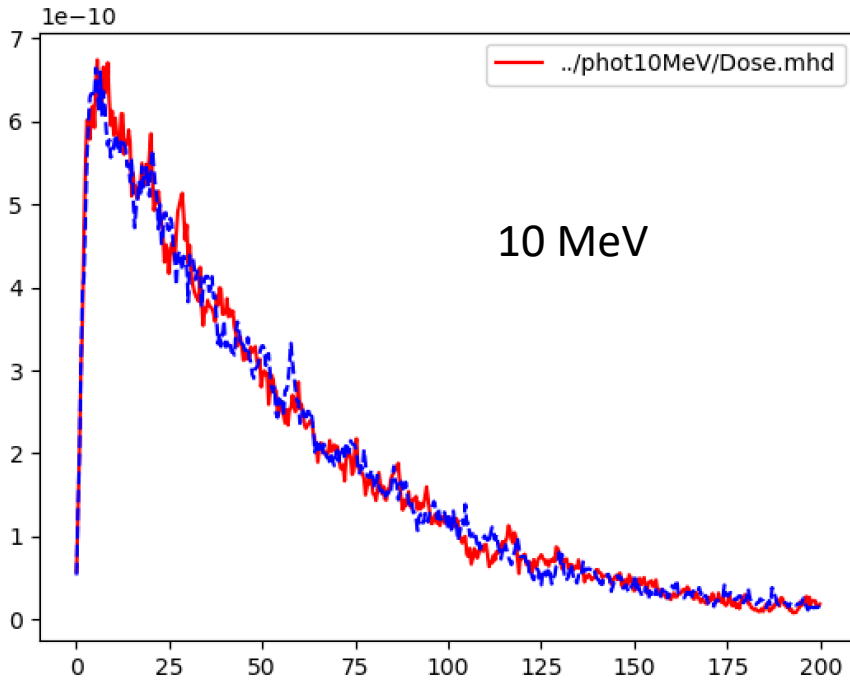FRED
FLUKA

Lateral profiles (x) electrons 100 MeV

FRED
FLUKA

DDD photons

10 MeV

100 MeV
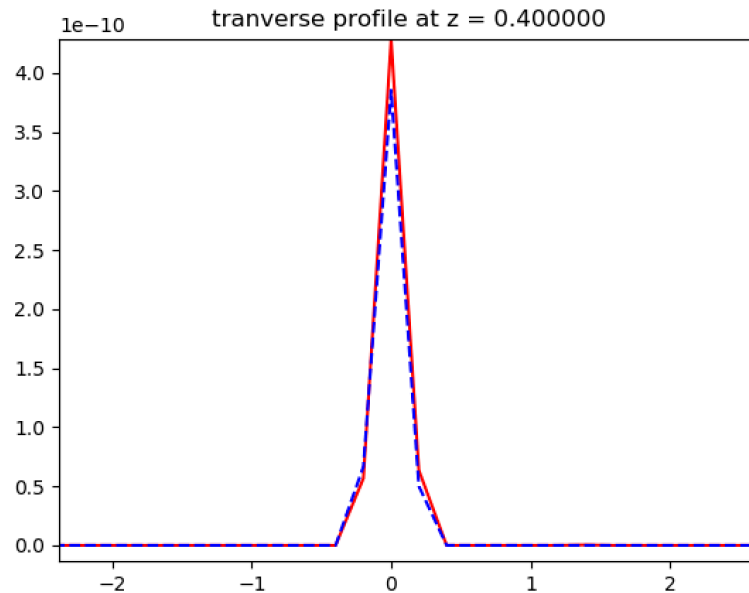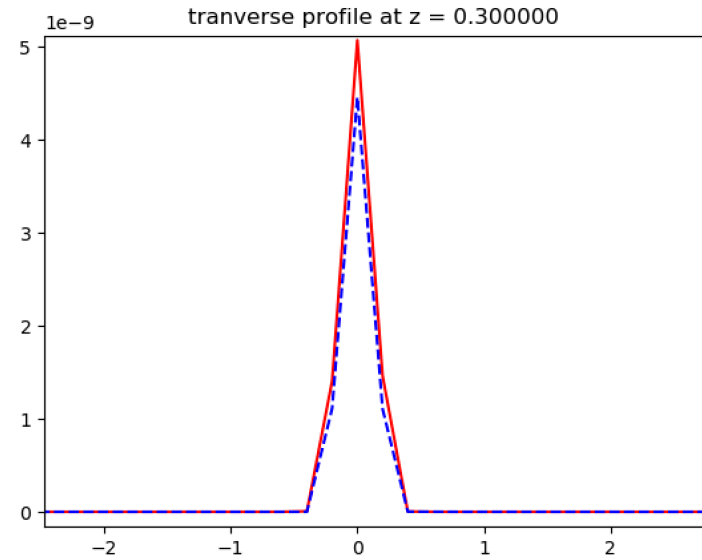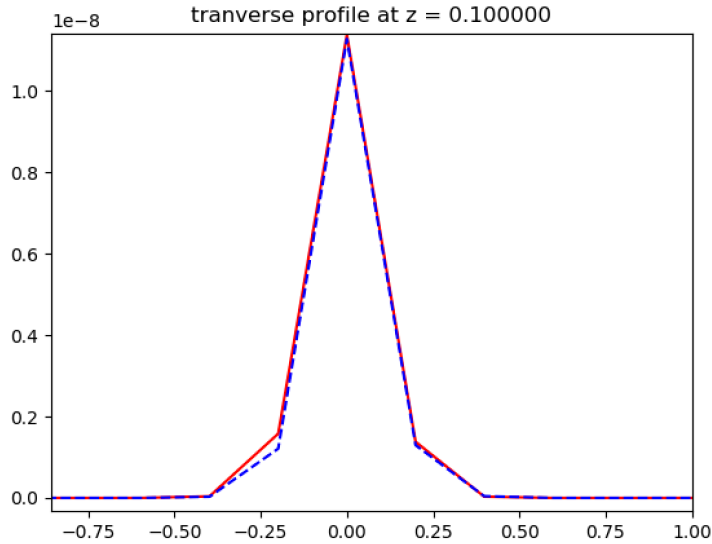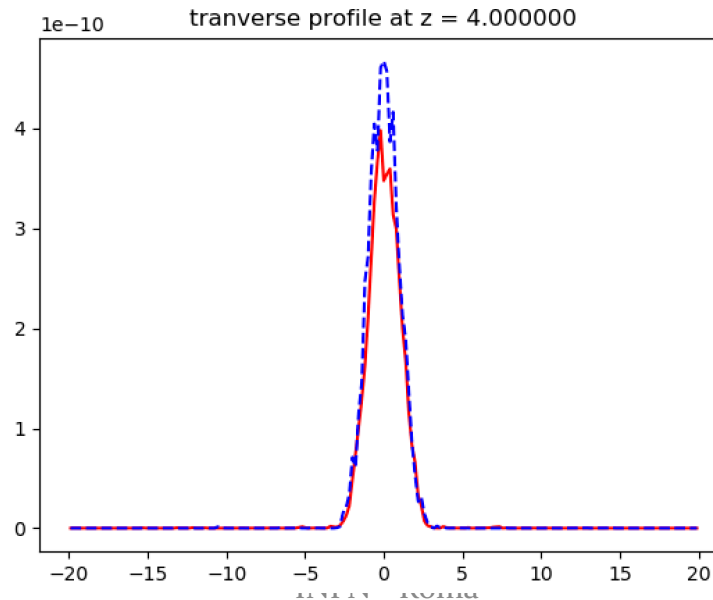
FRED
FLUKA

Mistake in positrons
interaction ?

Lateral profiles (x) photons 10 MeV

Lateral profiles (x) photons 100 MeV

Positrons DDD

10 MeV

100 MeV
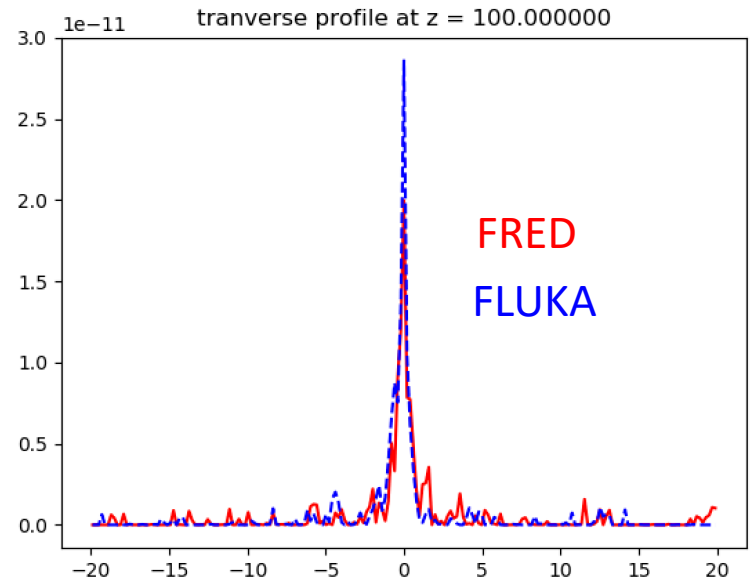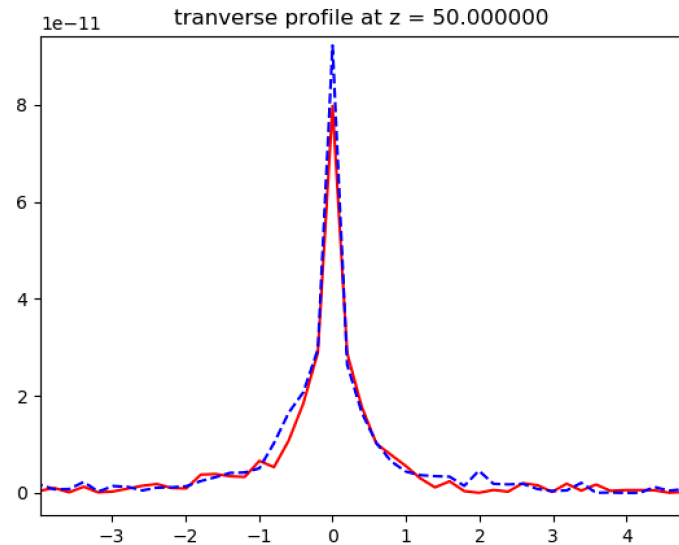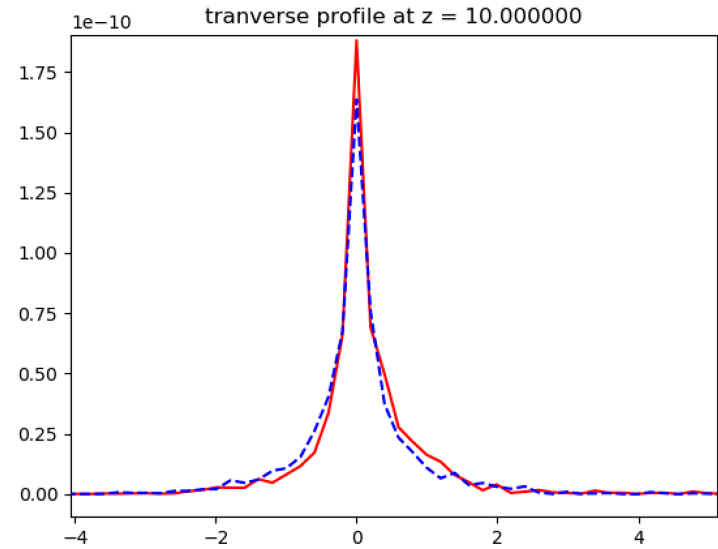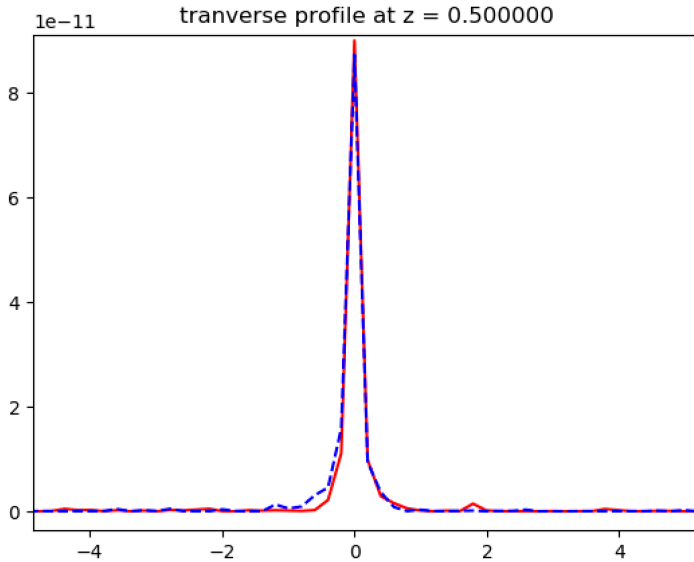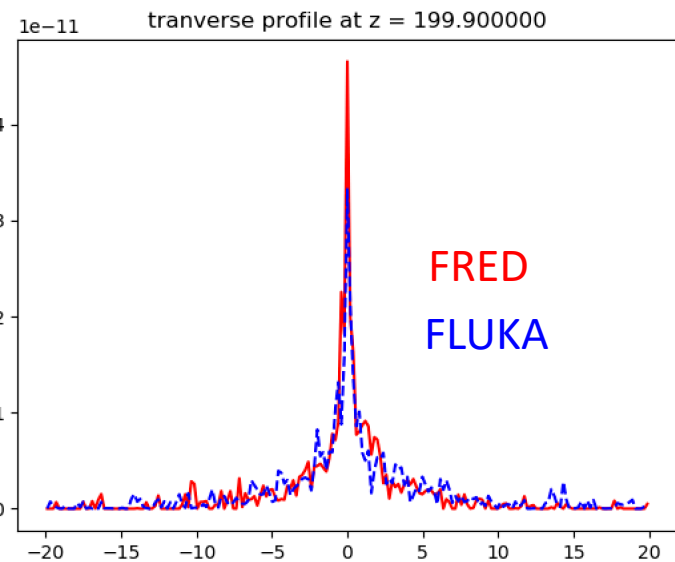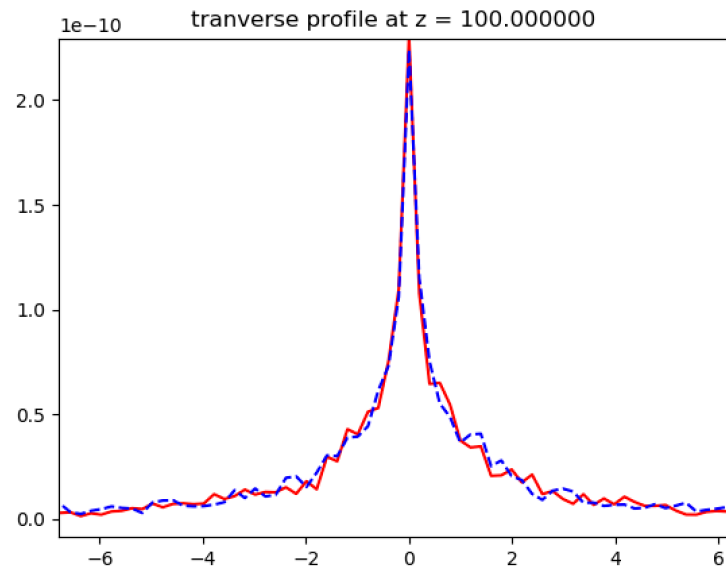
- We found a bug in the bremsstrahlung in the cross section calculation (ratiobremsstrahlung)

Delta rays production

Moller Scattering

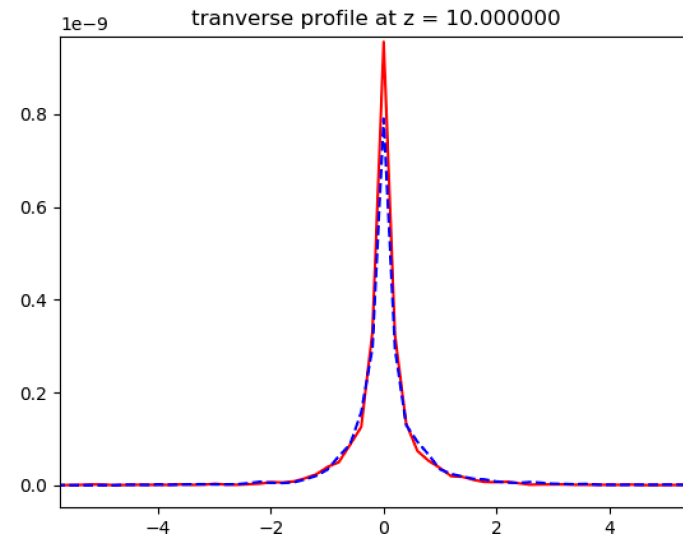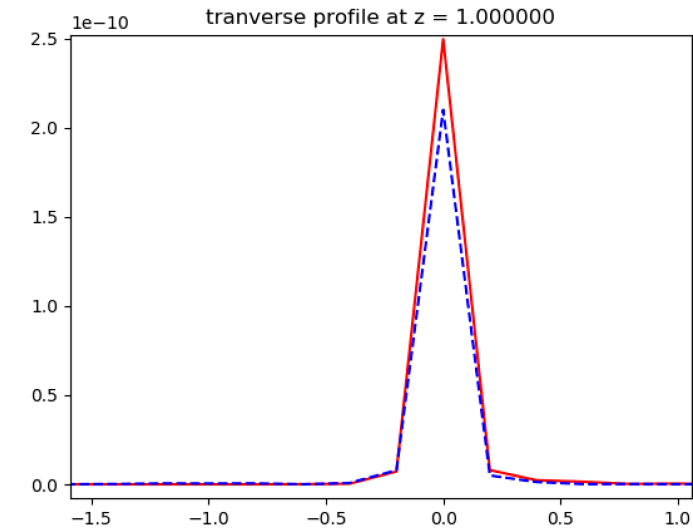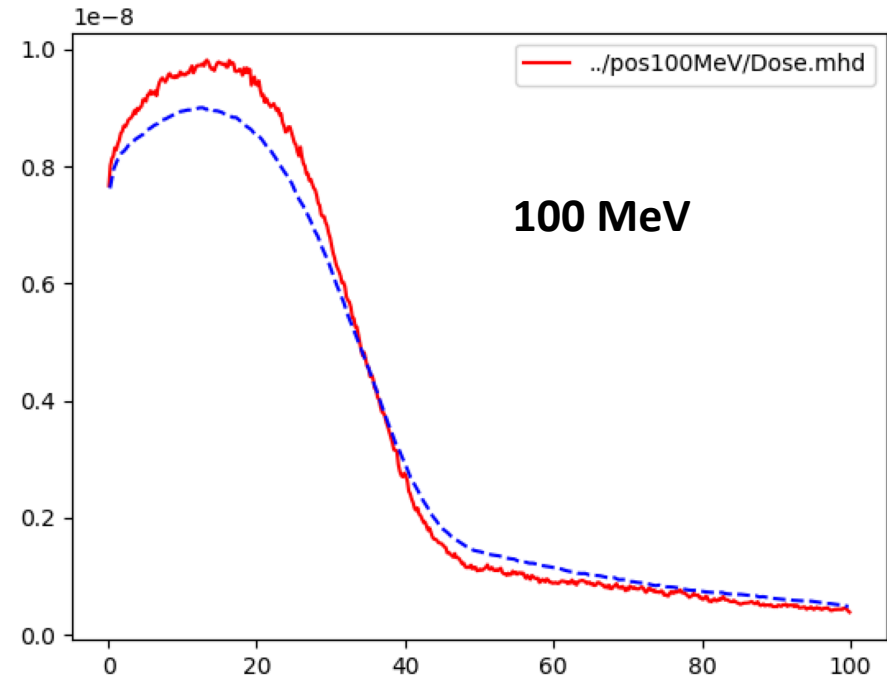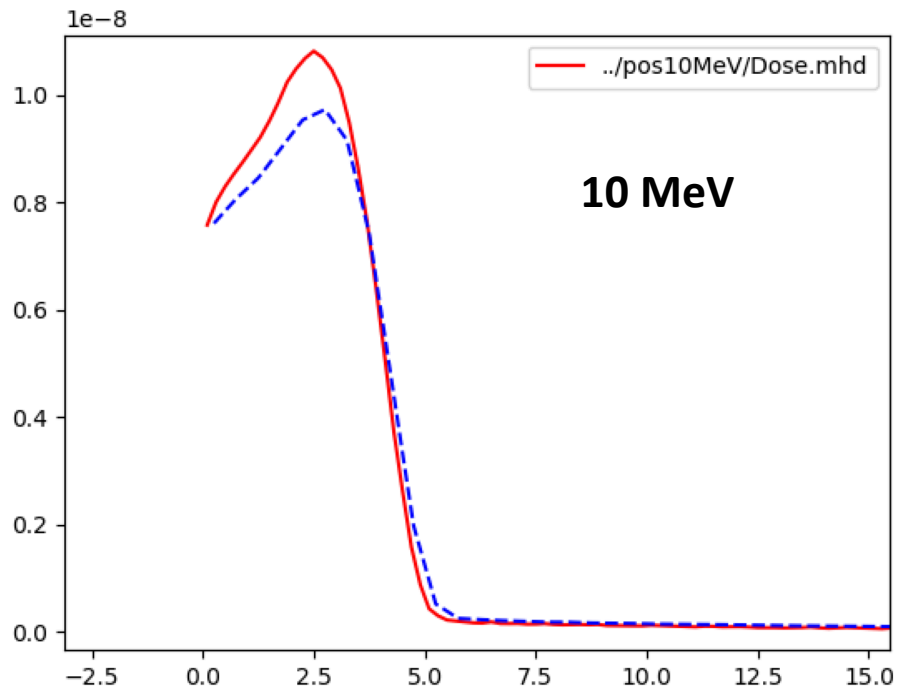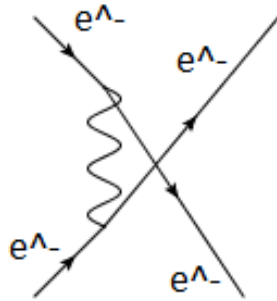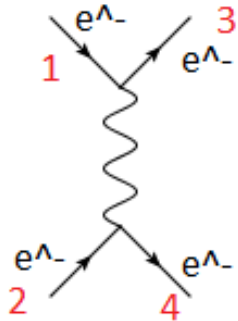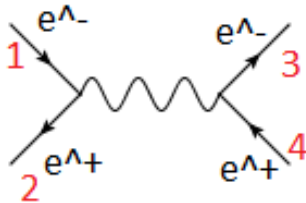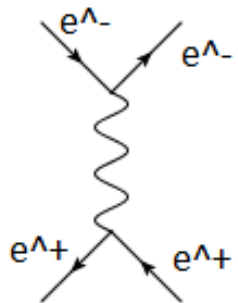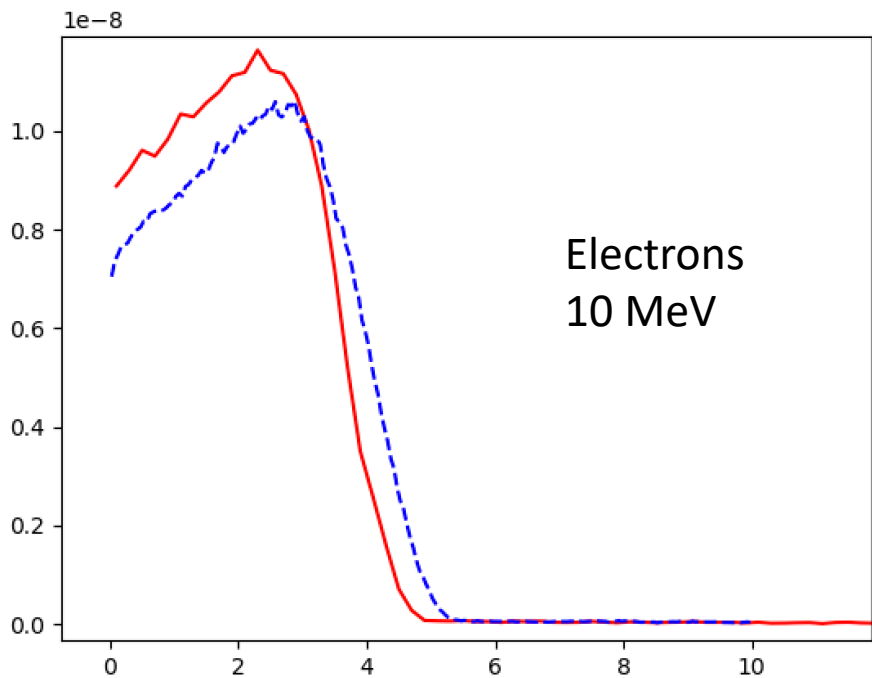$$\sigma(Z, E, T_{cut}) = \frac{2\pi r_e^2 Z}{\beta^2(\gamma-1)}\left[\frac{(\gamma-1)^2}{\gamma^2}\left(\frac{1}{2}-x\right) + \frac{1}{x} - \frac{1}{1-x} - \frac{2\gamma-1}{\gamma^2}\ln\frac{1-x}{x}\right],$$

Bhabha Scattering

$$\sigma(Z, E, T_{cut}) = \frac{2\pi r_e^2 Z}{(\gamma-1)}\left[\frac{1}{\beta^2}\left(\frac{1}{x}-1\right) + B_1\ln x + B_2(1-x) - \frac{B_3}{2}(1-x^2) + \frac{B_4}{3}\left(\right.\right.$$

- **It may have a significant impact on the restricted dE/dx**

Results

Electrons
10 MeV

Positrons
10 MeV

bene