

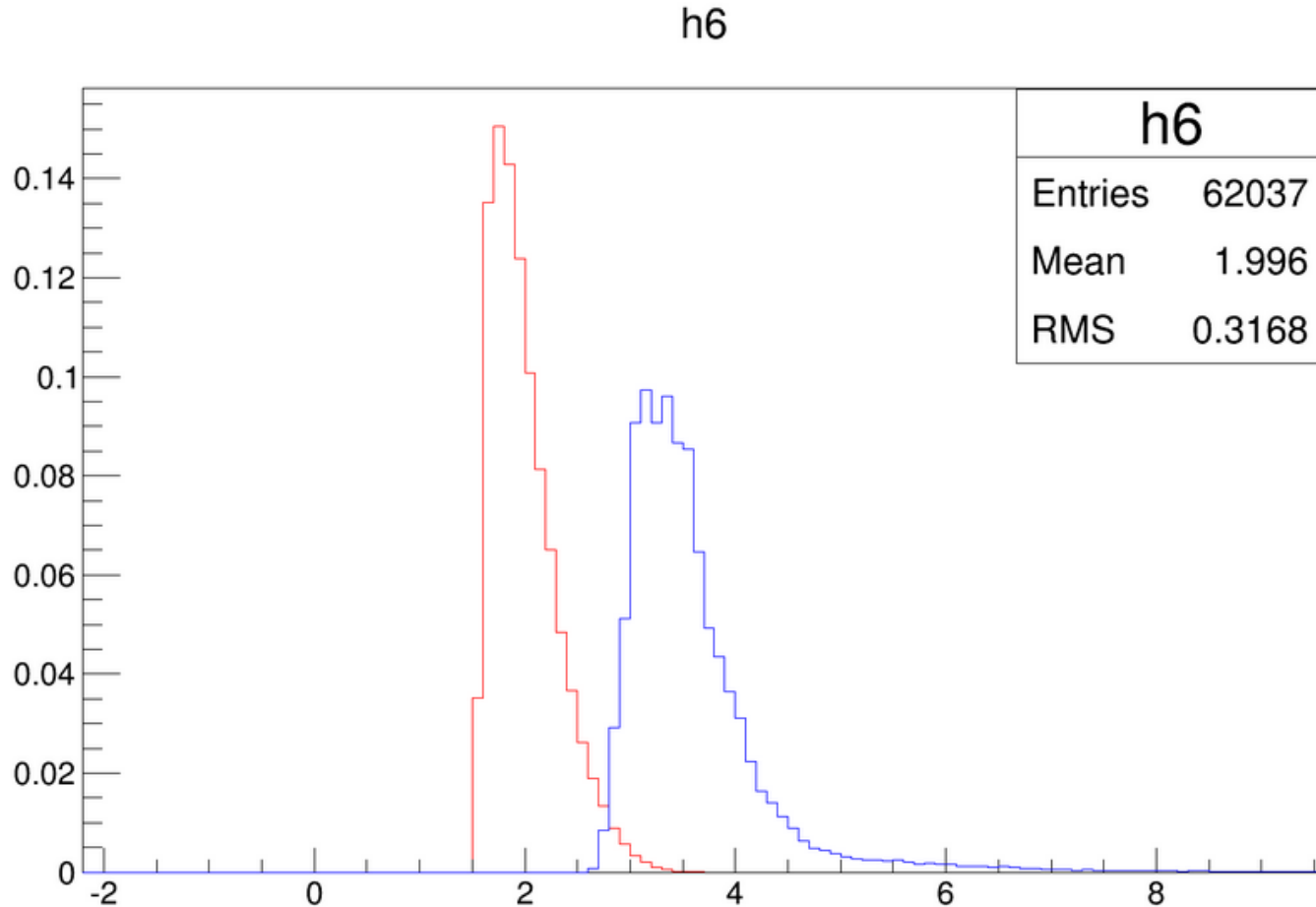
Simulation update

Last time:

- External bremsstrahlung
- Internal bremsstrahlung:
 - Peaking approximation versus exact calculation
- Multi-photon effect

Last time

Dp from event generator



Red:

Begin distribution

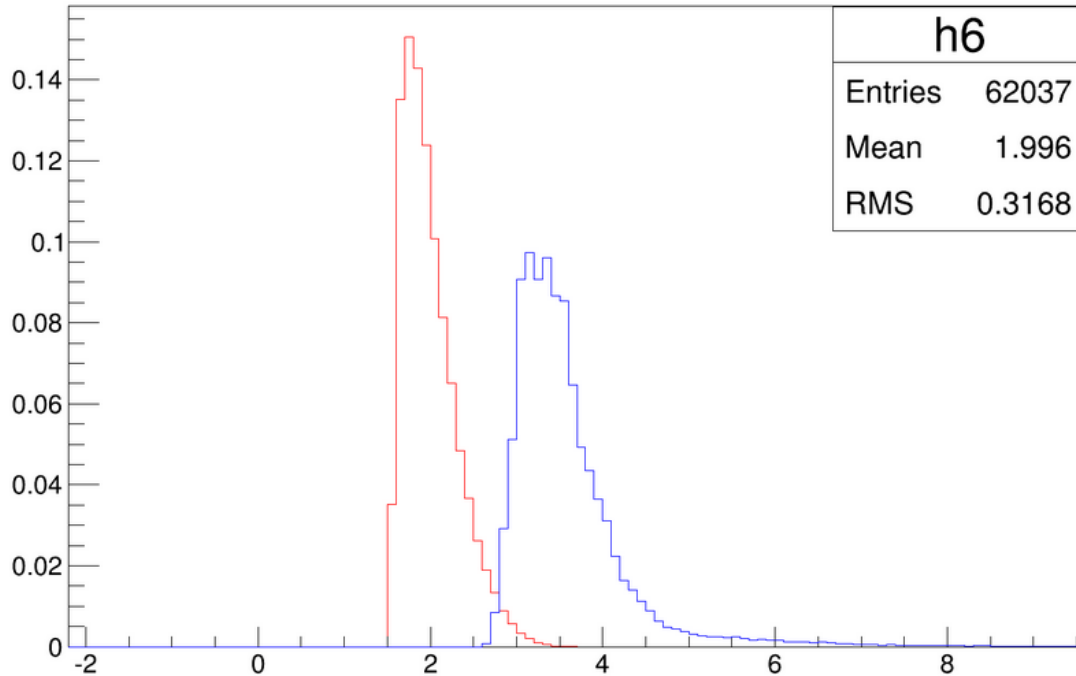
Blue:

End distribution

Nu (MeV)

Dp from event generator

h6



Event Generator:

$$d_E = E - \frac{E}{E + E/M * (1 - \cos(\theta))}$$

θ is uniform distribution.

θ smaller, density higher, dE smaller

Simulation Method

- 1st method
- Step
- Event generator $(E, (x, y, z), (\theta, \phi))$ \longrightarrow
energy loss model (ionization+bremsstrahlung) \longrightarrow
scattering XS (E_i, θ_{scatt}) \longrightarrow
energy loss model (ionization+bremsstrahlung) \longrightarrow
distribution $f(E_{final})$ \longrightarrow
weighted by elastic Born cross section with vacuum and vertex correction

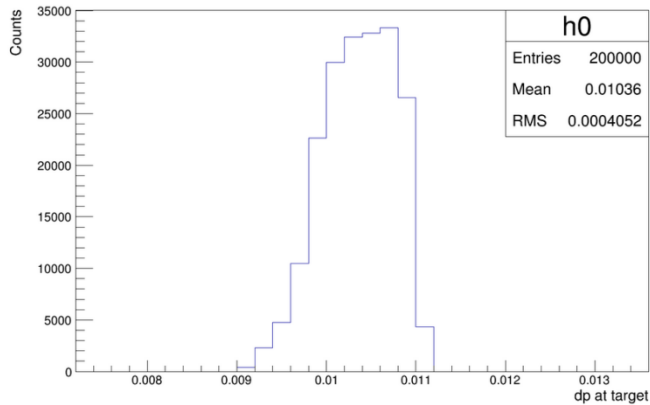
$$\delta_{vac} + \delta_{vertex} = \frac{2\alpha}{\pi} \left(\frac{13}{12} \ln \left(\frac{Q^2}{m^2} \right) - \frac{14}{9} \right)$$

Final distribution : $f(E_{final}) * \sigma_{born} * (1 + \delta)$

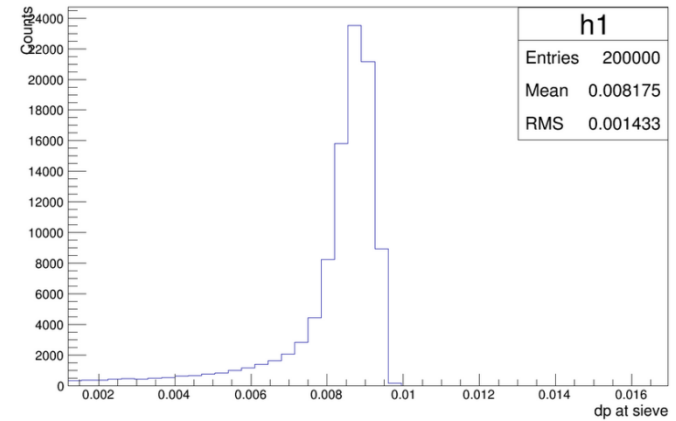
Simulation Method

- 1st method : Final distribution : $f(E_{final}) * \sigma_{born} * (1 + \delta)$

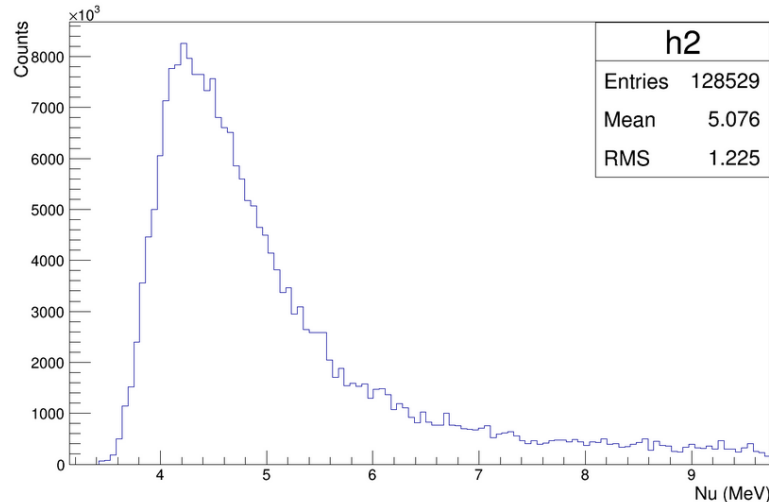
dp distribution at target



dp distribution at sieve



h2



Weighted at sieve

dE at Sieve/ MeV

Simulation Method

- 2nd method

- Step

- Event generator $(E, (x, y, z), (\theta, \phi))$ \longrightarrow
energy loss model (ionization+bremsstrahlung) \longrightarrow
scattering XS (E_i, θ_{scatt}) \longrightarrow
energy loss model (ionization+bremsstrahlung) \longrightarrow
distribution $f(E_{final})$ \longrightarrow

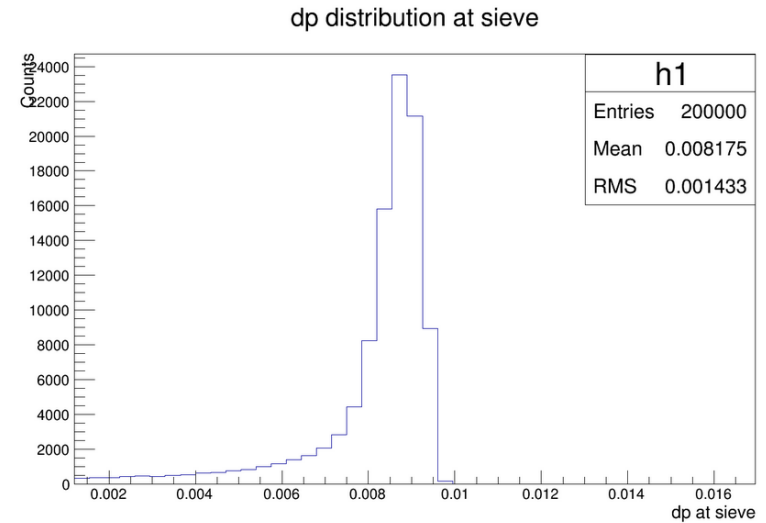
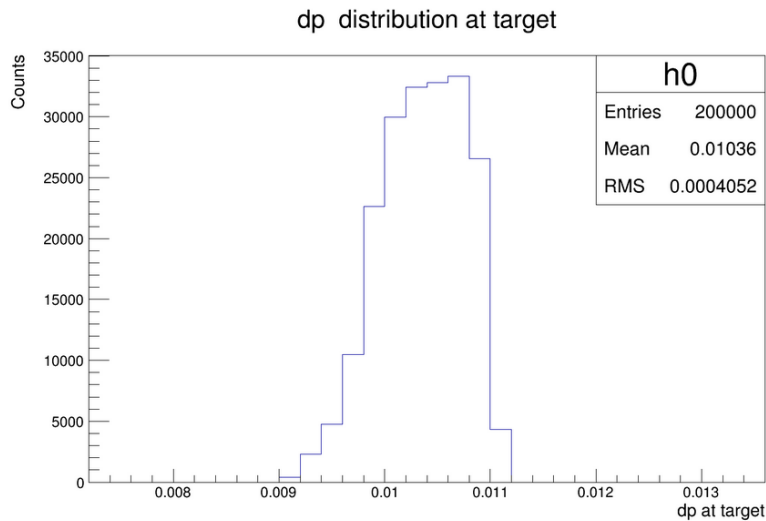
weighted by radiative cross section XS($E, E_{final}, \theta_{scatt}, t_a, t_b$) include internal bremsstrahlung, external bremsstrahlung, ionization effect)

Final distribution : $f(E_{final}) * \text{Radiated XS}(E, E_{final}, \theta_{scatt}, t_a, t_b)$

Ionization and bremsstrahlung introduced twice?

Simulation Method

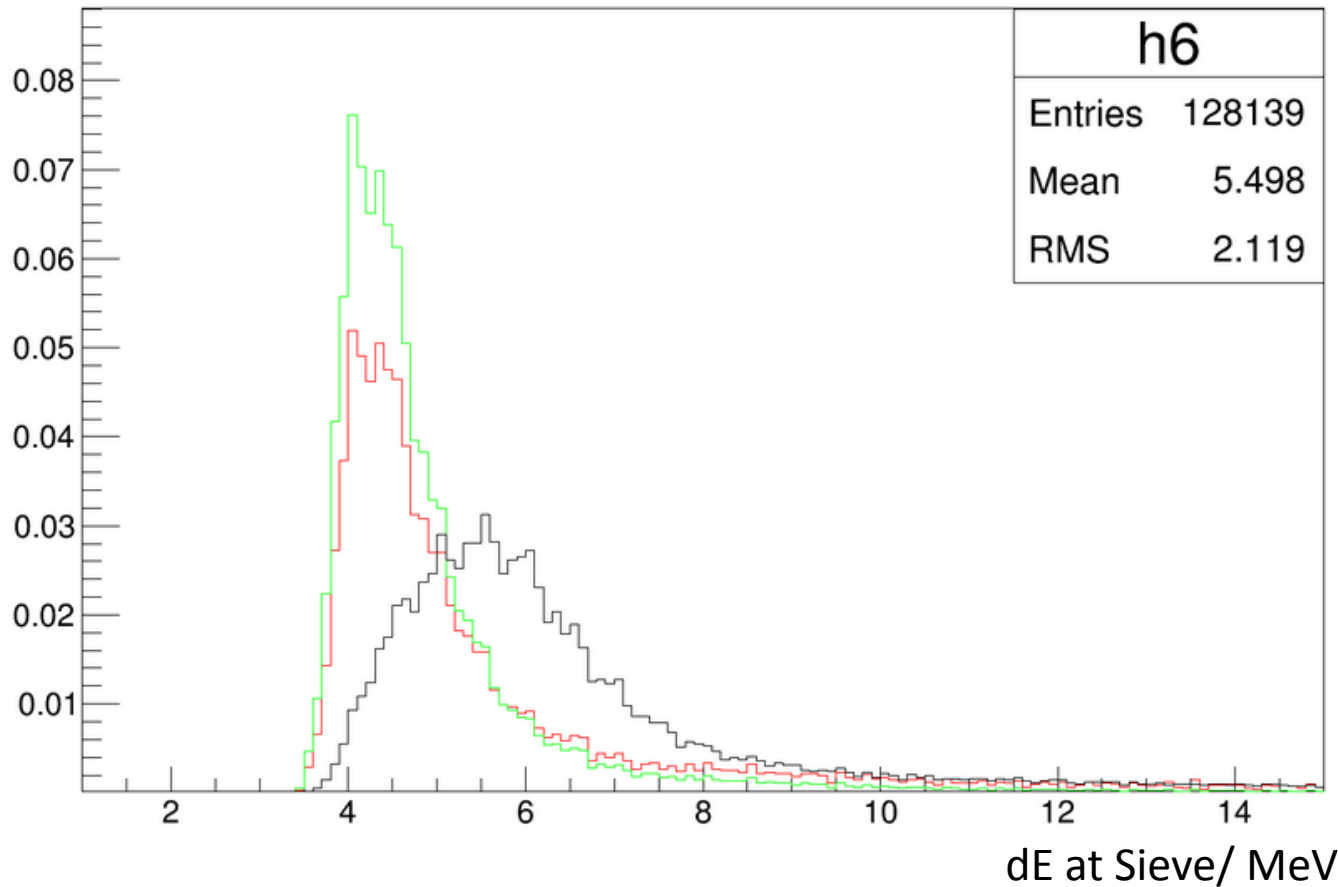
- 2nd method : Final distribution : $f(E_{final}) * \text{Radiated XS}(E, E_{final}, \theta_{scatt}, ta, tb)$



Simulation Method

- 2nd method : Final distribution : $f(E_{final}) * \text{Radiated XS}(E, E_{final}, \theta_{scatt}, ta, tb)$

h6

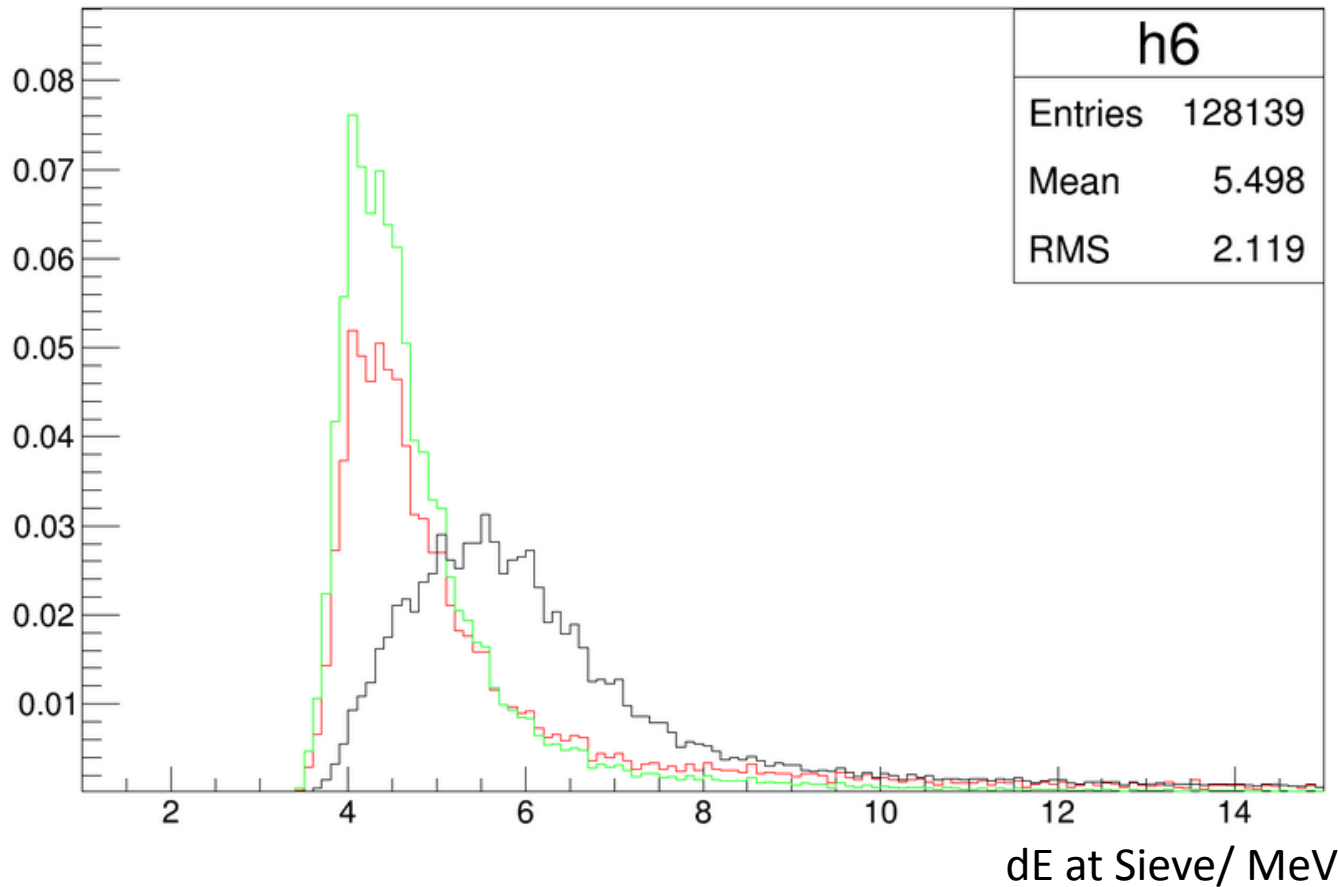


- Red: Method 1st
- Green: Method 2nd
- Black: No weighting

Simulation Method

- 2nd method : Final distribution : $f(E_{final}) * \text{Radiated XS}(E, E_{final}, \theta_{scatt}, ta, tb)$

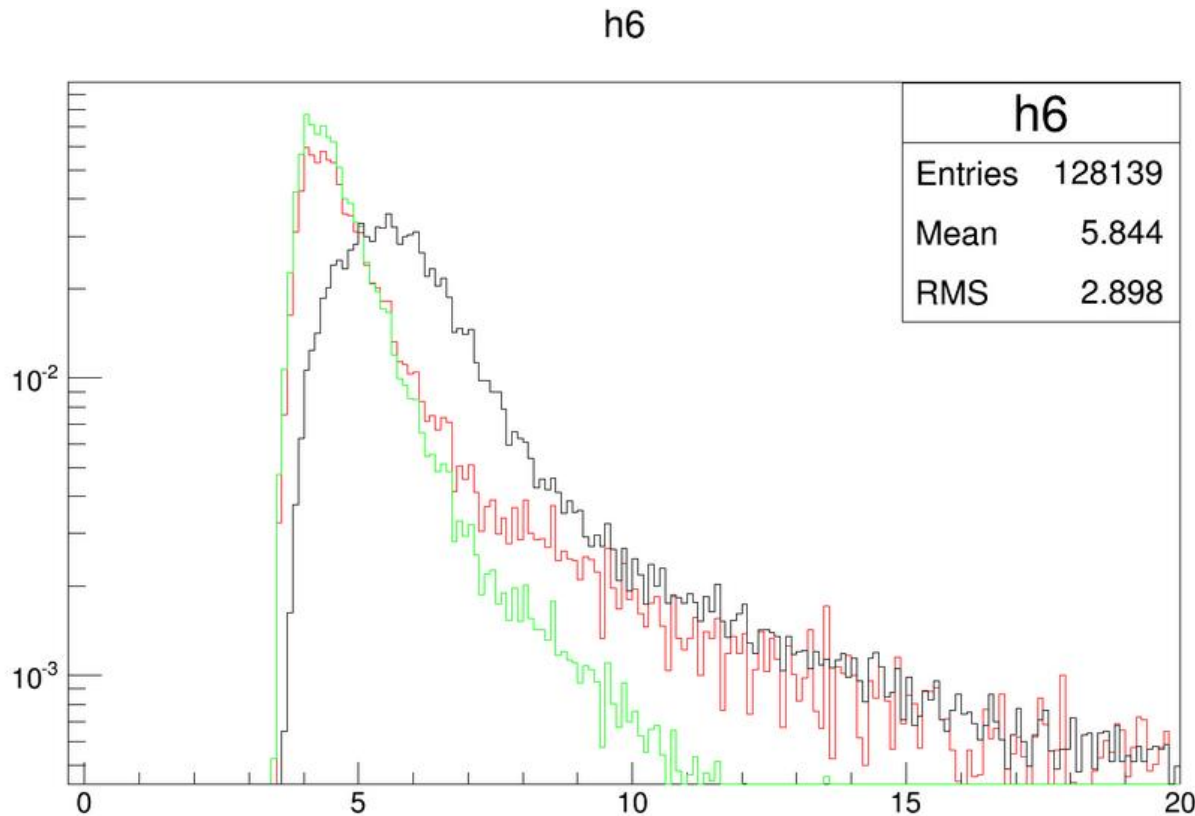
h6



- Red:
Method 1st
- Green:
Method 2nd
- Black:
No weighting

Simulation Method

- 2nd method : Final distribution : $f(E_{final}) * \text{Radiated XS}(E, E_{final}, \theta_{scatt}, ta, tb)$

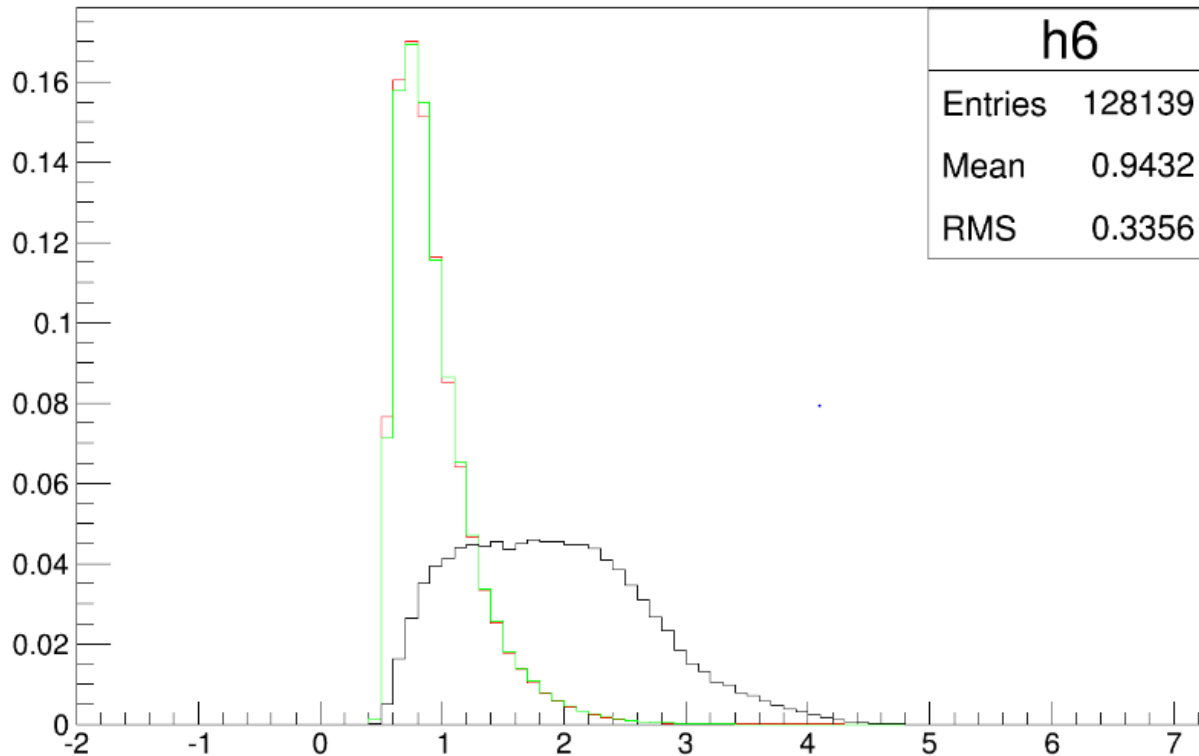


- Red: Method 1st
- Green: Method 2nd
- Black: No weighting

Simulation Method

- 2nd method : Final distribution : $f(E_{final}) * \text{Radiated XS}(E, E_{final}, \theta_{scatt}, ta, tb)$

h6



- Red:
Method 1st
- Green:
Method 2nd
- Black:
No weighting