

# Energy Loss Model

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# Last time Review

## Bremesstrahlung - g2psim

### ➤ External Bremesstrahlung

- Consider a small energy interval  $dE$ , the probability of finding an electron in this interval with initial energy  $E_0$  and energy  $E$

$$I_e(E_0, E, t) = bt(E_0 - E)^{-1} \left[ \frac{E}{E_0} + \frac{3}{4} \left( \frac{E_0 - E}{E_0} \right)^2 \right] \left( \ln \frac{E_0}{E} \right)^{bt}$$

- samples an energy loss according to the distribution using the acceptance-rejection method

### ➤ Internal Bremesstrahlung

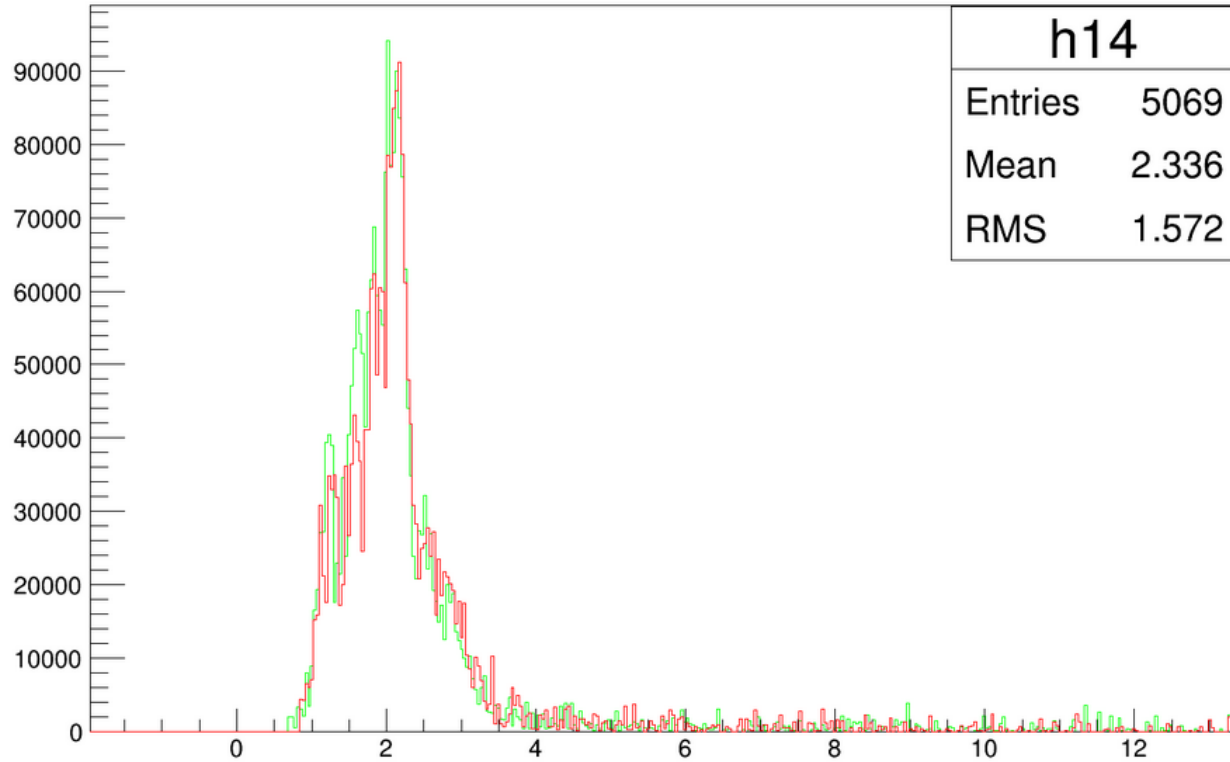
- equivalent radiator approximation

□  $SAMC : \Delta E = E_0 R^{1/bt}$

# Last time Review

## Model Comparison

h14



Only Bremsstrahlung

Red: external

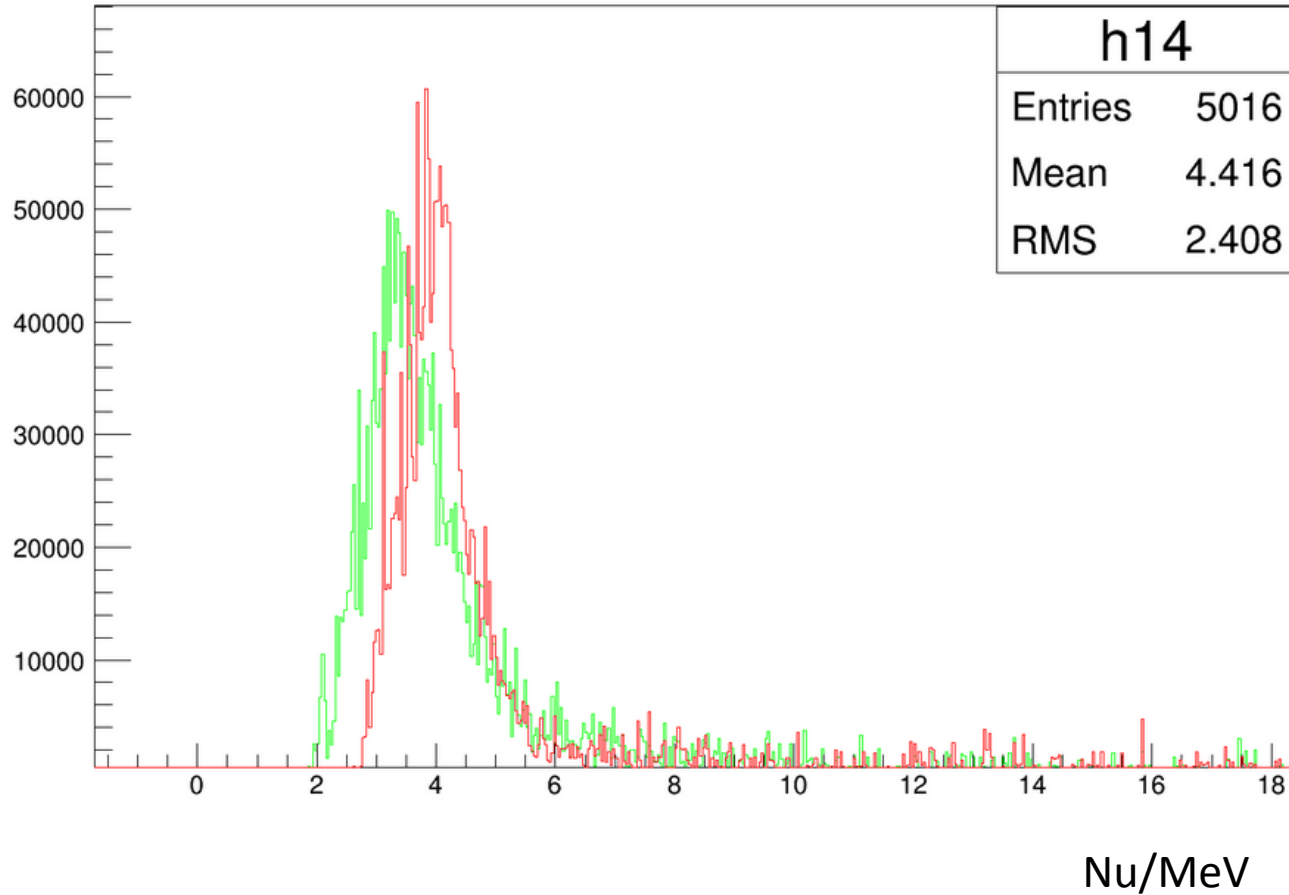
Green: Internal

Nu/MeV

# Last time Review

## Model Comparison

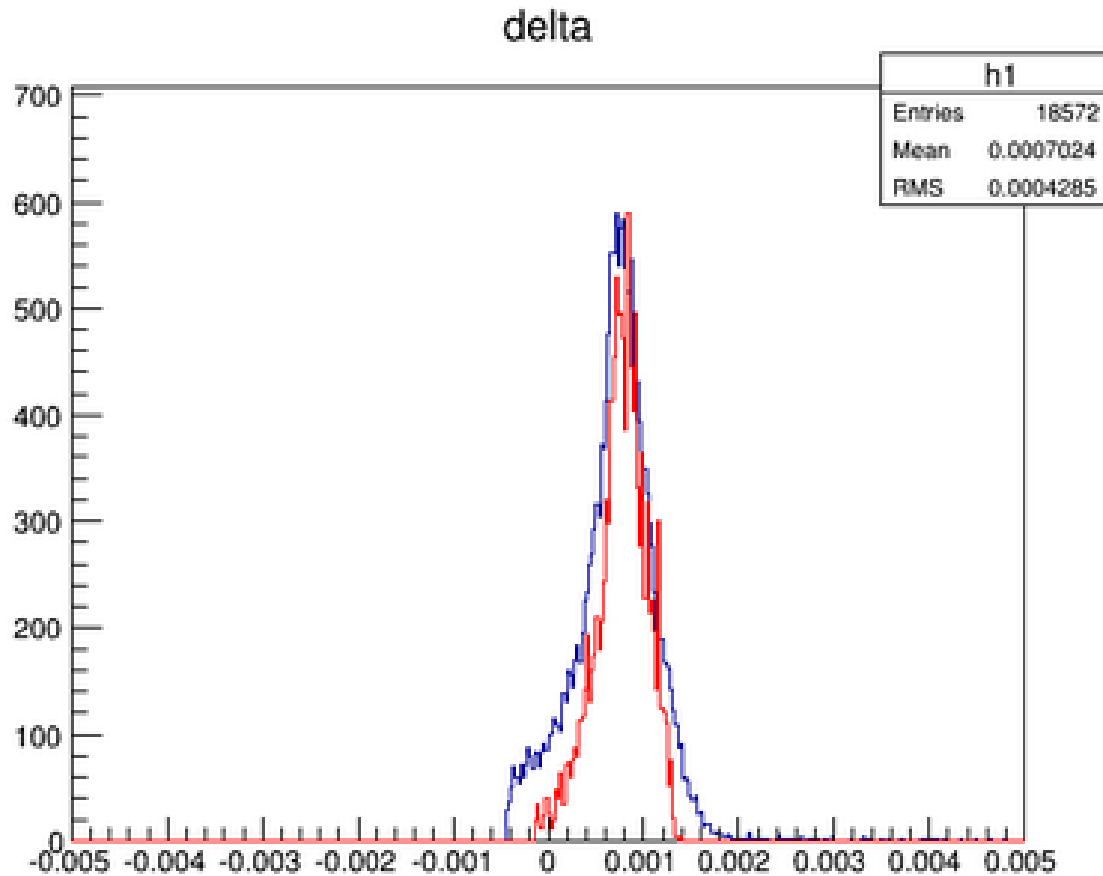
h14



Ioni+ Bremsstrahlung  
Red: Ioni (geant4, fluc)  
Brems(g2psim)  
Green: SAMC

# Last time Review

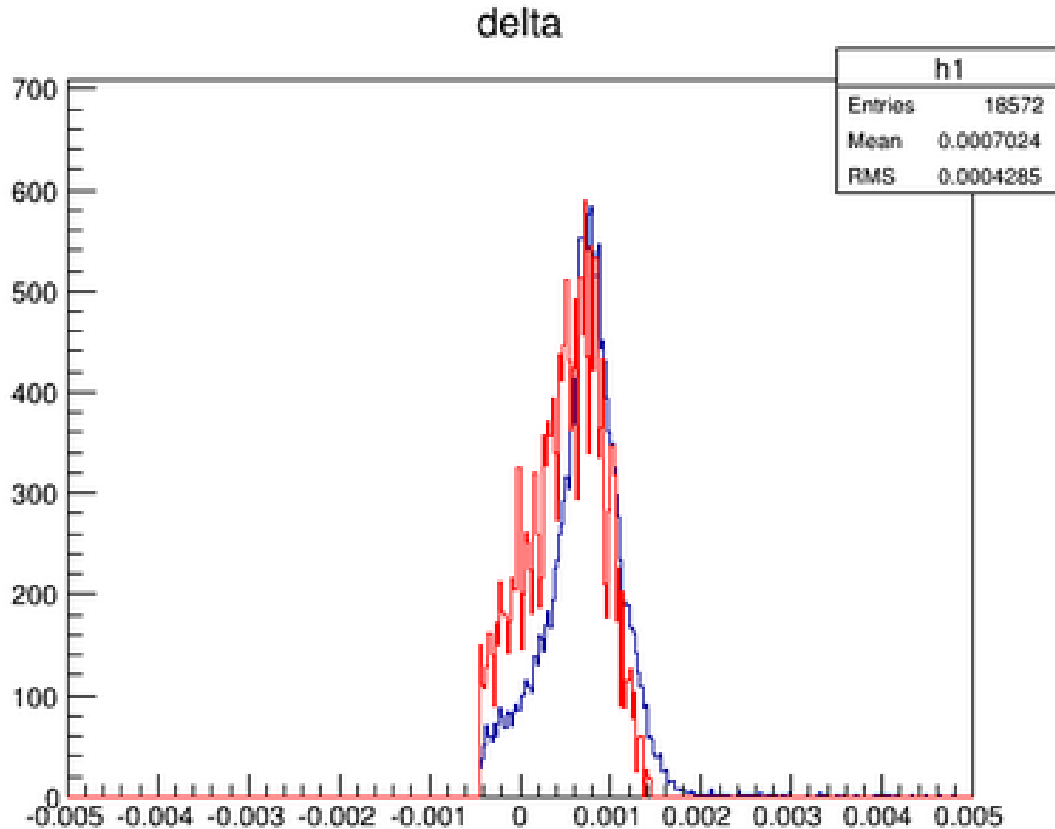
## Model Comparison



Ioni+ Bremsstrahlung  
Red: Ioni (geant4, fluc)  
Brems(g2psim)  
Blue: Data

# Last time Review

## Model Comparison



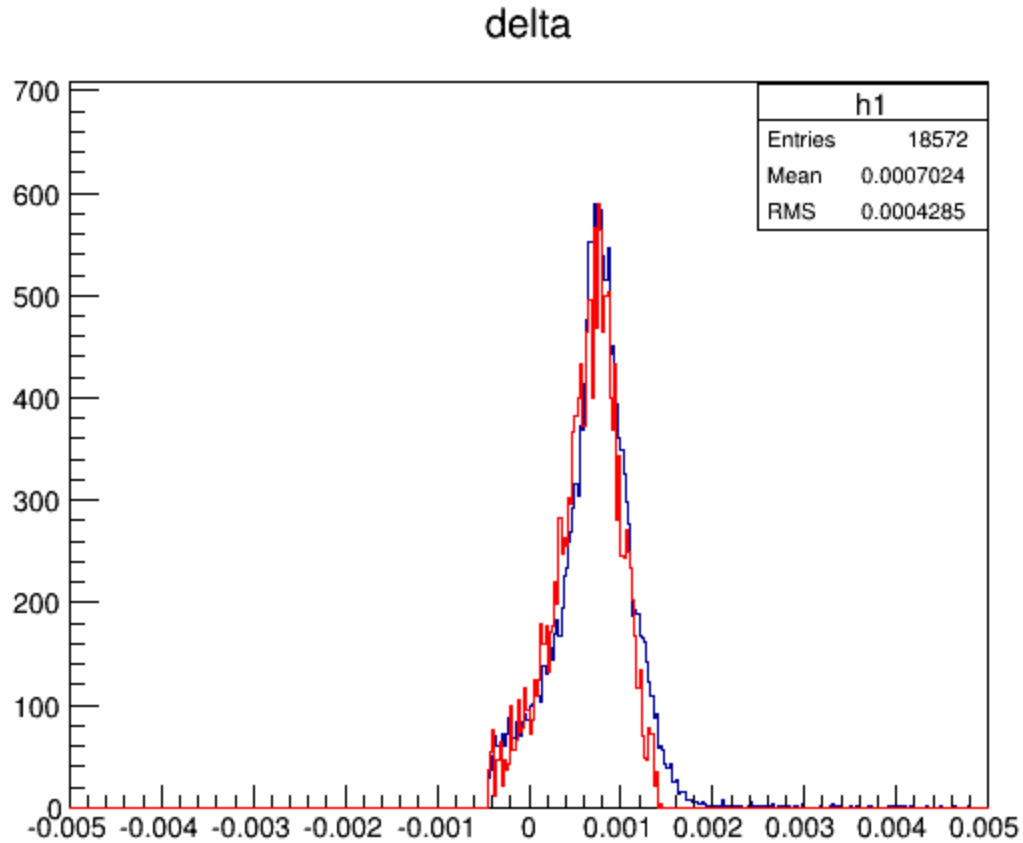
Ioni+ Bremsstrahlung

Red: Ioni (SAMC, landau)  
Brems(g2psim)

Blue: Data

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## Model Comparison



Ioni+ Bremsstrahlung

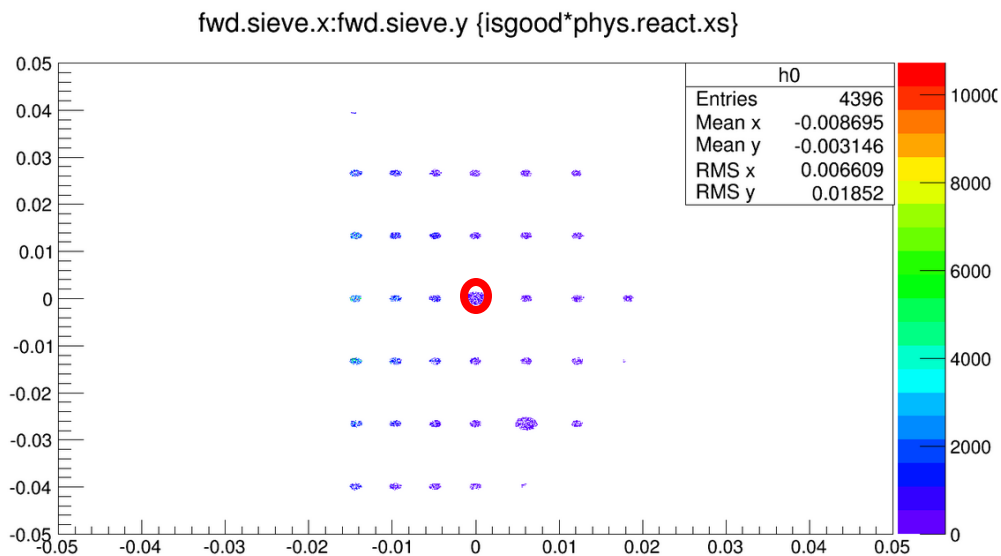
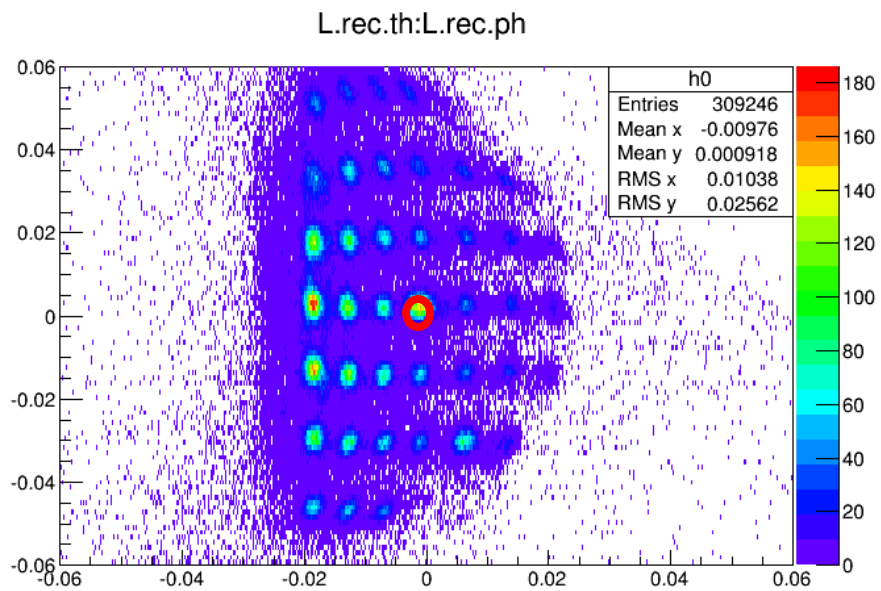
Red: Ioni (SAMC, landau)  
Brems(SAMC)

Blue: Data



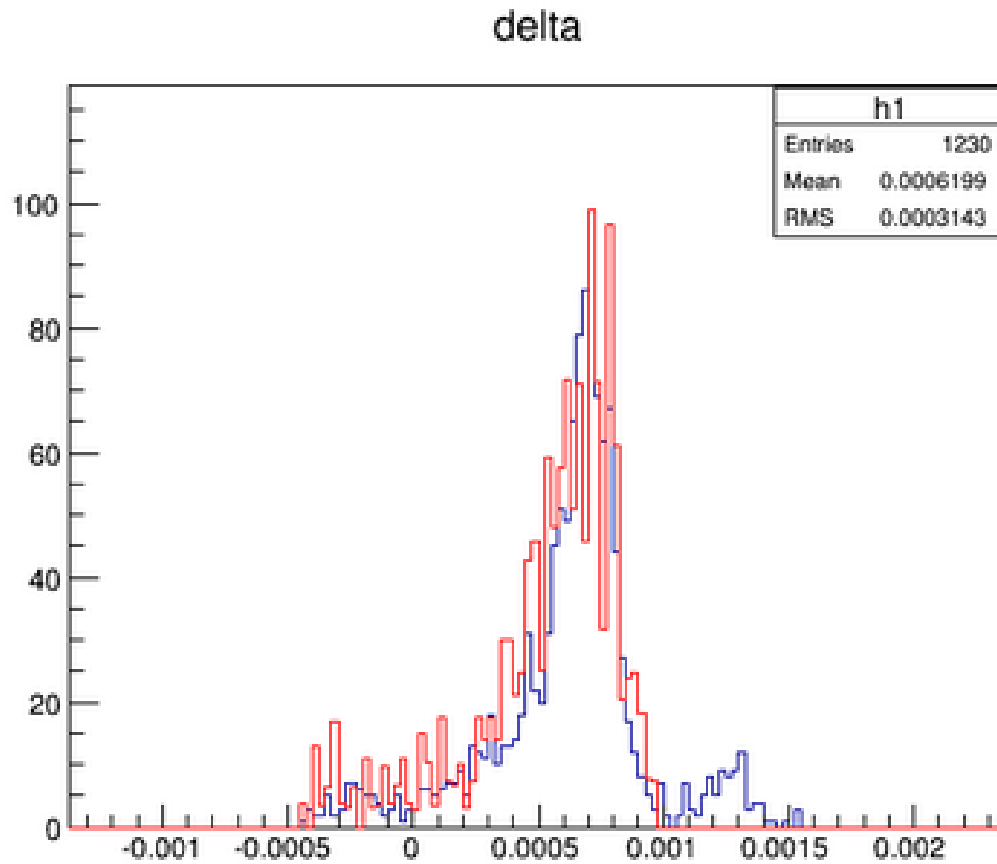
Total silver hole dp

- Focus on the center siver hole





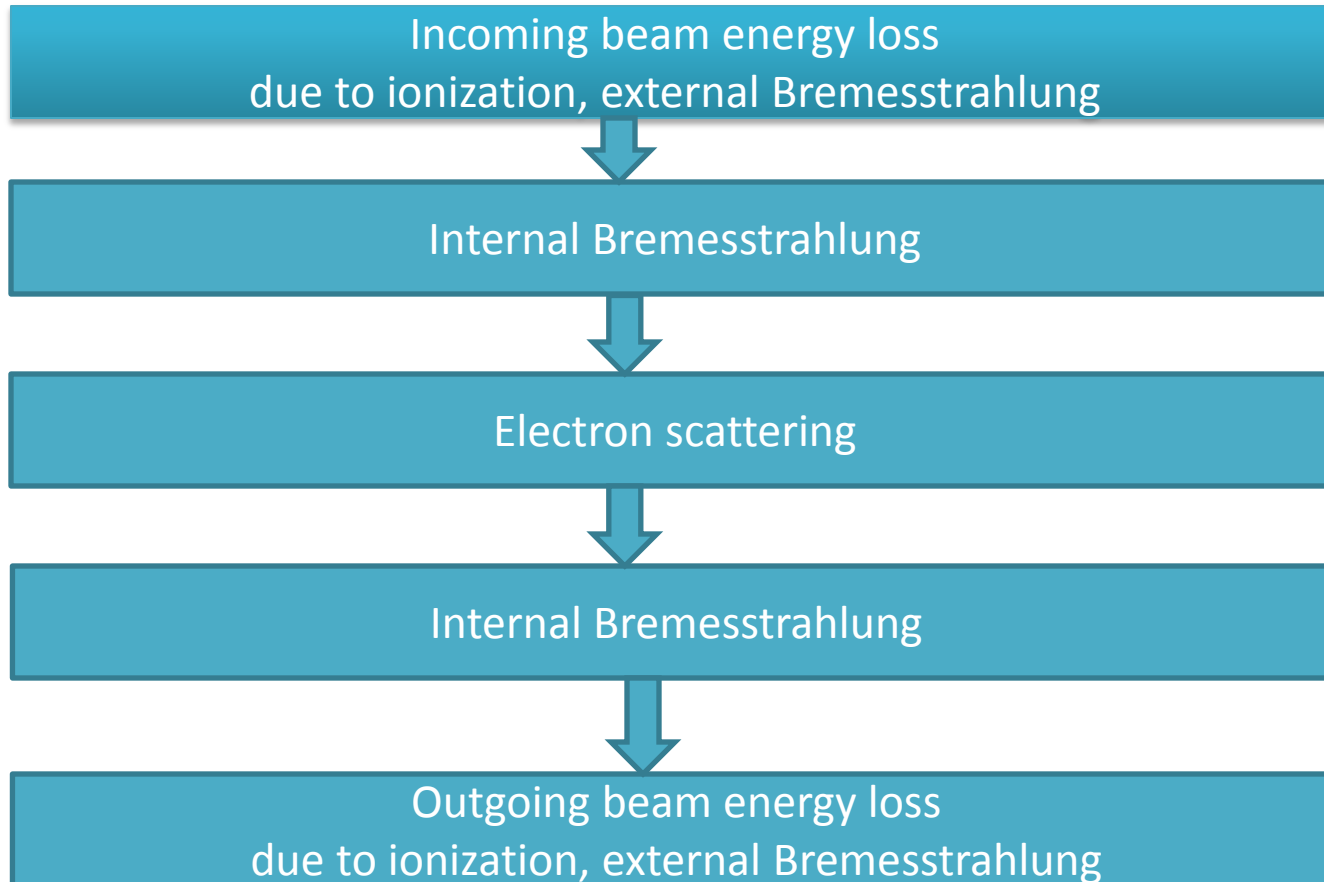
# Model Comparison



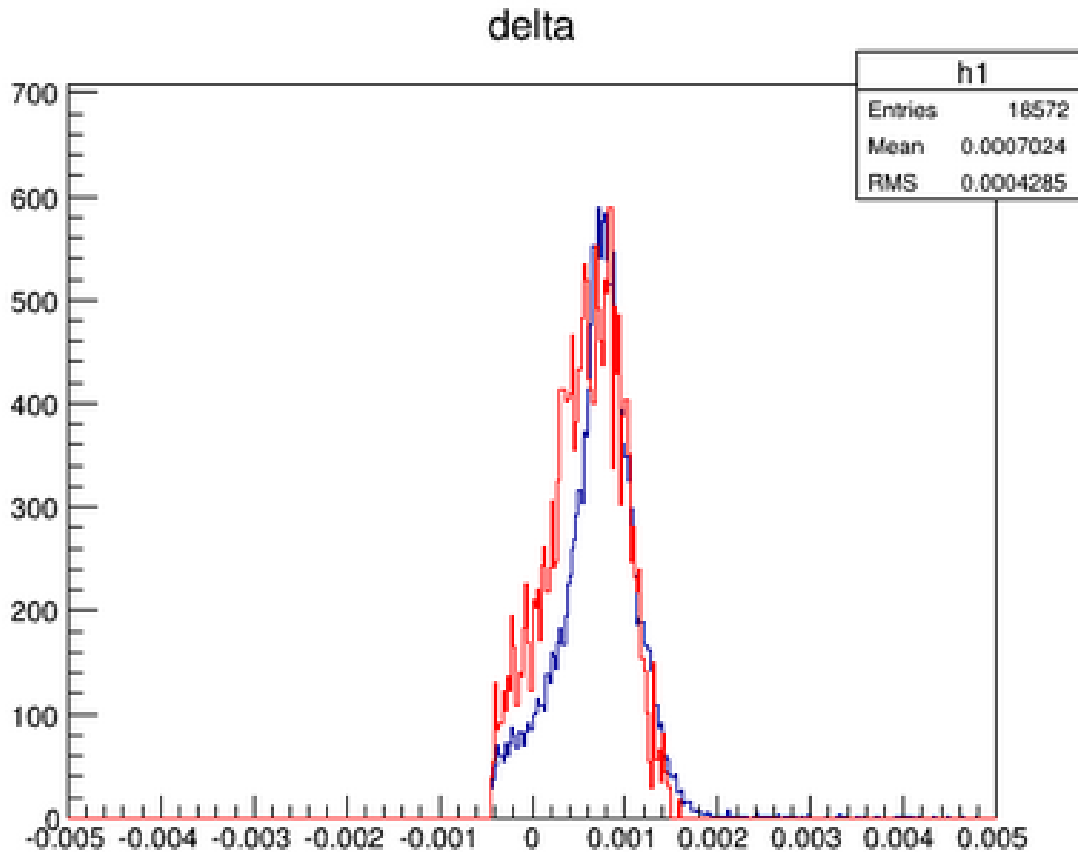
Ioni+ Bremsstrahlung  
Red: Ioni (SAMC, landau)  
Brems(SAMC)  
Blue: Data

Center siver hole dp

# Energy loss step by step



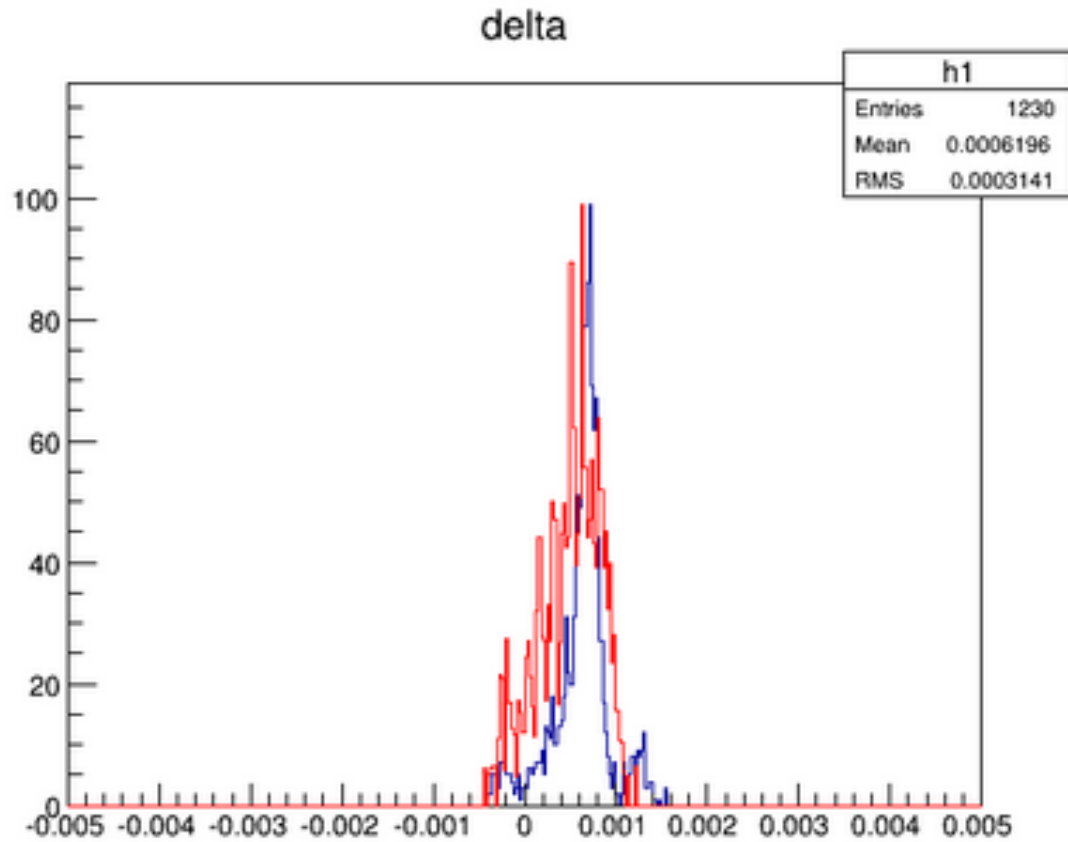
## Model Comparison



Ioni+ Bremsstrahlung  
Red: Ioni (SAMC, landau)  
Brems(SAMC)  
Blue: Data

→ Total silver holes dp

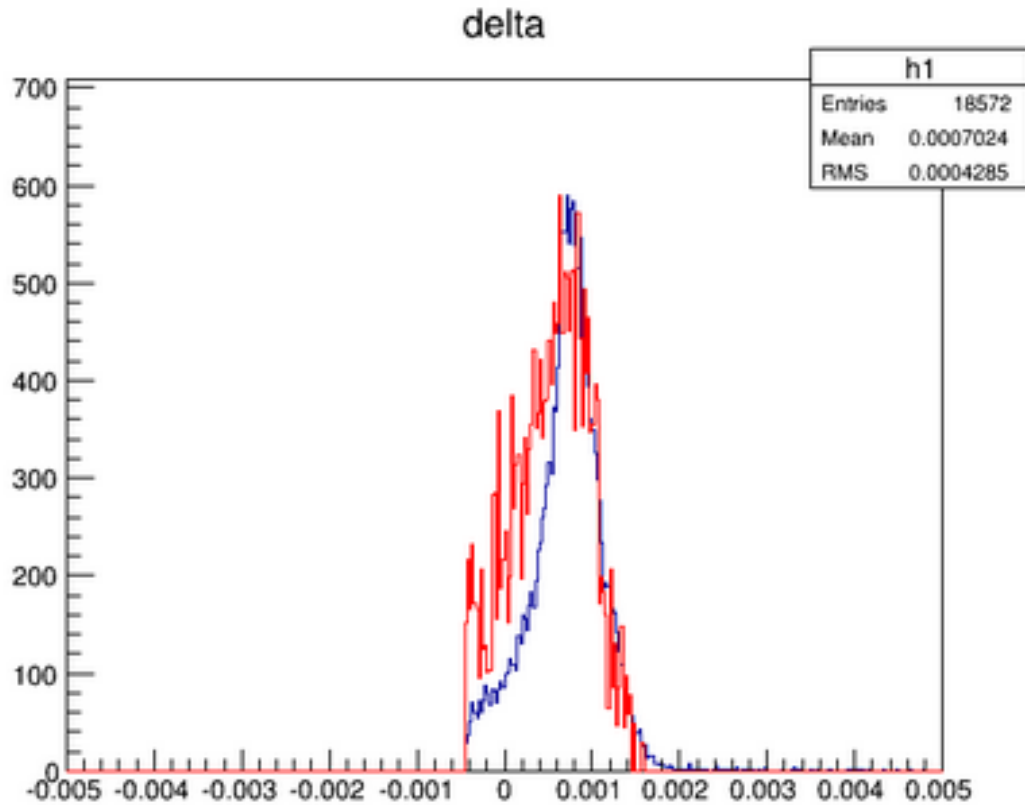
# Model Comparison



Ioni+ Bremsstrahlung  
Red: Ioni (SAMC, Landau)  
Brems(SAMC)  
Blue: Data

Center siver hole dp

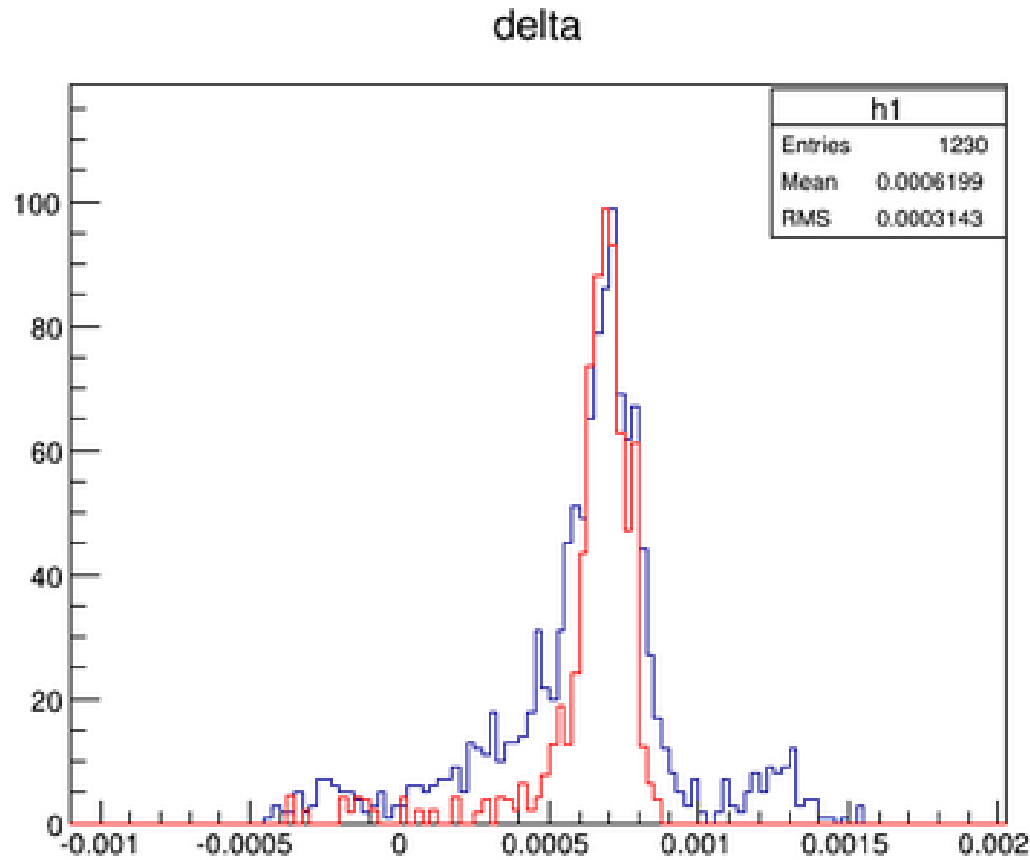
# Model Comparison



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Brems(g2psim)  
Blue: Data

→ Total silver holes dp

# Model Comparison



Ioni+ Bremsstrahlung  
Red: Ioni (geant4, fluc)  
Brems(g2psim)  
Blue: Data

→ Center siver hole dp

# Todo

- SAMC seems the better one?
- Check it on other target settings
- Packing simulation