UPDATE ON THE ANALYSIS OF GSI ^{16}O DATA TAKING

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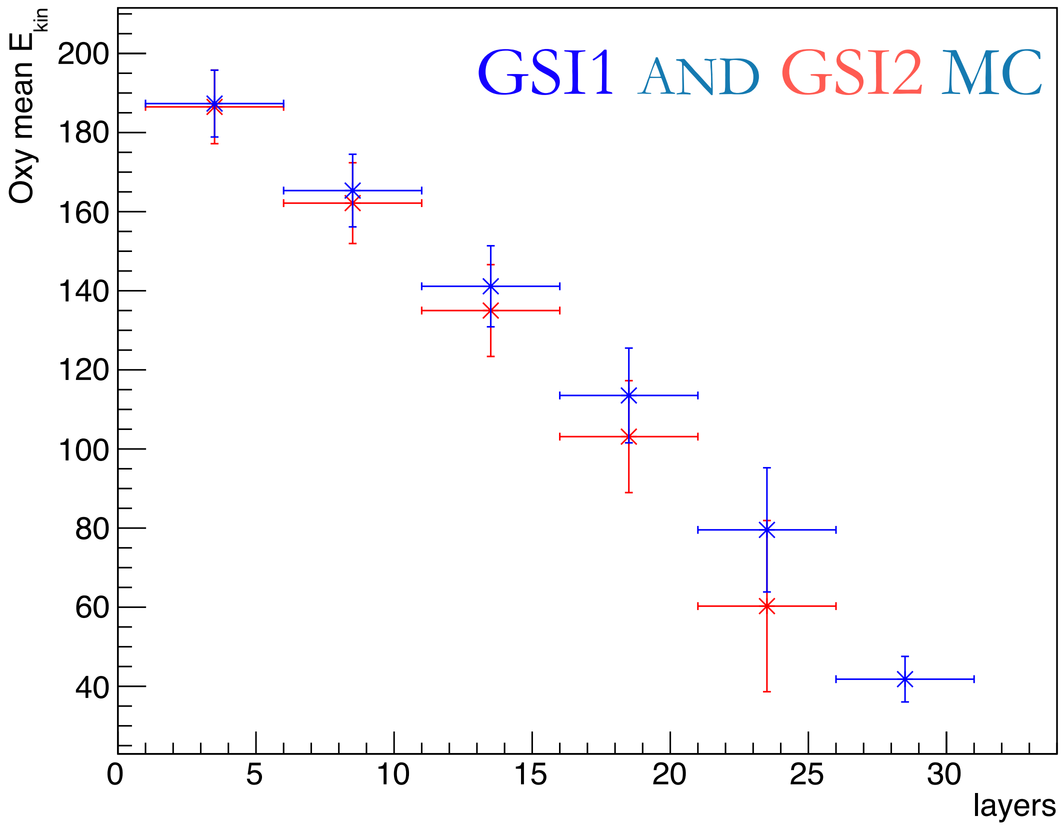
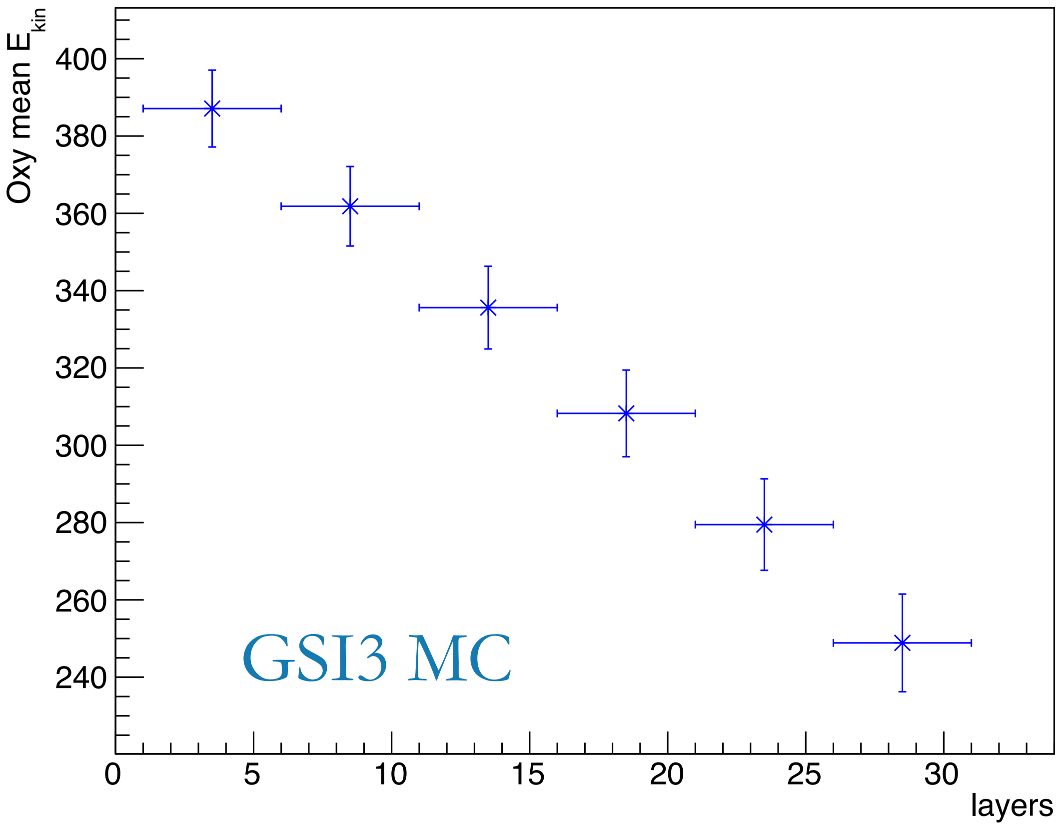
One detector… many measurements!

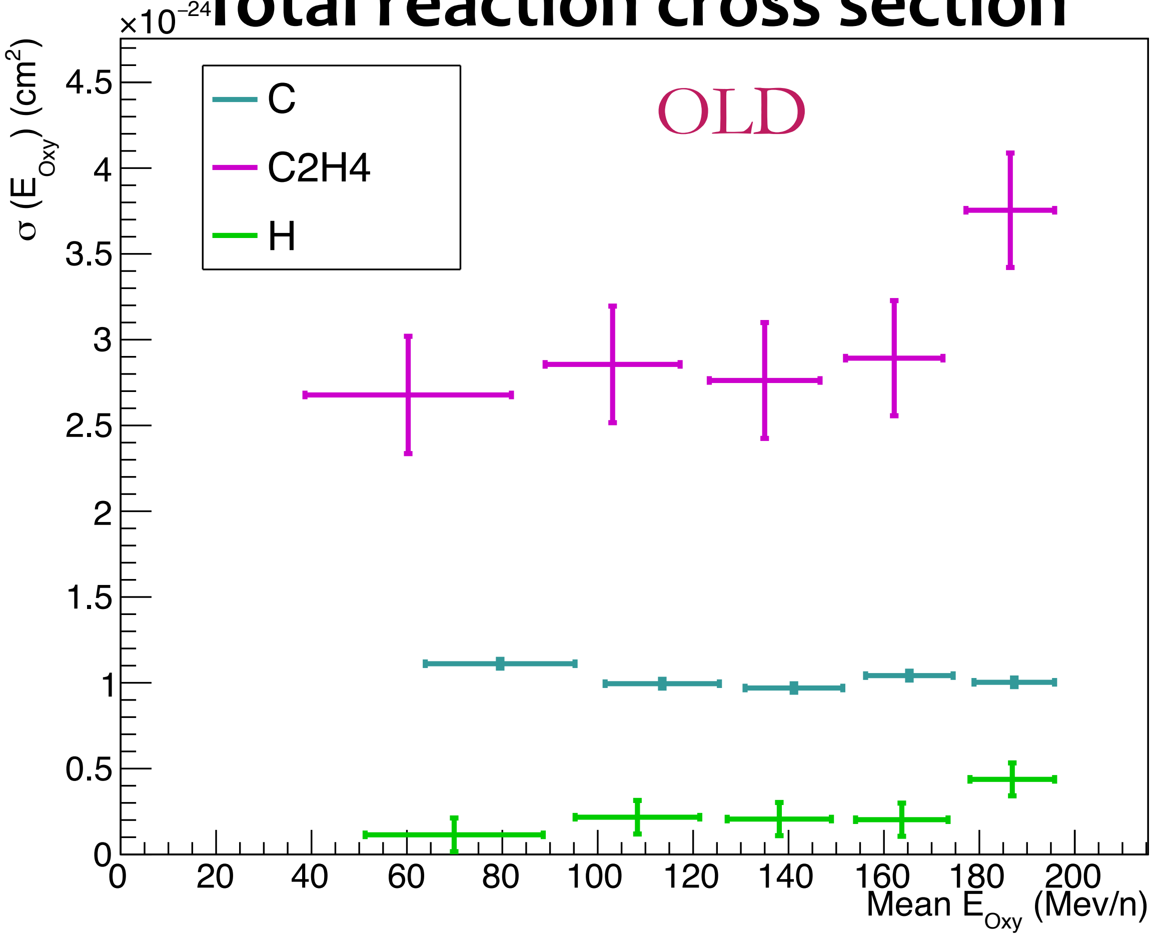
- The energy loss within S1 is not negligible
- We can divide S1 into sub-sections of 5 layers and obtain many measurements in different energy ranges!





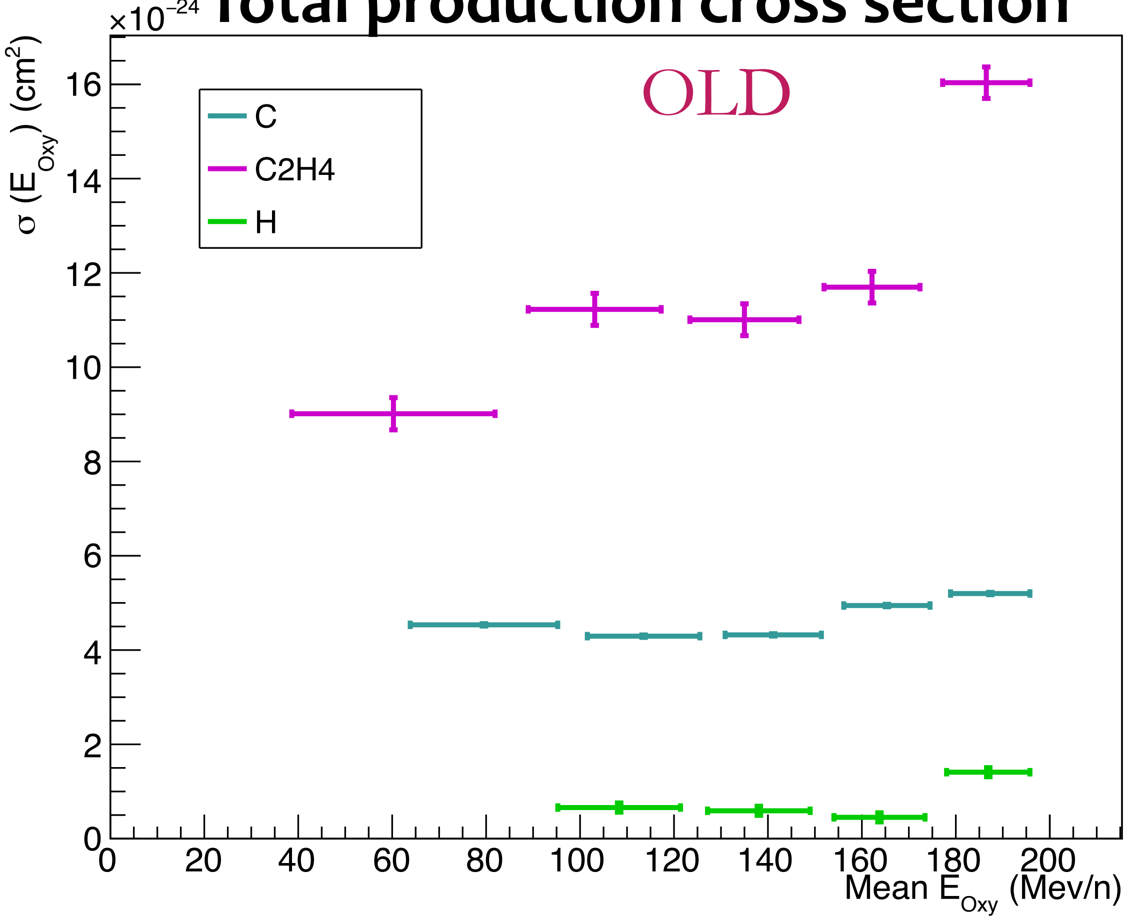
OLD - Integrated cross section Oxy@200MeV/n

Total reaction cross section



$Y_i = \#$ of vertices

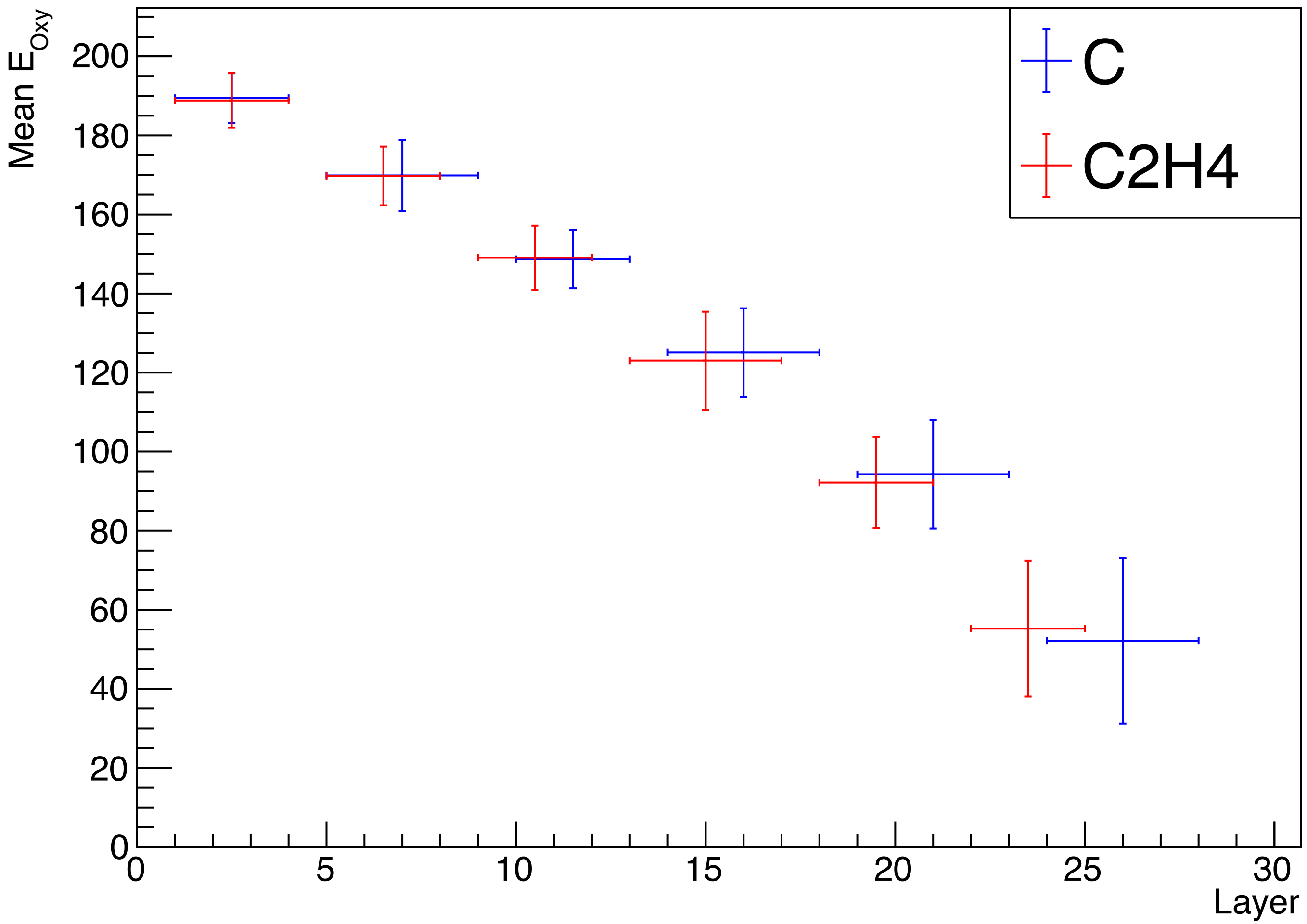
Total production cross section



$Y_i = \#$ of fragments

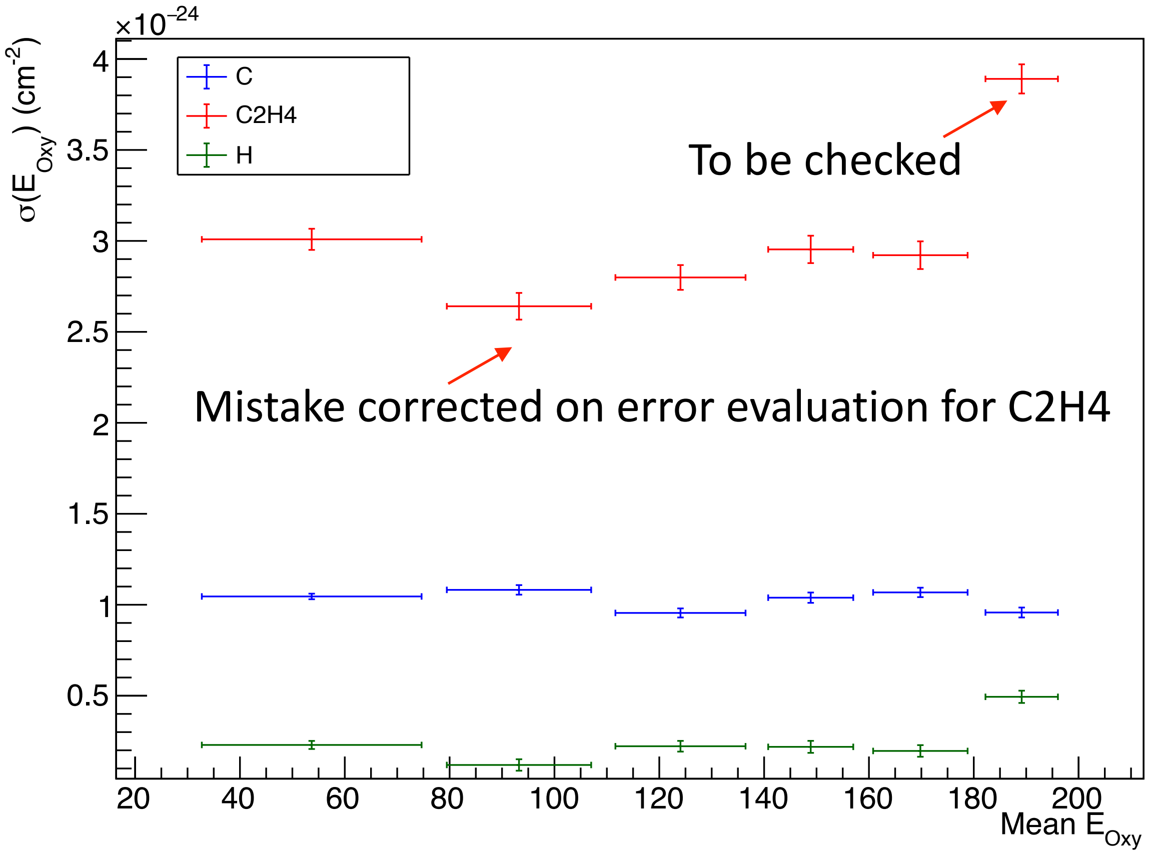
DATA

New Energy bin



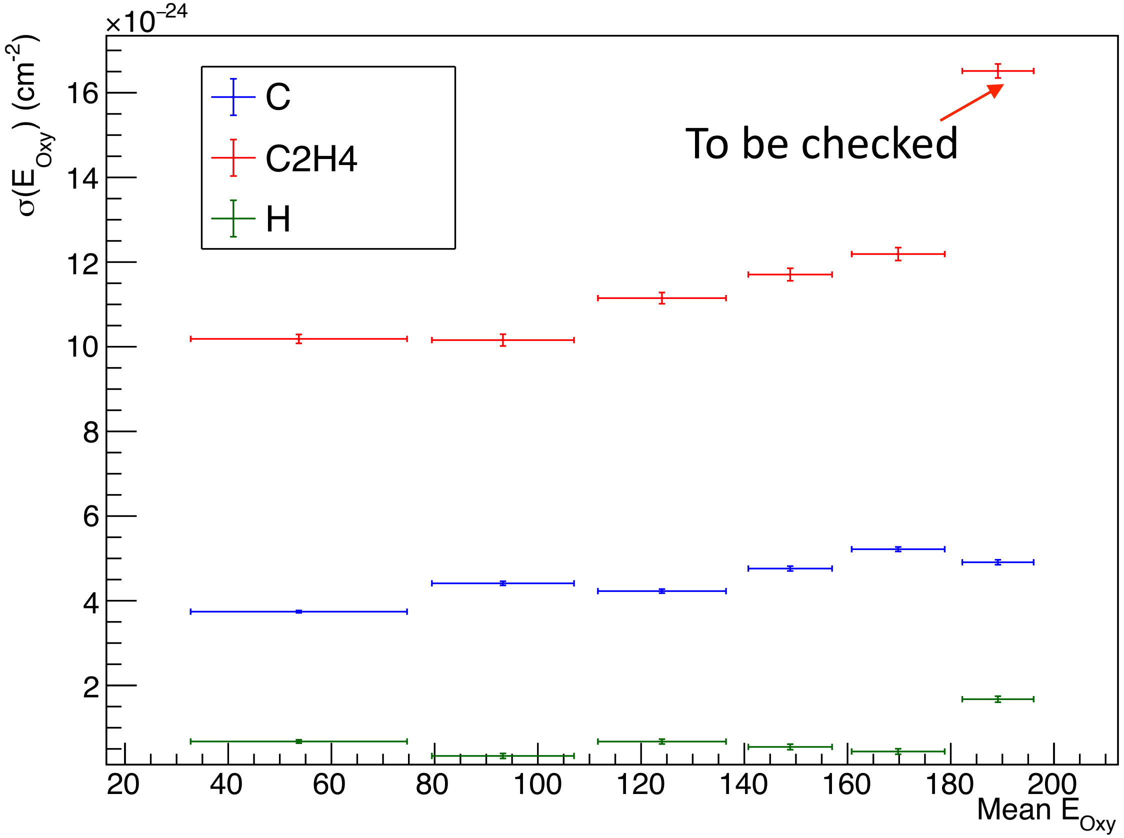
NEW - Integrated cross section Oxy@200MeV/n

Total reaction cross section



$Y_i = \#$ of vertices

Total production cross section



$Y_i = \#$ of fragments

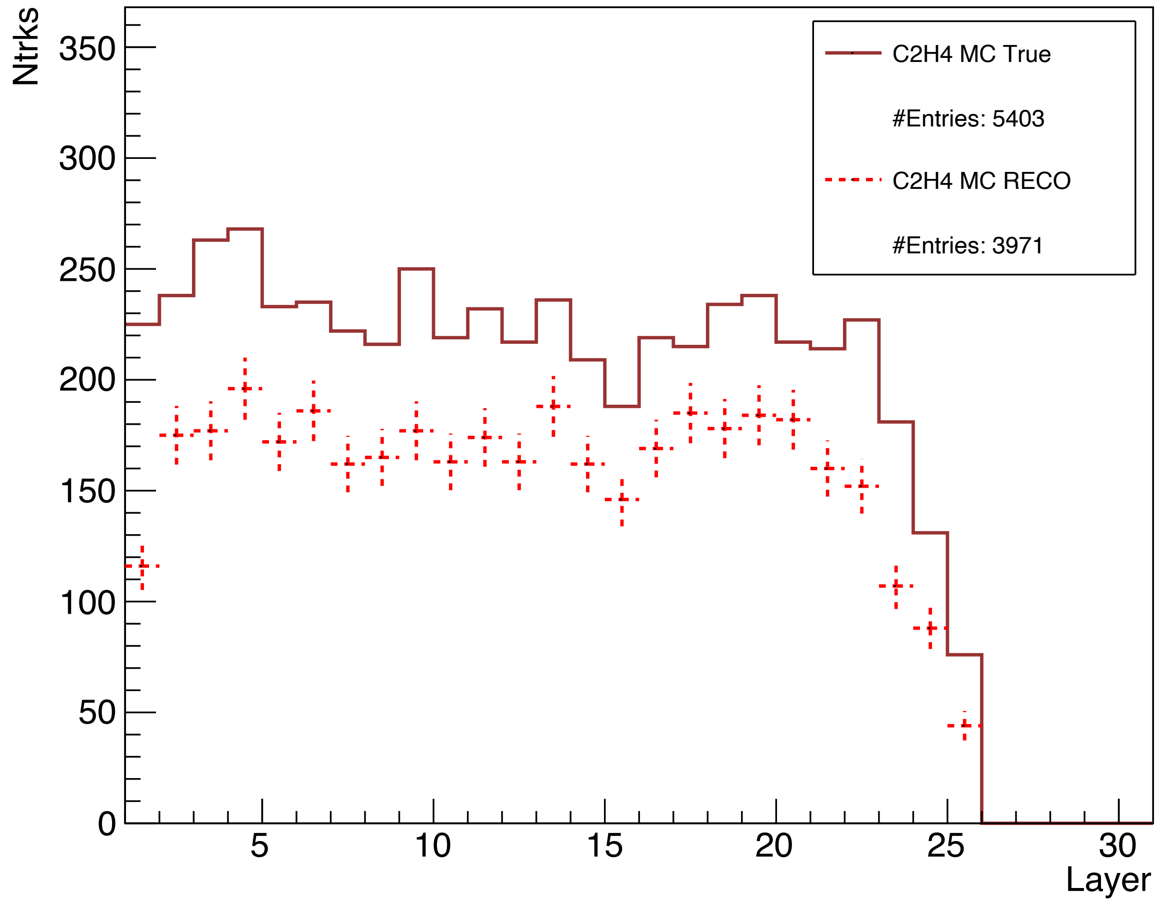
DATA

THANK YOU!

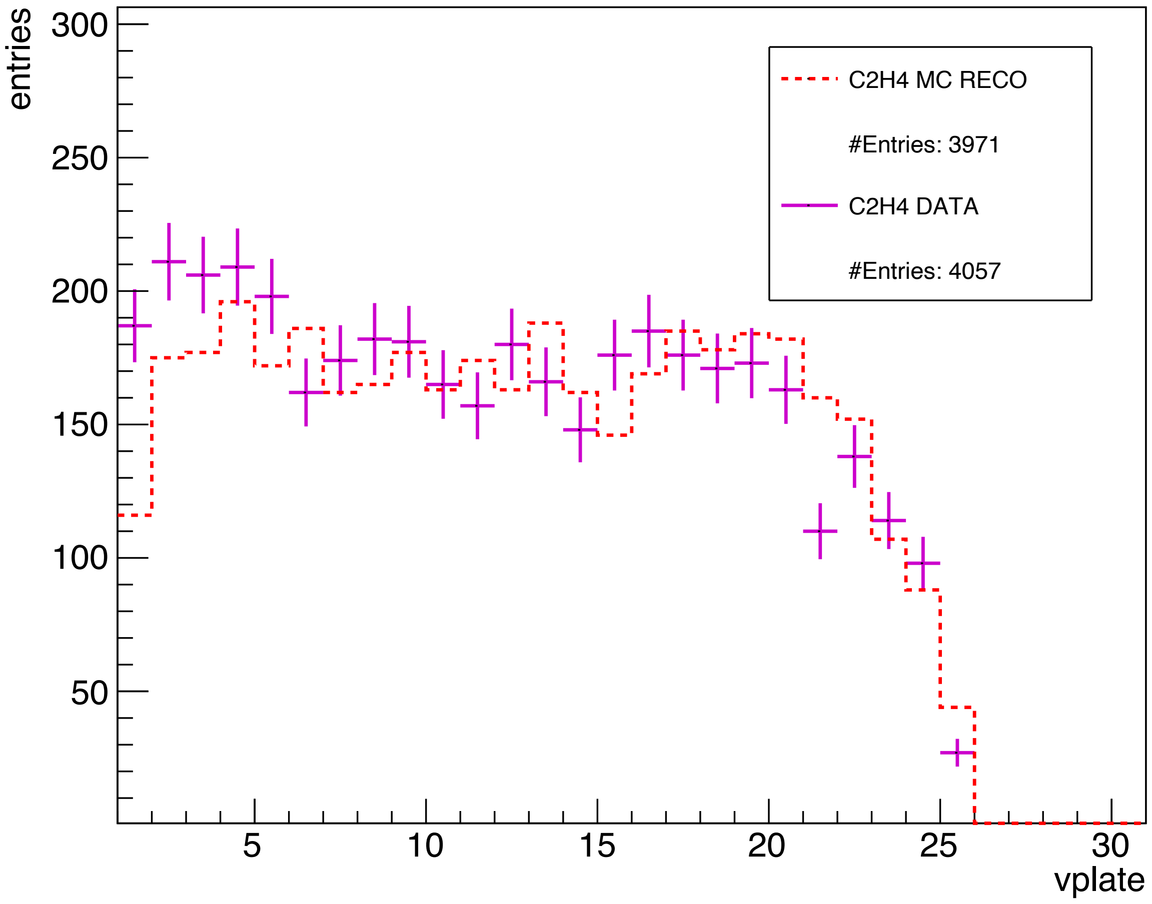
GSI2: Oxy@200 MeV/n on C2H4 target

N vertices per layer

MC TRUE vs MC RECO



MC RECO vs DATA

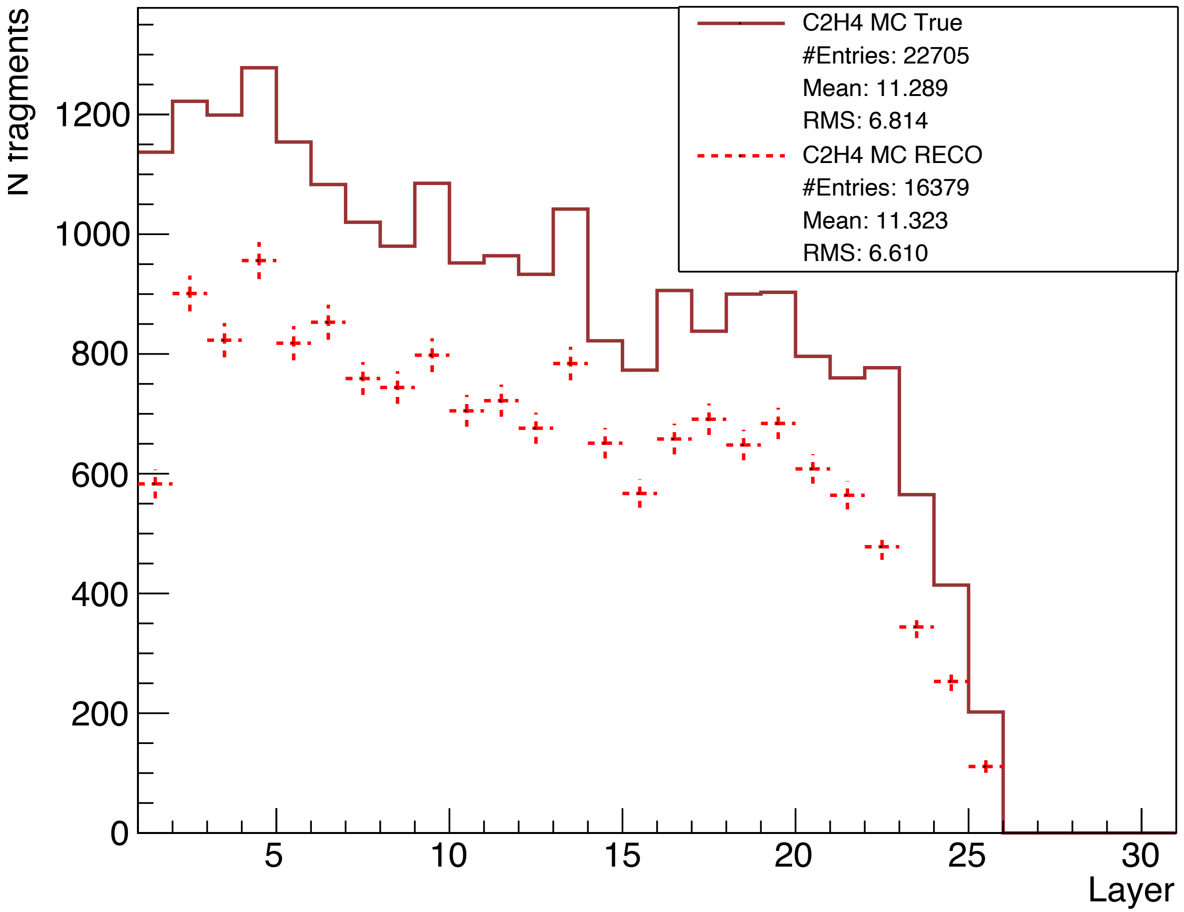


Distributions normalised to beam particles

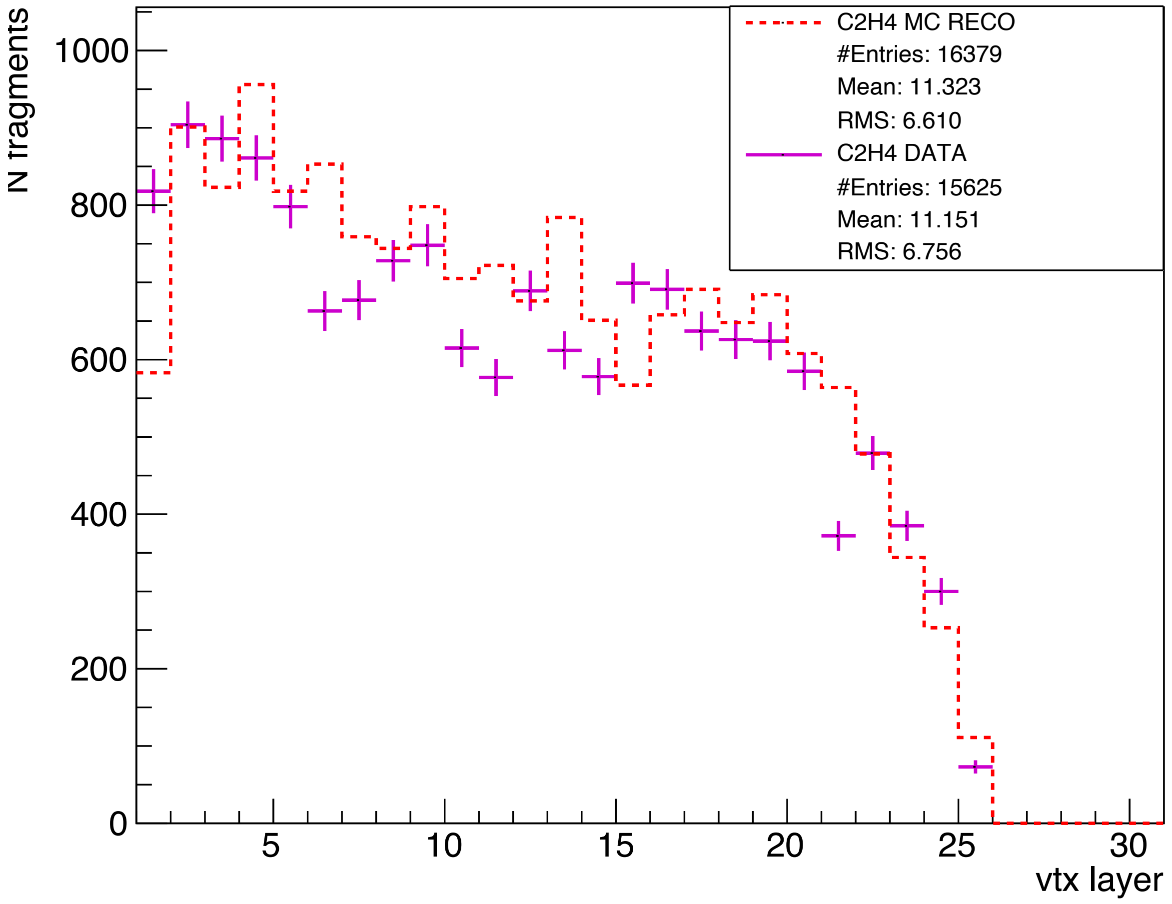
GSI2: Oxy@200 MeV/n on C2H4 target

N fragments per layer

MC TRUE vs MC RECO



MC RECO vs DATA

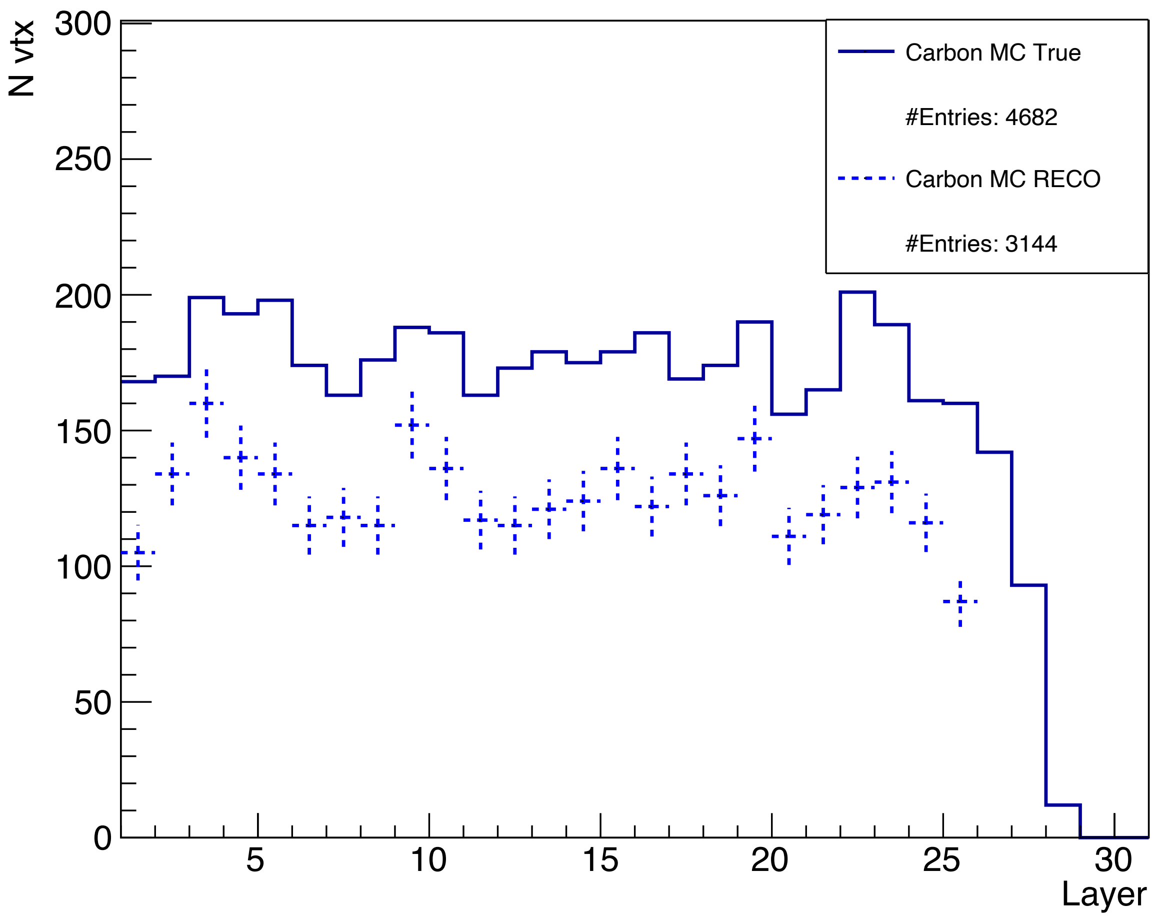


Distributions normalised to beam particles

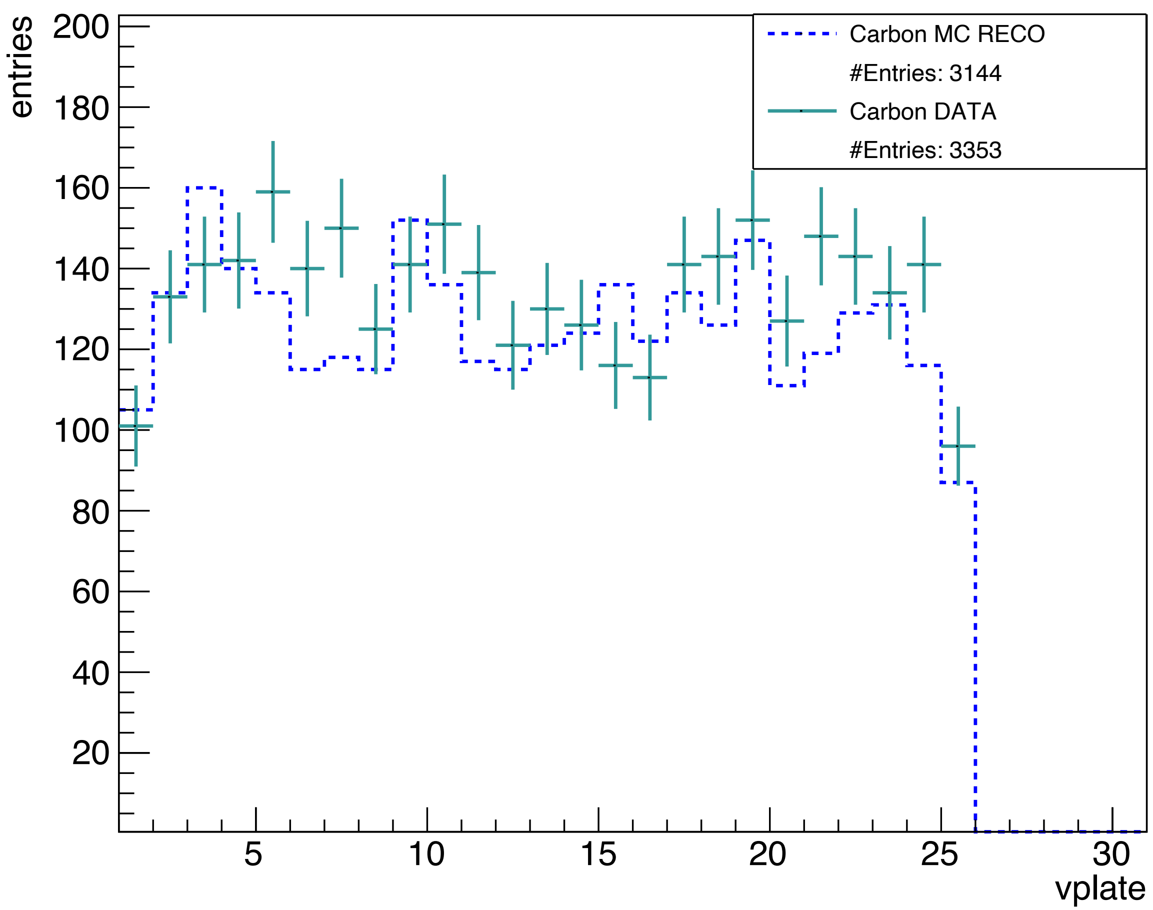
GSI1: Oxy@200 MeV/n on C target

N vertices per layer

MC TRUE vs MC RECO



MC RECO vs DATA

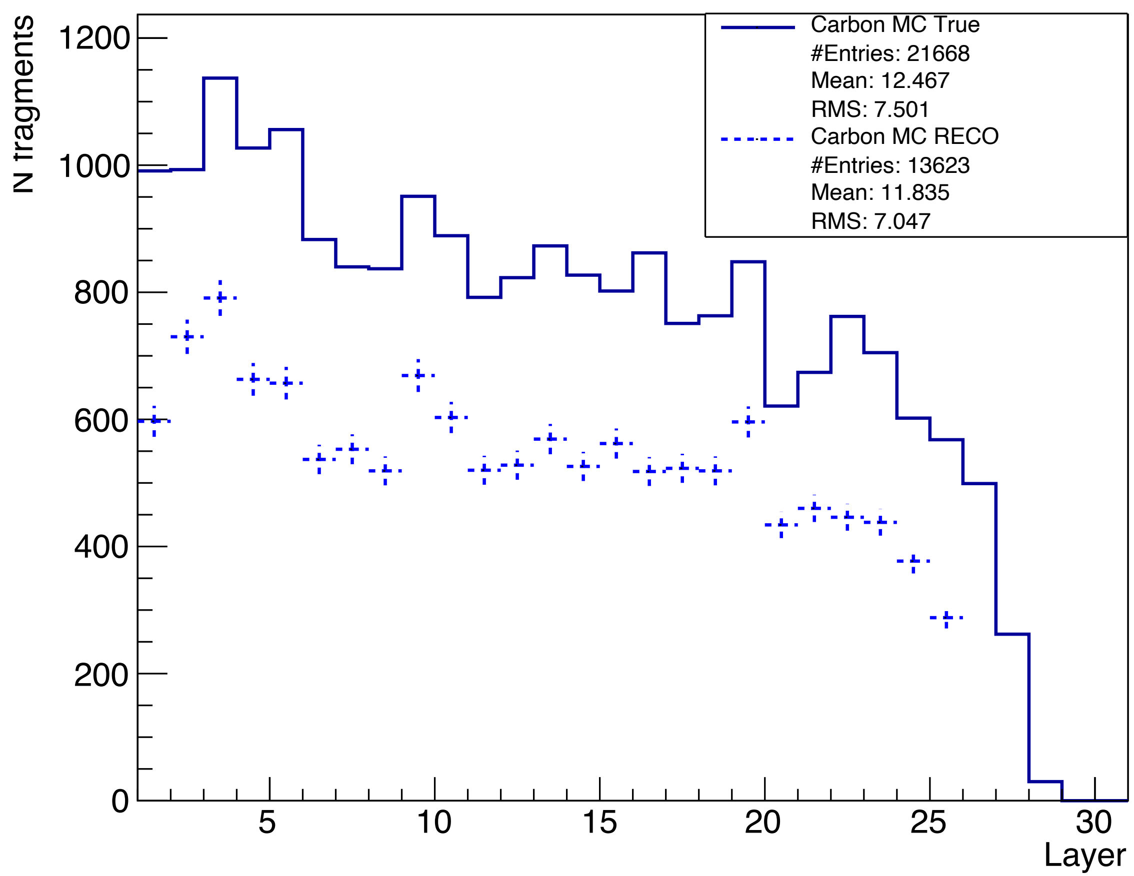


Distributions normalised to beam particles

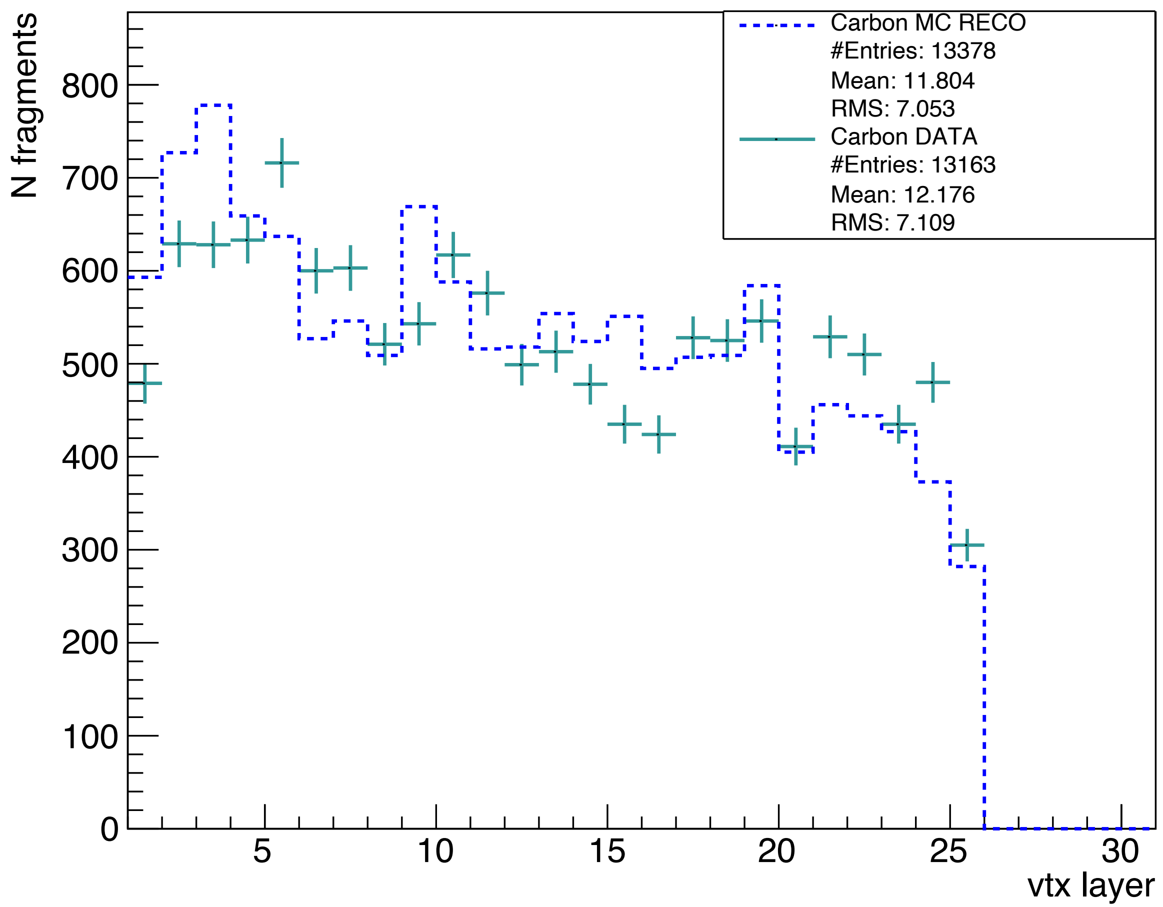
GSI1: Oxy@200 MeV/n on C target

N fragments per layer

MC TRUE vs MC RECO



MC RECO vs DATA



Distributions normalised to beam particles

Cross Section Measurement

$$\left.\frac{d\sigma(x)}{dx}\right|_{C\ or\ C_2H_4} = \frac{Y_i(x)}{N_B N_{TG} \Delta x \epsilon^i_{reco}(x)}$$

$$\left.\frac{d\sigma(x)}{dx}\right|_{H} = \frac{1}{4}\left(\left.\frac{d\sigma(x)}{dx}\right|_{C_2H_4} - 2\left.\frac{d\sigma(x)}{dx}\right|_{C}\right)$$

- Y_i = # of fragments in the interval Δx
- N_B = # of ions colliding on the target
- N_{TG} = # of particles in the target: $\frac{\rho d N_A}{A}$, with:
  - ρ = target density:
    $\rho_C = 2.26 g/cm^3$
    $\rho_{C_2H_4} = 0.94 g/cm^3$
    $\rho_H = 0.0708 g/cm^3$
  - d = target thickness:
    $d_C = 0.1 cm$ per layer
    $d_{C_2H_4} = 0.2 cm$ per layer
  - $N_A = 6.022 \cdot 10^{23} /mol$
  - A = molar mass:
    $A_C = 12 g/mol$
    $A_{C2H4} = 28 g/mol$
    $A_H = 1 g/mol$
- Δx = x bin
- ϵ^i_{reco} = reconstruction efficiency