



Software for Cross Section measurements

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Global reconstruction

From SHOE branch “glbreco_v1”:
libs/src/TAGfoot/**GlobalRecoAna.cxx**



Global reconstruction of an event

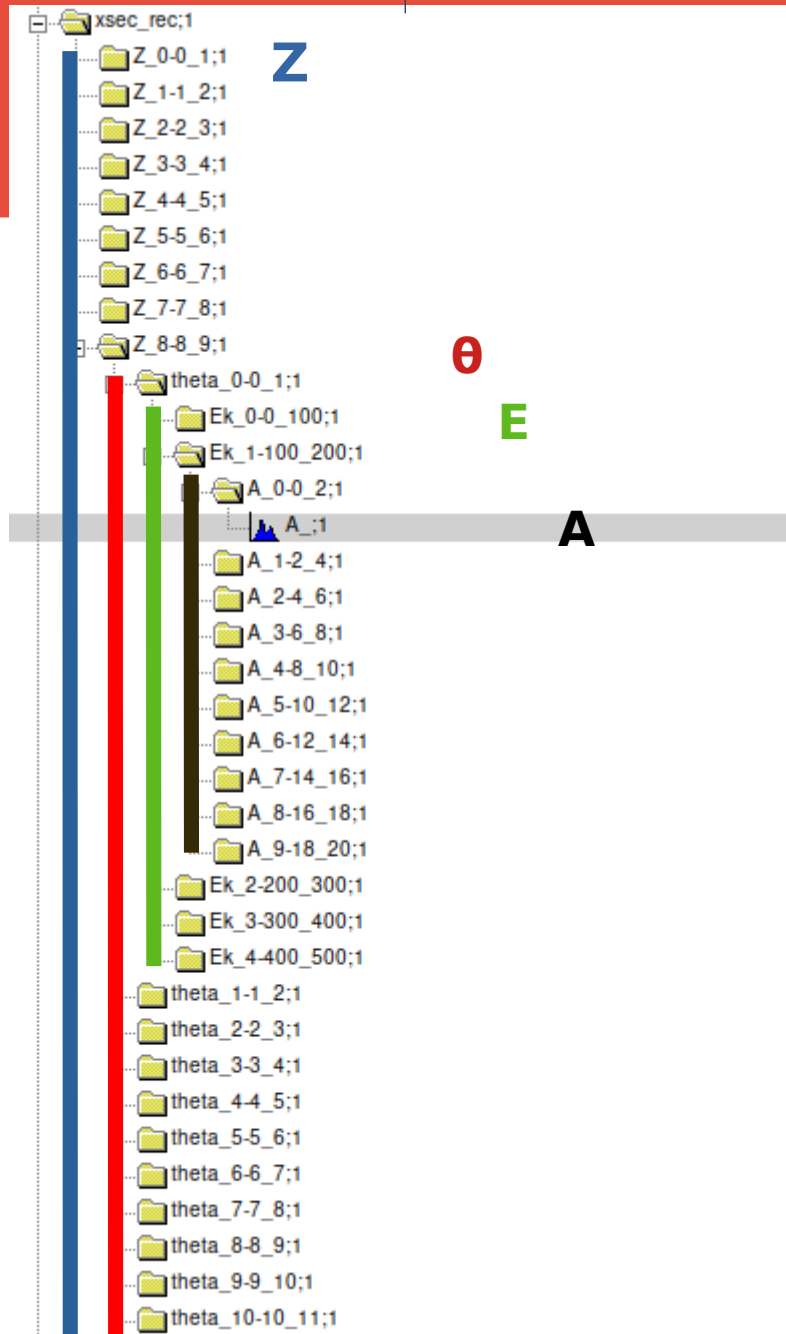
- Particle ID: **Z,A**
- Kinematics: **E,p**
- Angular distribution: **θ**

.root file with histograms of
variable distribution

Aim of the new software:

- Measure differential cross section **σ** (Z,A, θ ,E)
wrt all combination of variables
- Written in **python**

Exampe of Input file From SHOE



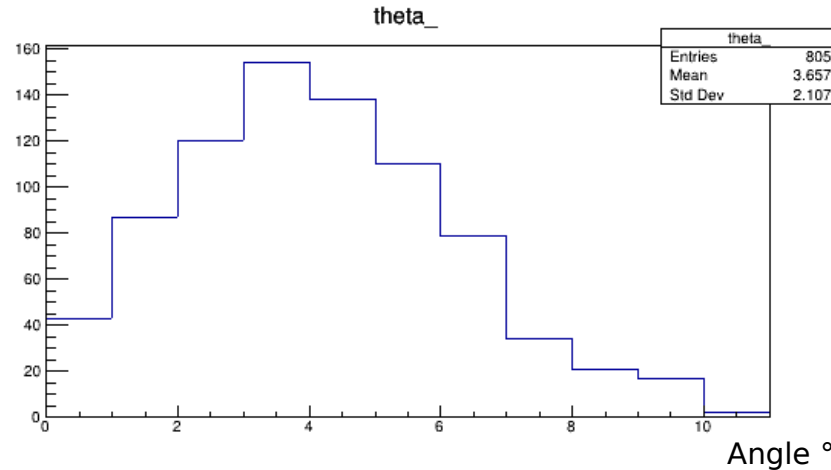
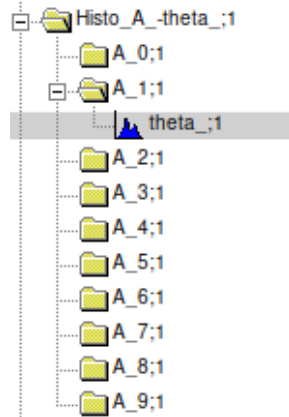
- There are only **histos of A**
- Every subdirectory is due to **input binning** of the variable
- Every histo is univocally discriminated by its path

The software

- takes info dinamically about input variables and binning
- Generates **differential distribution** wrt all combinations of variables

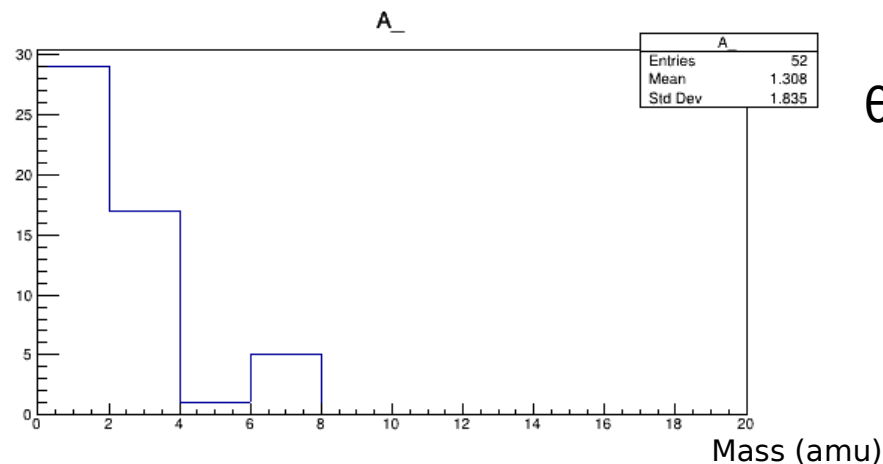
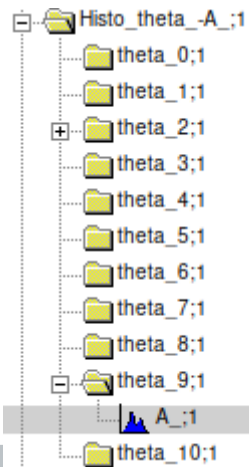
Es. beam of O₁₆ of 200 MeV/n against a target of C₂H₄ (MC)

Write_Histo_events ("**A**/**theta**", eventContainer, outFile,inputPar_dict)



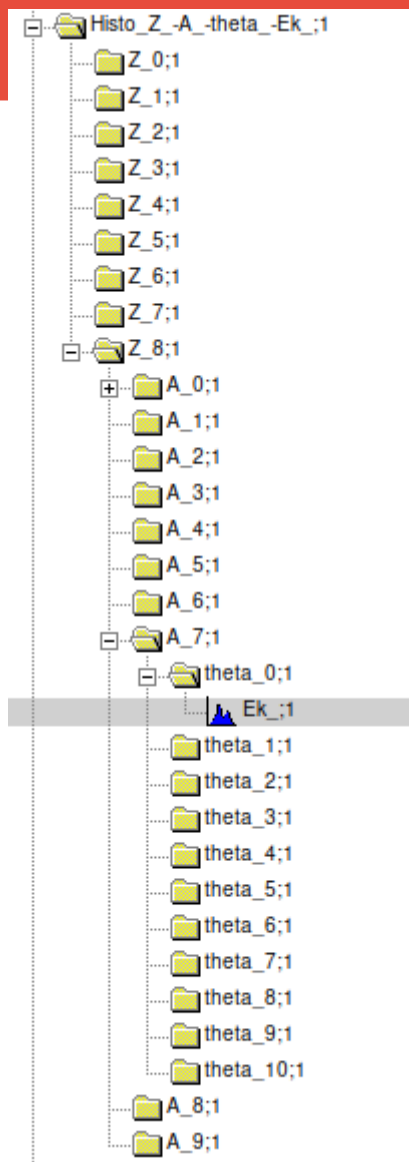
A₁: 2 < A < 4 amu
0° < θ < 11°

Write_Histo_events ("**theta**/**A**", eventContainer, outFile,inputPar_dict)

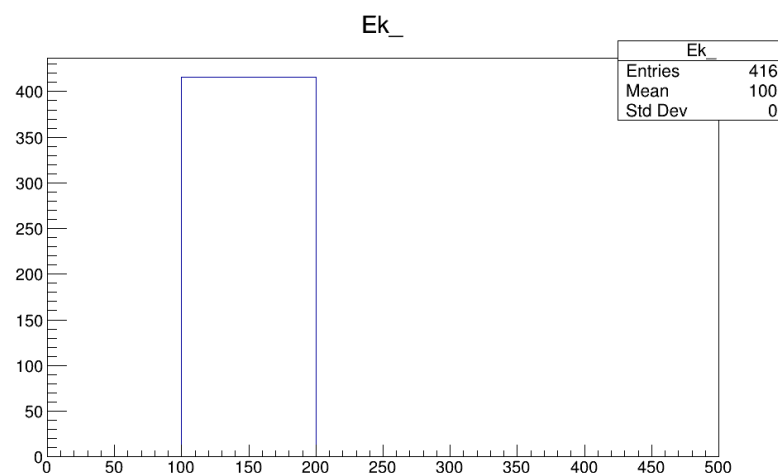


θ₉: 9° < θ < 10°
0 < A < 20 amu

4 - differential distribution



`Write_Histo_events ("Z_/A_/theta_/Ek_", eventContainer, outFile,inputPar_dict)`



$Z = 8$
 $14 < A < 16$
 $0^\circ < \theta < 1^\circ$

To do:

- Choose **output binning** in agreement with the input one
- Apply **unfolding**
- Do **TH2** histograms
- Do it for signal, background and systematics
- Obtain final **differential cross section**

<https://baltig.infn.it/gubaldi/xshoe>