

Acceptance Study Status

Chao Gu

Acceptance Study

- Check the acceptance with elastic cross-section
- Since we have pretty enough data, we could only use the central region of the acceptance to calculate the cross-section
- Elastic cross-section is well-known so we should be able to compare the calculated cross-section with different cut of the acceptance to give a check

$$\sigma_0 = \frac{P_S N}{\frac{Q}{e} (\rho \Delta Z) T_L \epsilon_{\text{det}}} \frac{1}{\Delta \Omega \Delta E' A}$$

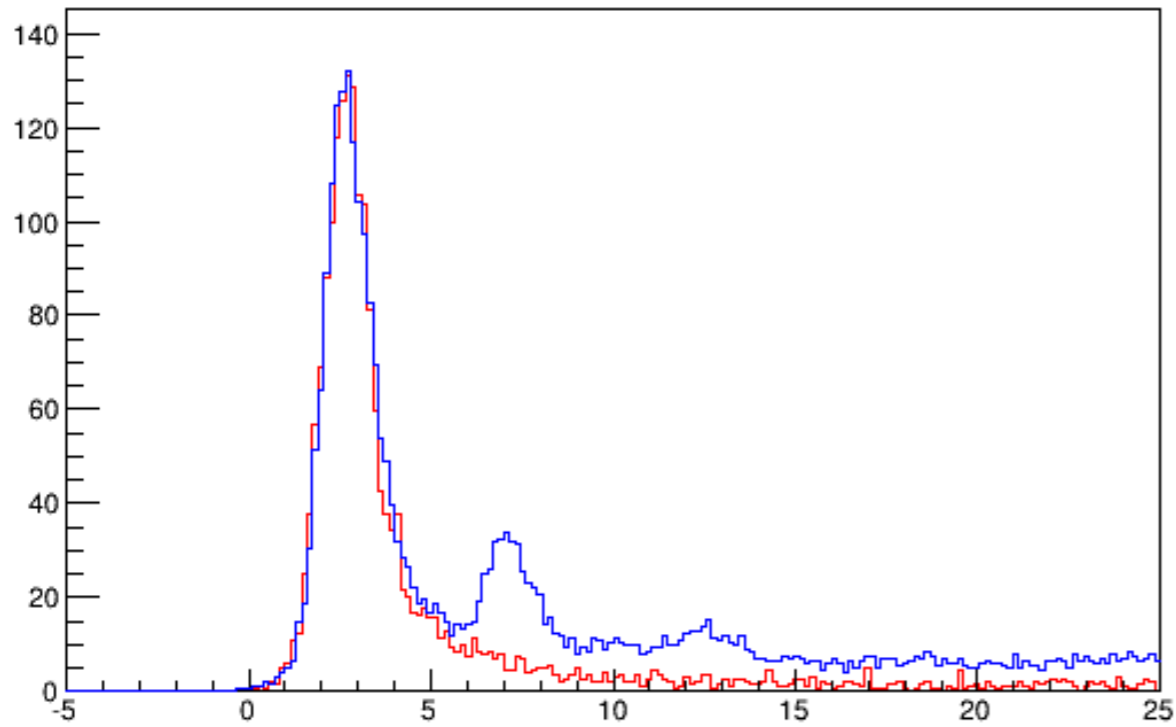
initial angle and momentum coverage in simulation

ratio of accepted events and total events

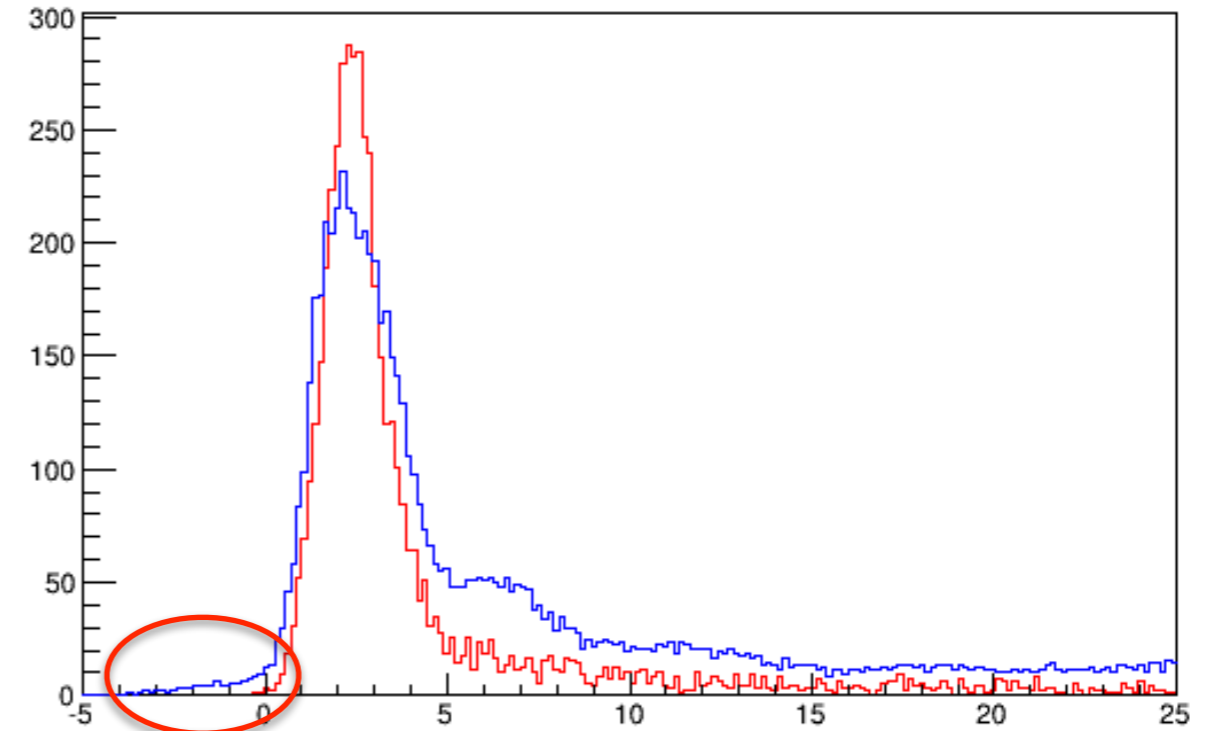
Acceptance Study

Sim
Data

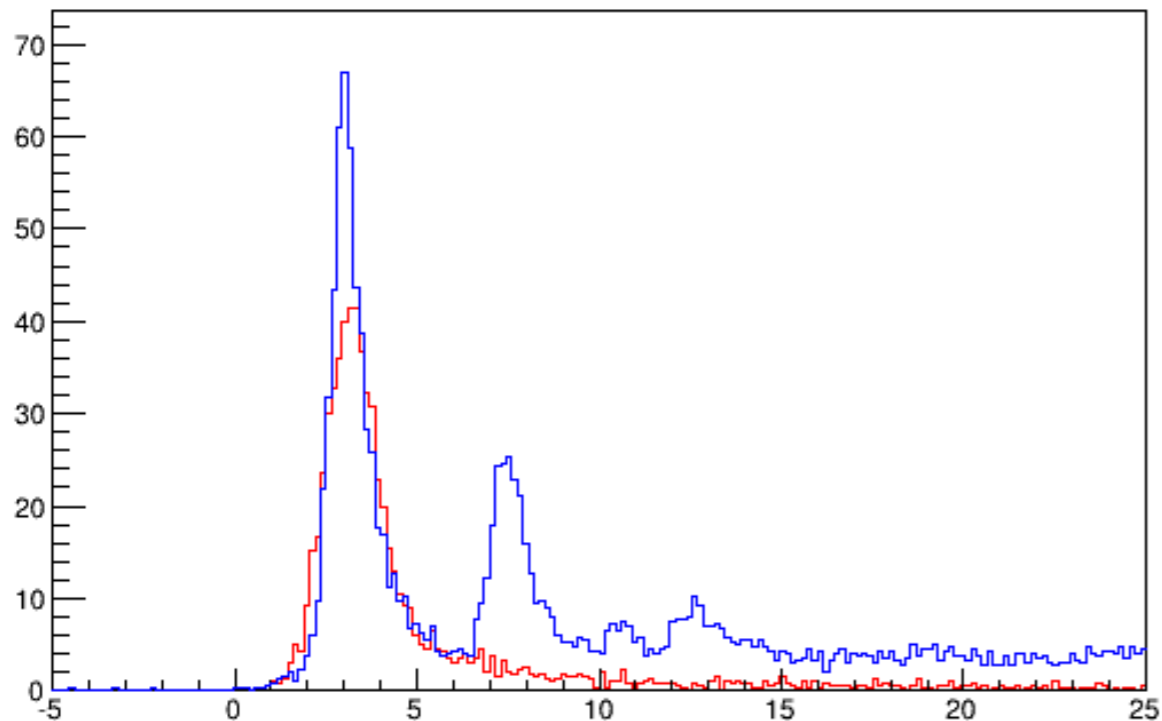
$-0.005 < \phi < 0.005$



$-0.015 < \phi < -0.005$



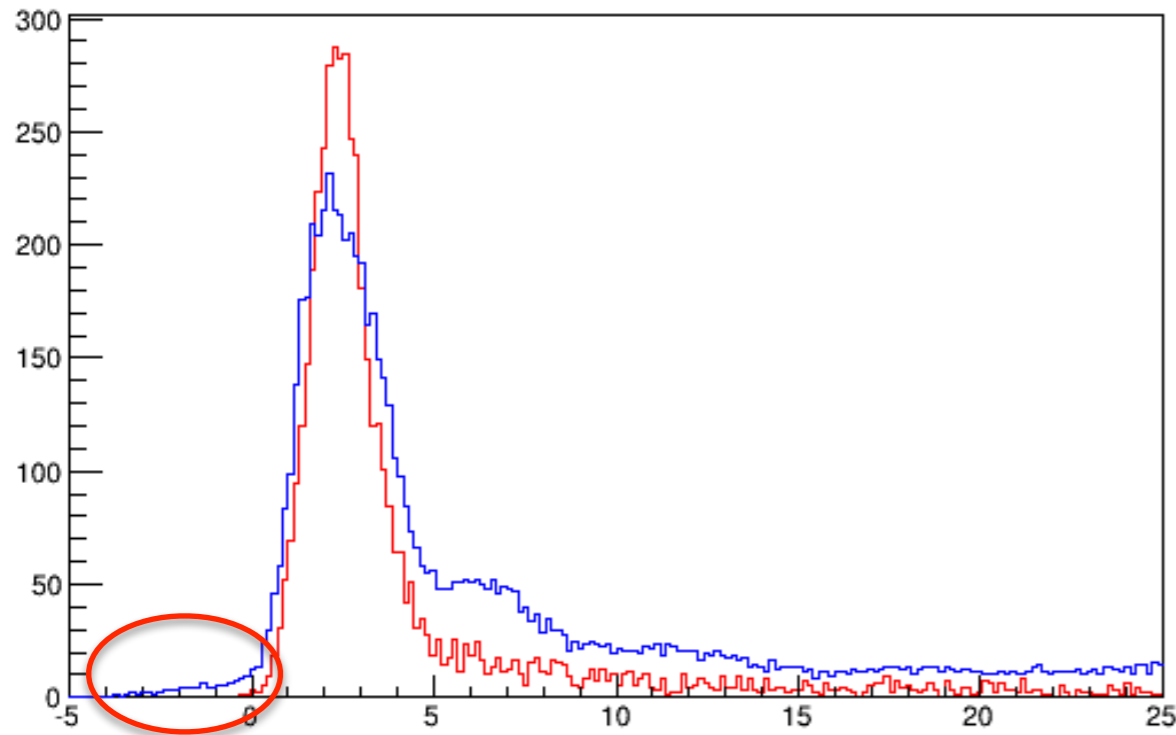
$0.005 < \phi < 0.015$



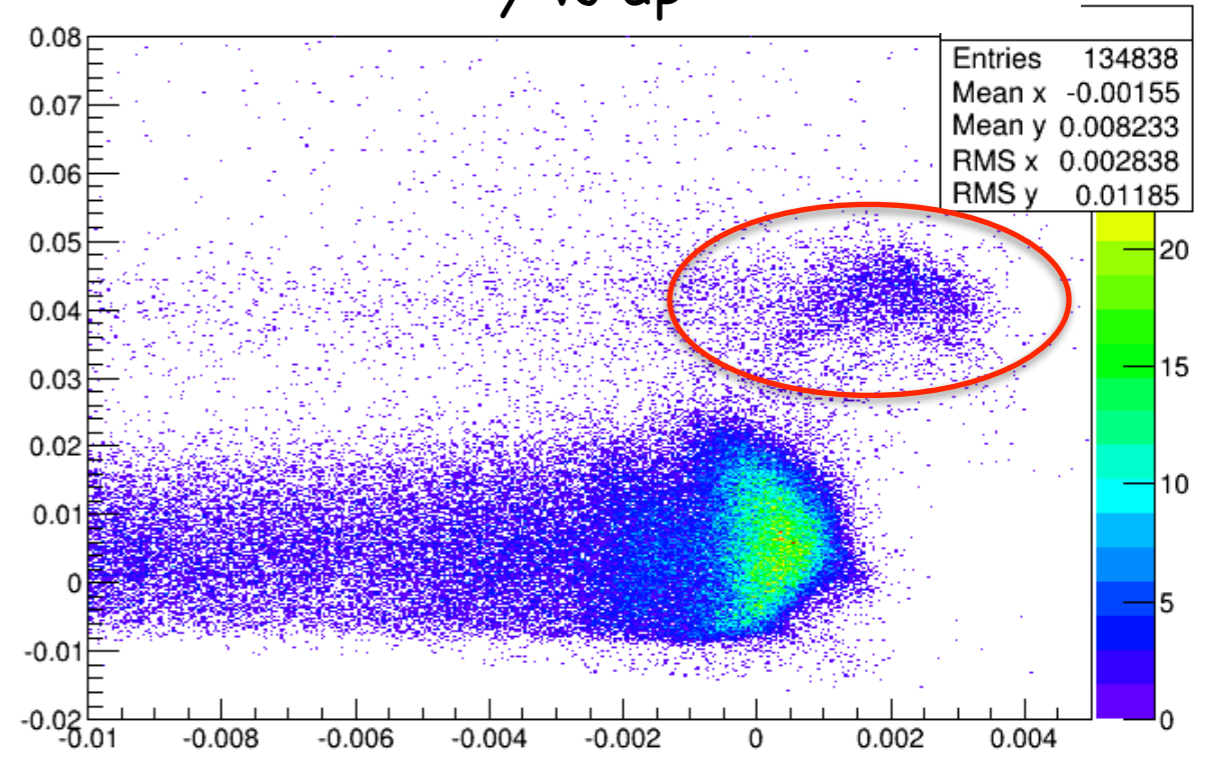
- Problem:
 - “Super-elastic” events in small phi angle
 - Dilution from excited states of the carbon

Acceptance Study

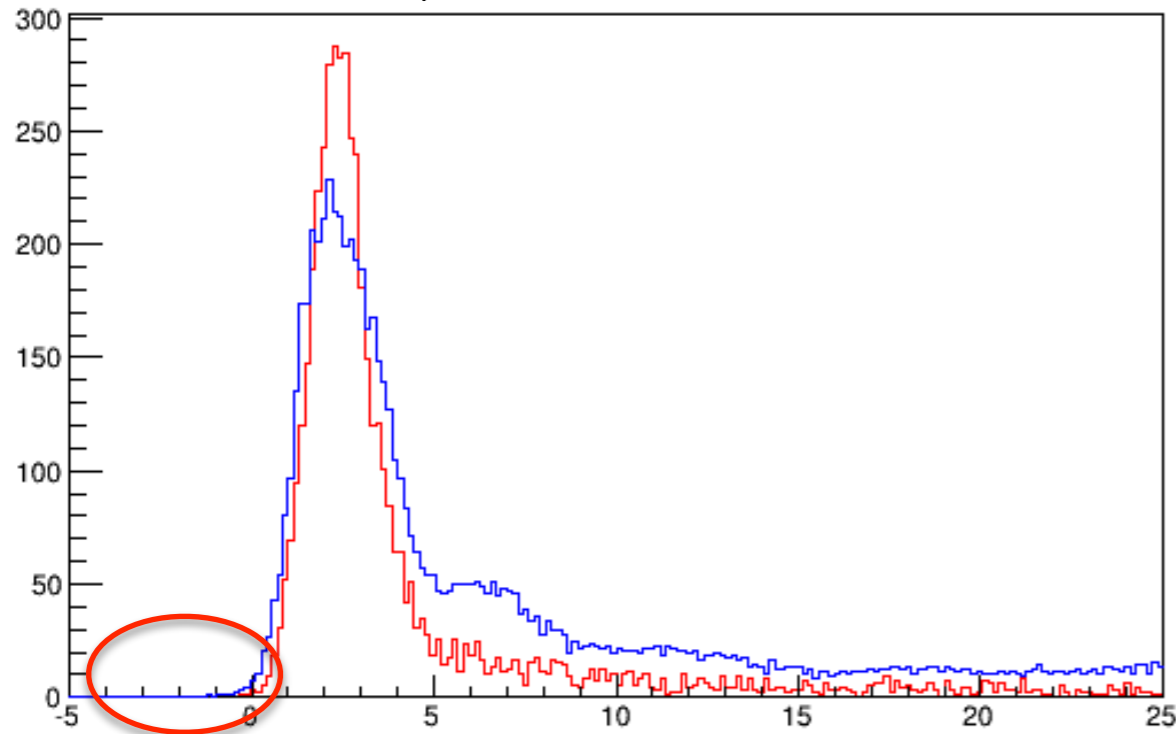
$-0.015 < \phi < -0.005$



y vs d_p



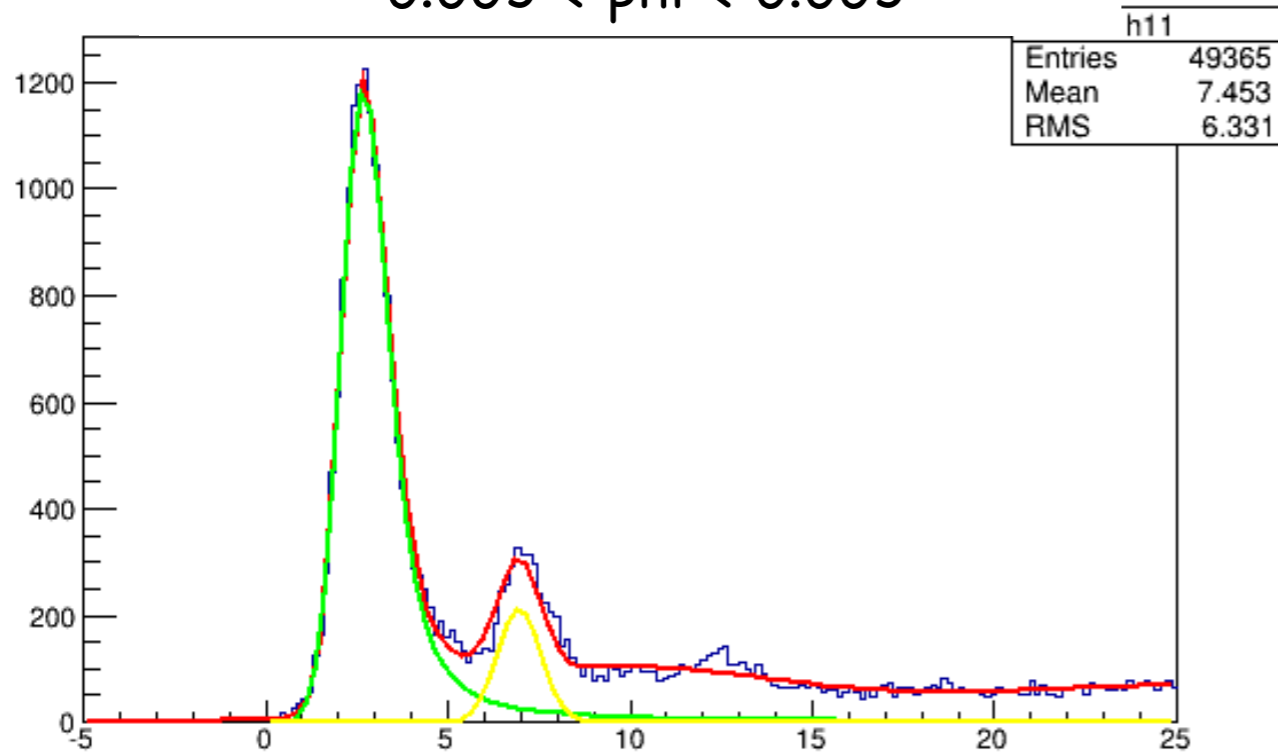
$-0.015 < \phi < -0.005$, with y cut



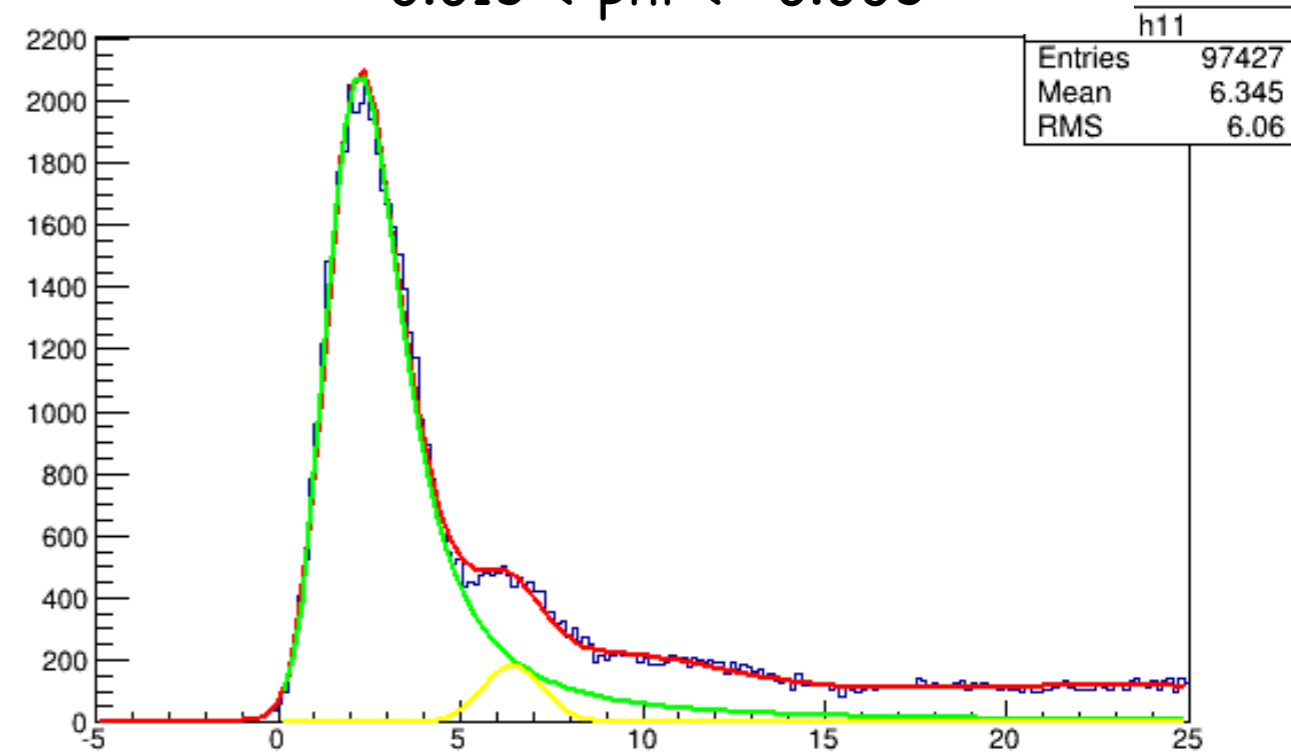
- y cut: $-0.01 < y < 0.025$

Acceptance Study

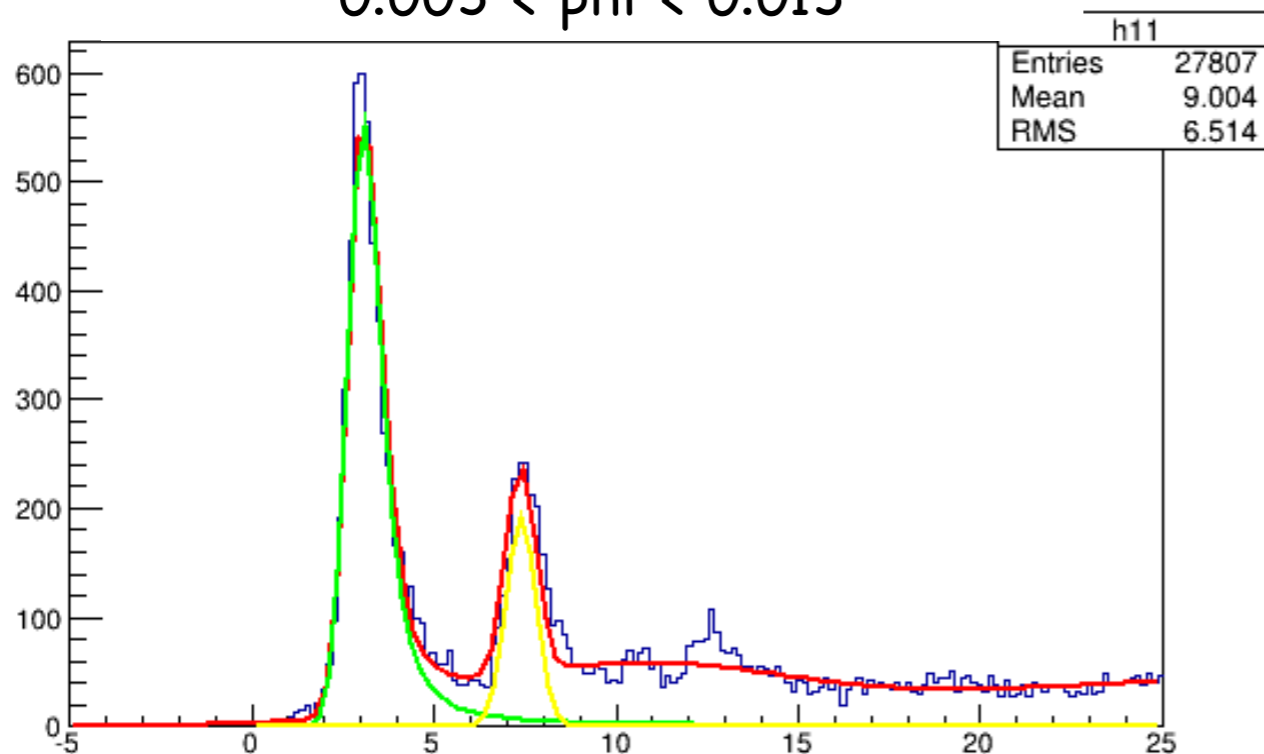
$-0.005 < \phi < 0.005$



$-0.015 < \phi < -0.005$



$0.005 < \phi < 0.015$

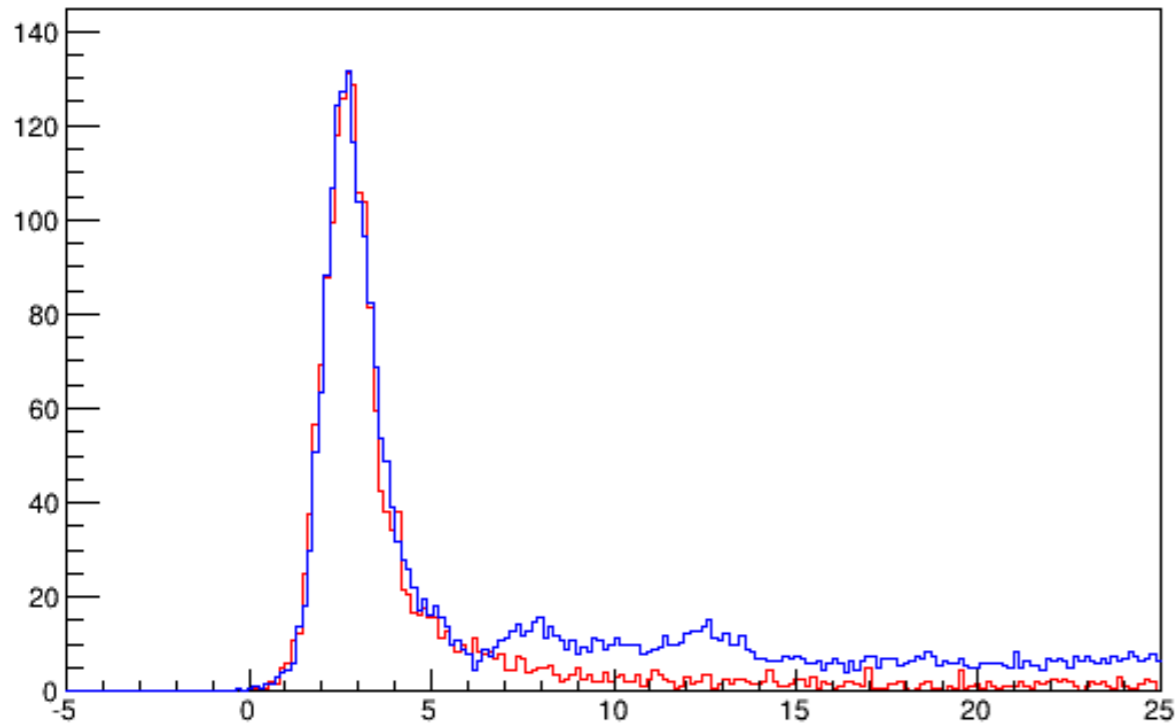


- Fit the elastic spectrum:
 - Elastic peak: Landau-Gaussian function
 - 1st and 2nd excited peak: Gaussian function
 - Background

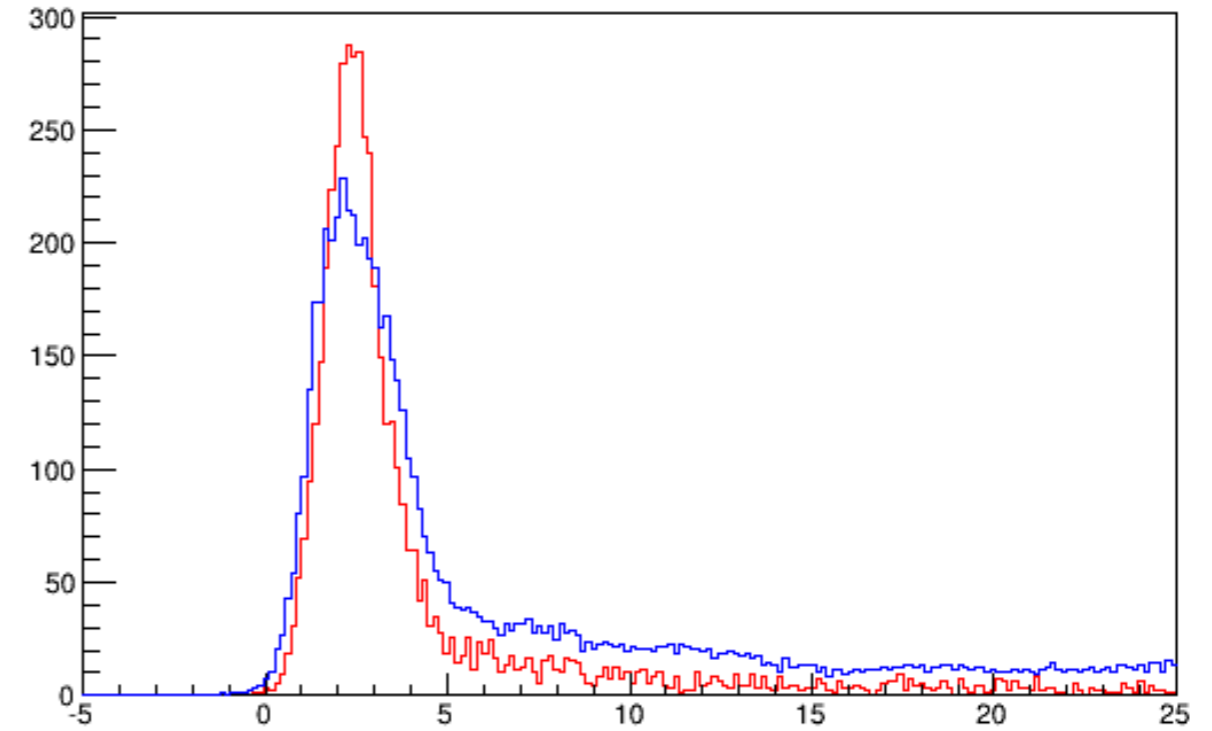
Acceptance Study

Sim
Data

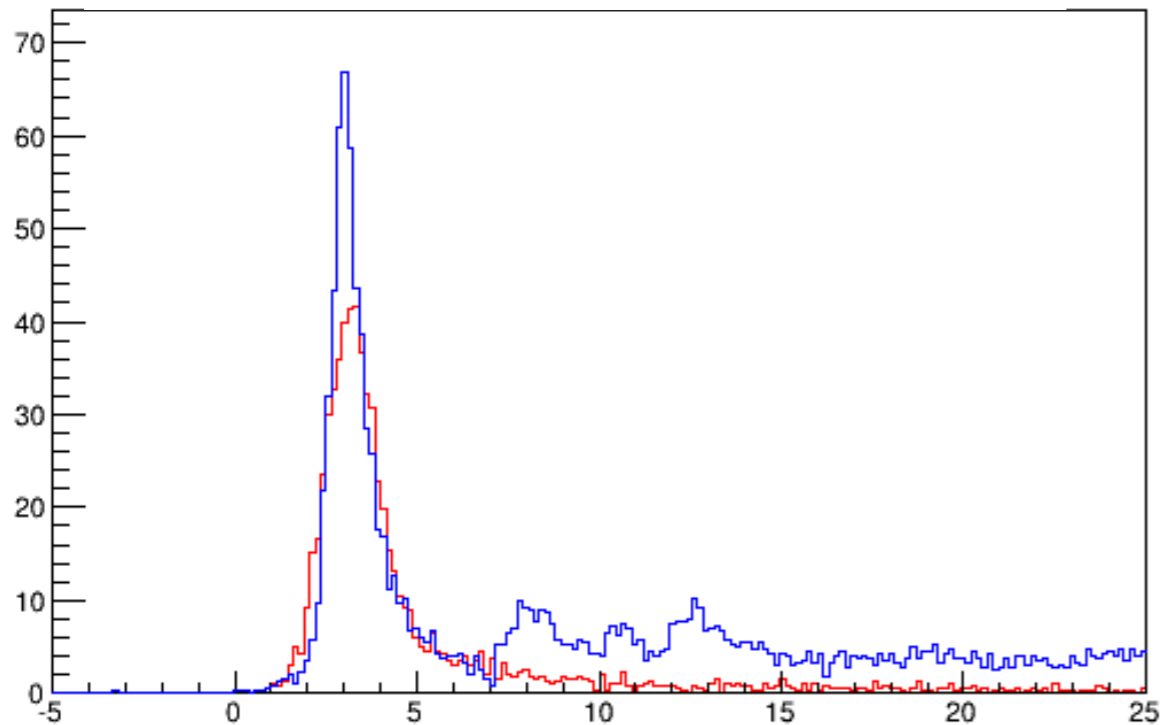
$-0.005 < \phi < 0.005$



$-0.015 < \phi < -0.005$



$0.005 < \phi < 0.015$



- Integral of elastic peak (0-6MeV)
 - $\phi = -0.01$: 4429, 4036
 - $\phi = 0.00$: 1625, 1598
 - $\phi = 0.01$: 573, 536