

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

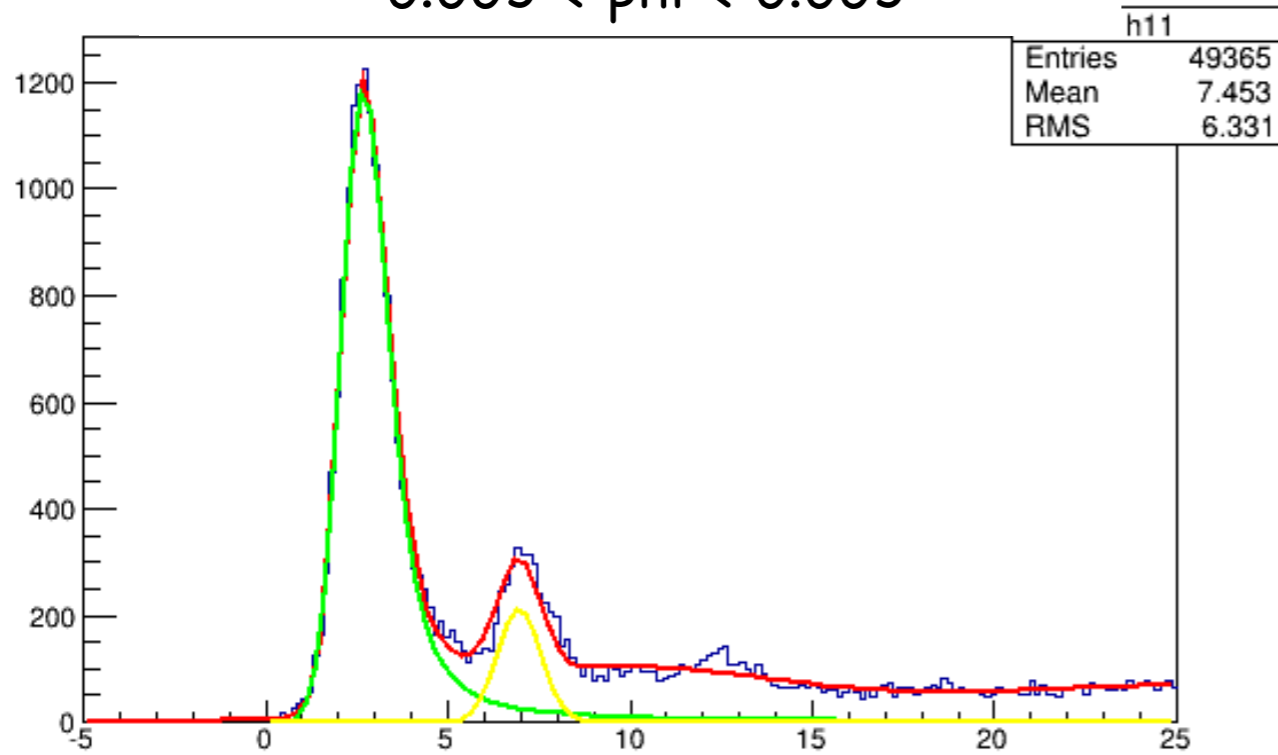
$$\sigma_0 = \frac{P_S N}{\frac{Q}{e} (\rho \Delta Z) T_L \epsilon_{\text{det}}} \frac{1}{\Delta \Omega \Delta E' A}$$

initial angle and
momentum coverage
in simulation

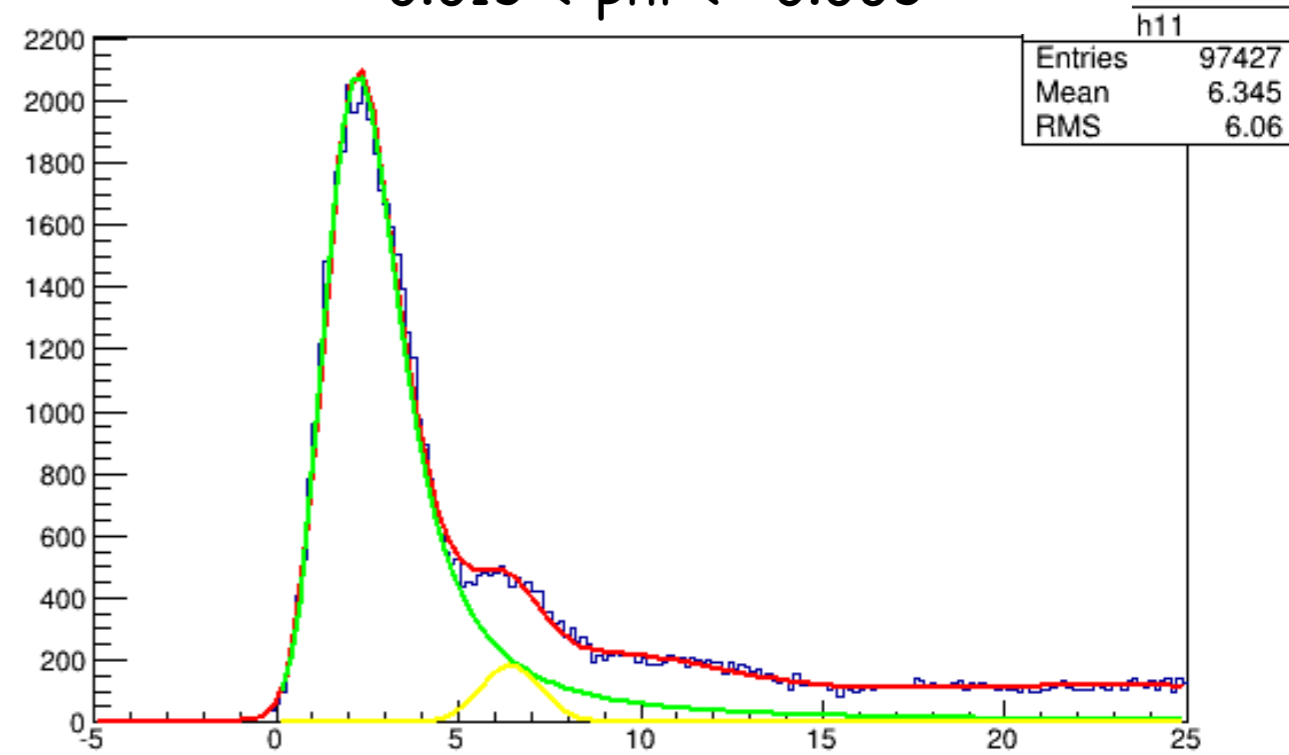
ratio of accepted
events and total
events

Acceptance Study

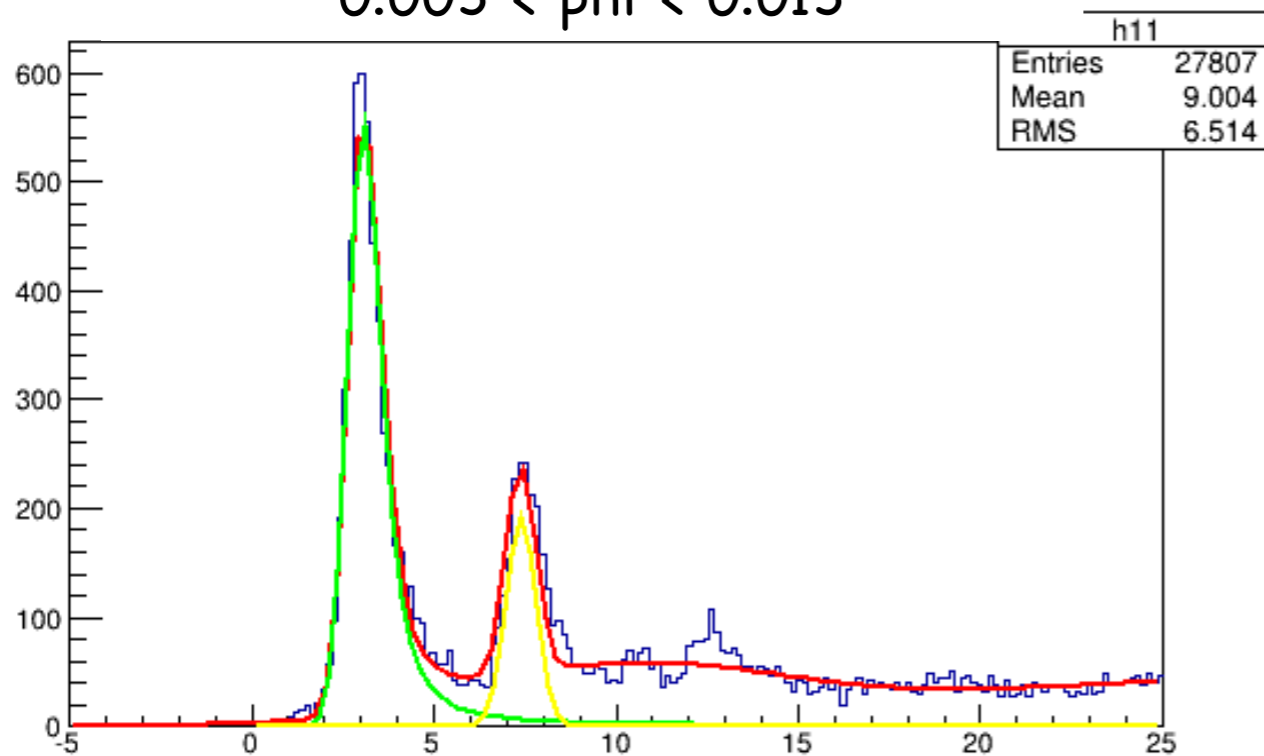
$-0.005 < \phi < 0.005$



$-0.015 < \phi < -0.005$



$0.005 < \phi < 0.015$

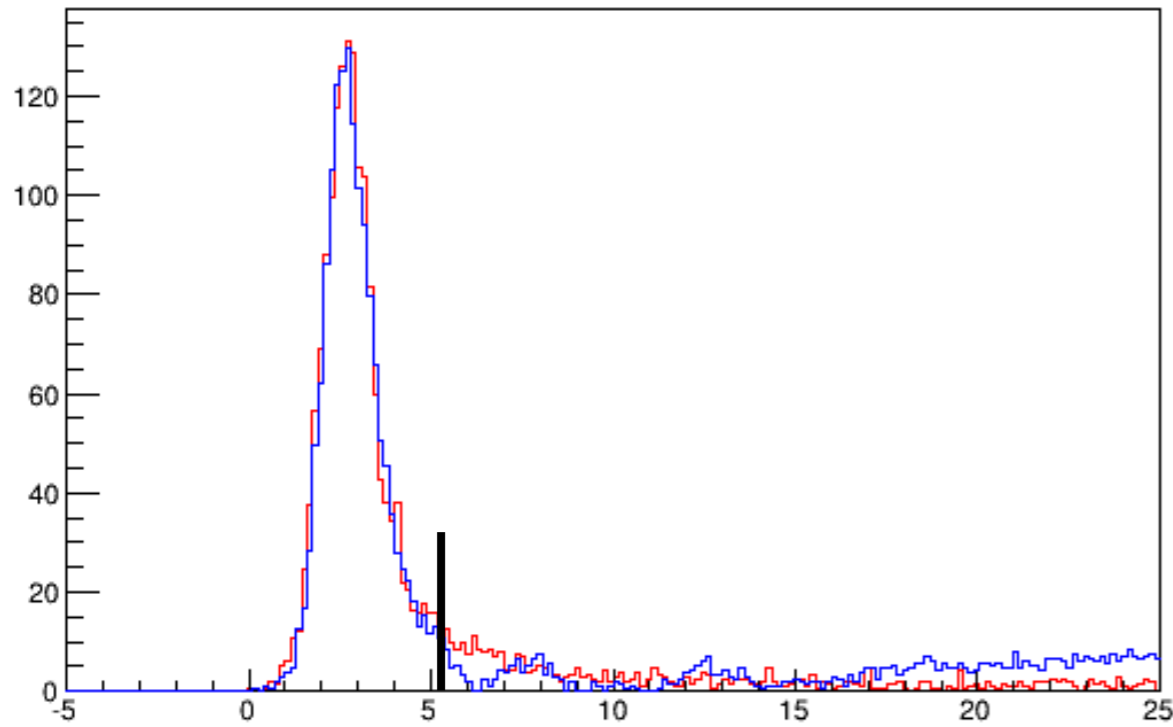


- Fit the elastic spectrum:
 - Elastic peak: Landau-Gaussian function
 - 1st and 2nd excited peak: Gaussian function
 - Background

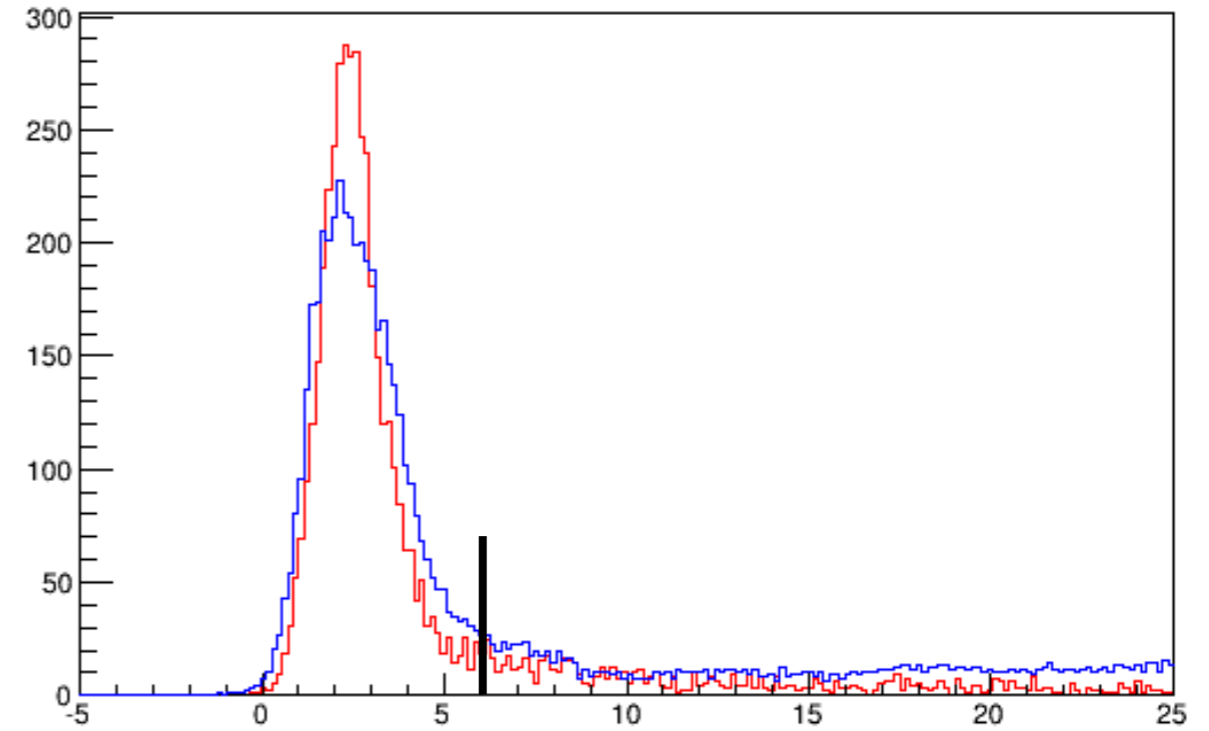
Acceptance Study

Sim
Data

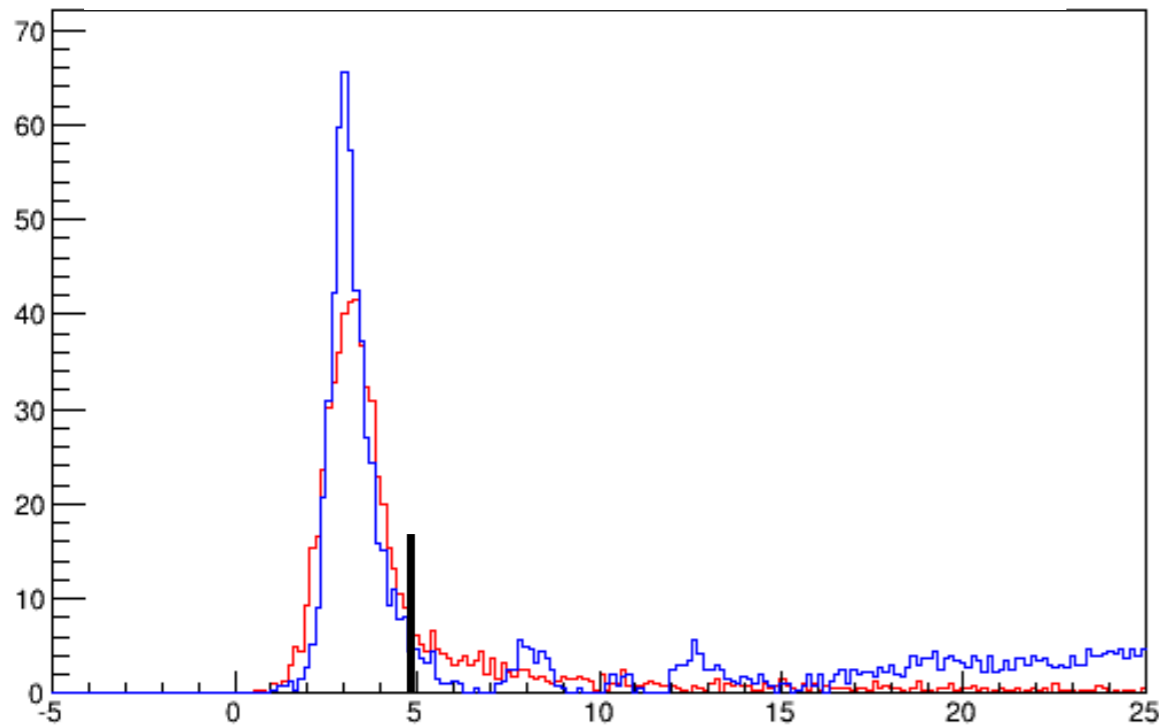
$-0.005 < \phi < 0.005$



$-0.015 < \phi < -0.005$



$0.005 < \phi < 0.015$



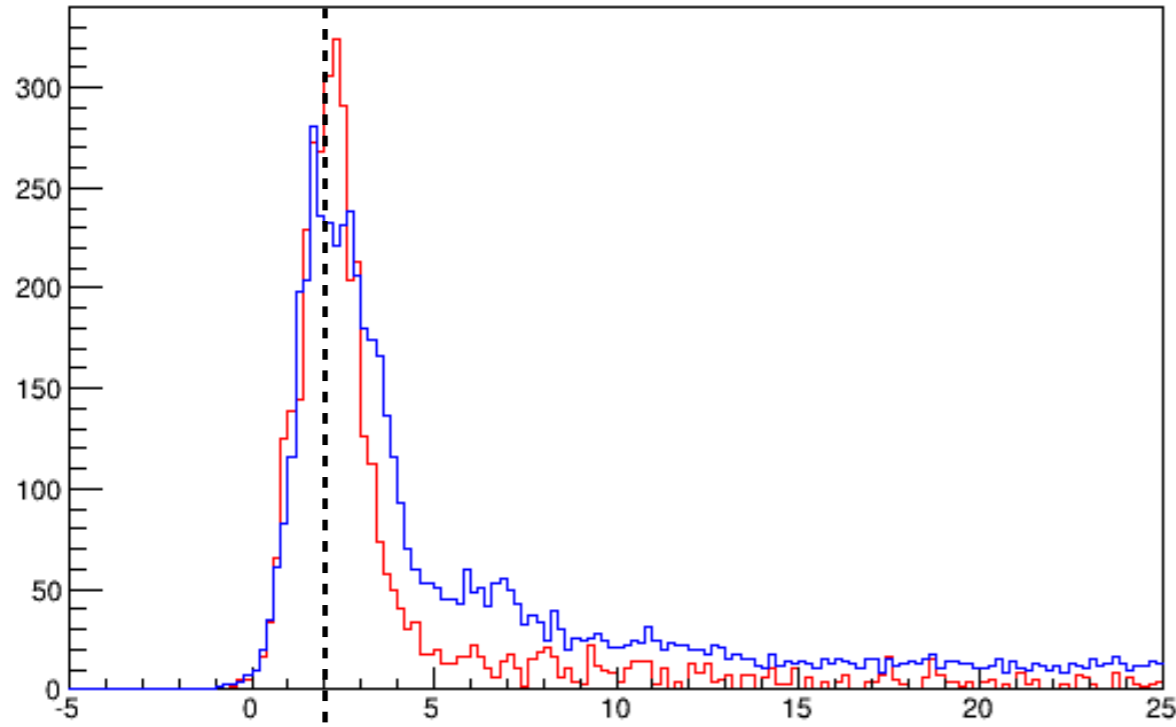
- $-0.01 < \theta < 0.03$
- Subtract 1st and 2nd excited peak
- Integral of elastic peak (5 sigma)
 - $-0.015 < \phi < -0.005$: 4353, 4036
 - $-0.005 < \phi < 0.005$: 1486, 1546
 - $0.005 < \phi < 0.015$: 500, 502

$-0.015 < \phi < -0.005$, no subtraction

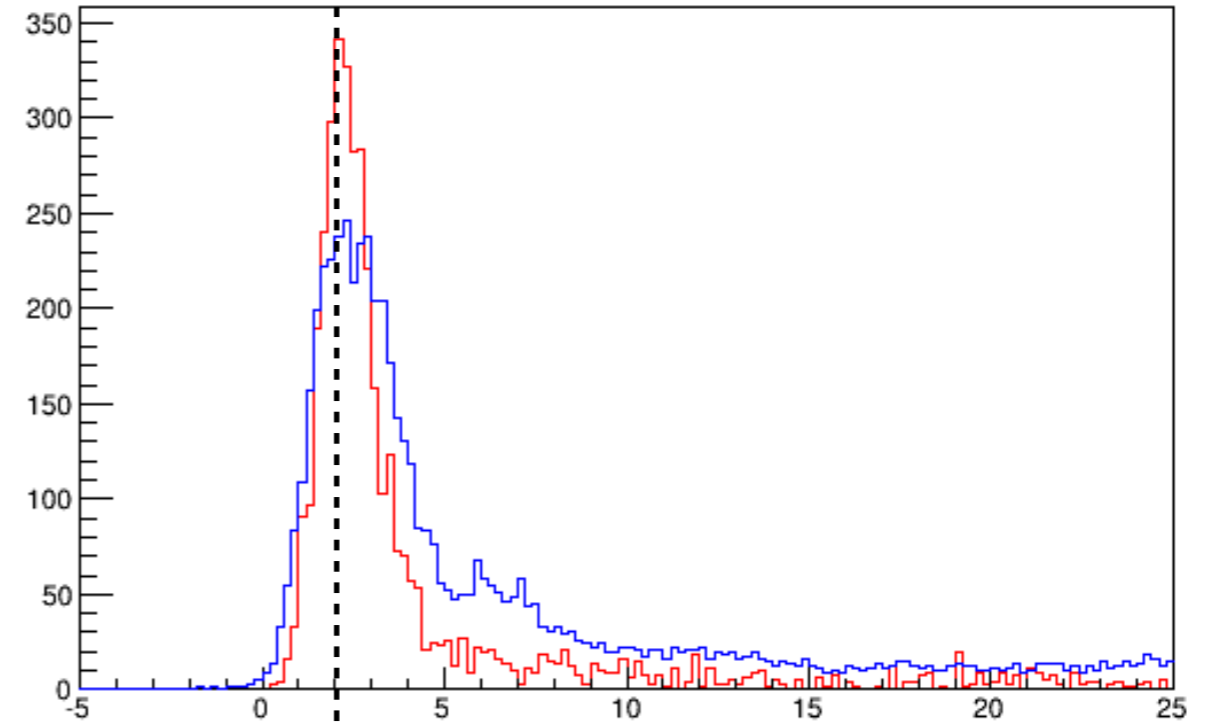
Acceptance Study

Sim
Data

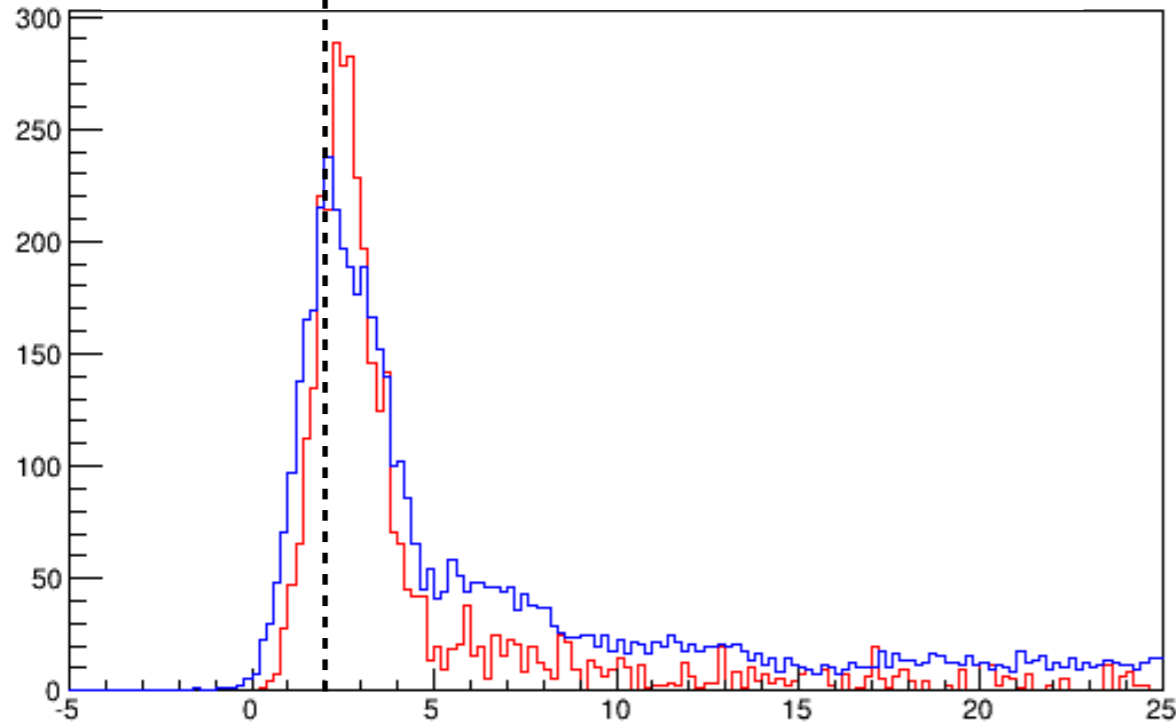
$-0.01 < \theta < 0.00$



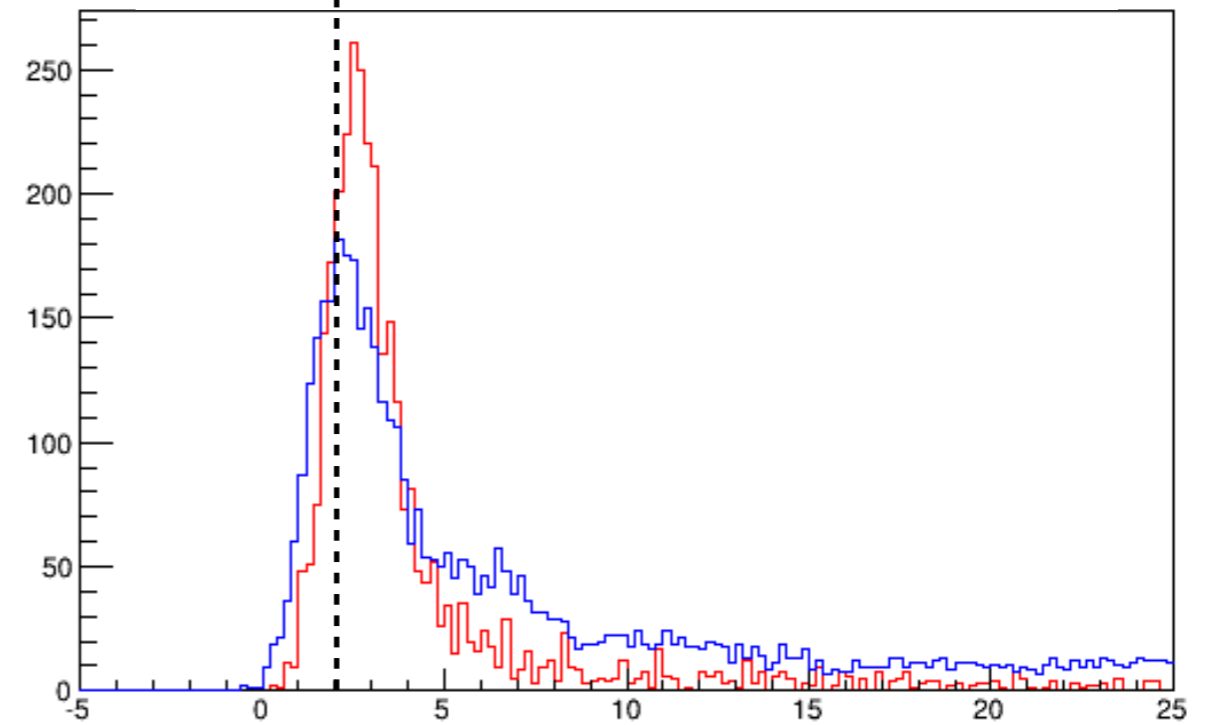
$0.00 < \theta < 0.01$



$0.01 < \theta < 0.02$



$0.02 < \theta < 0.03$

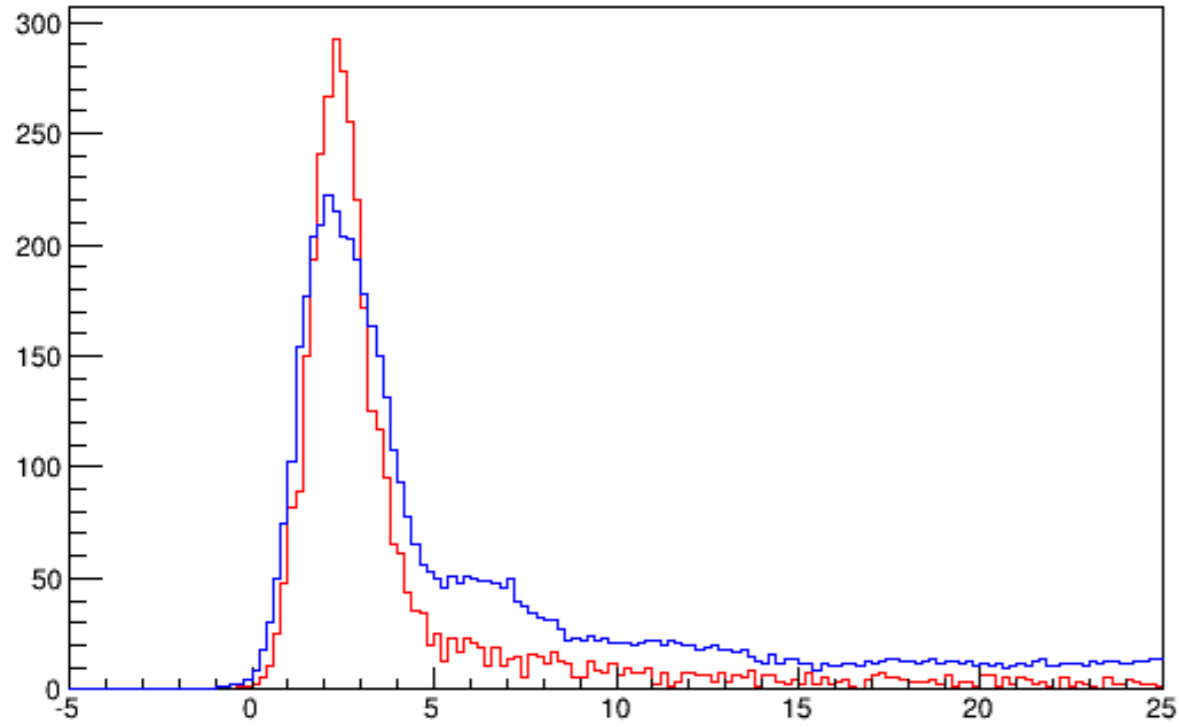


-0.015 < phi < -0.005, no subtraction

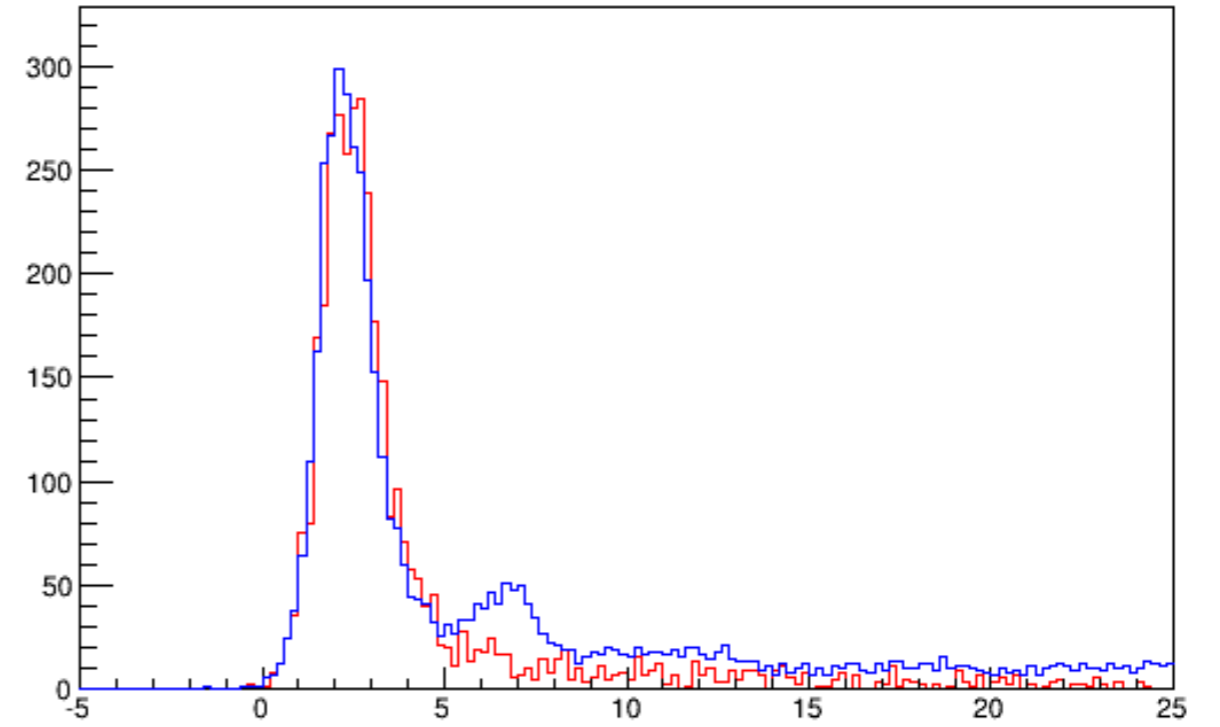
Acceptance Study

Sim
Data

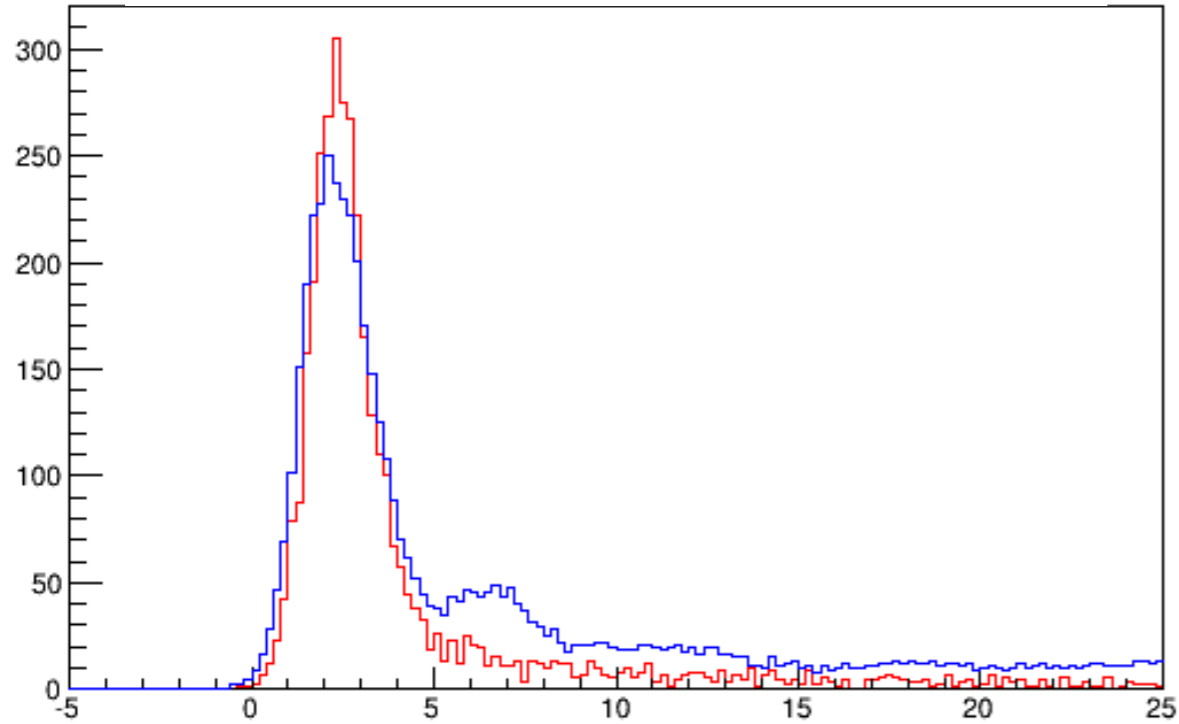
No raster cut



raster radius < 5 mm



raster radius < 8 mm



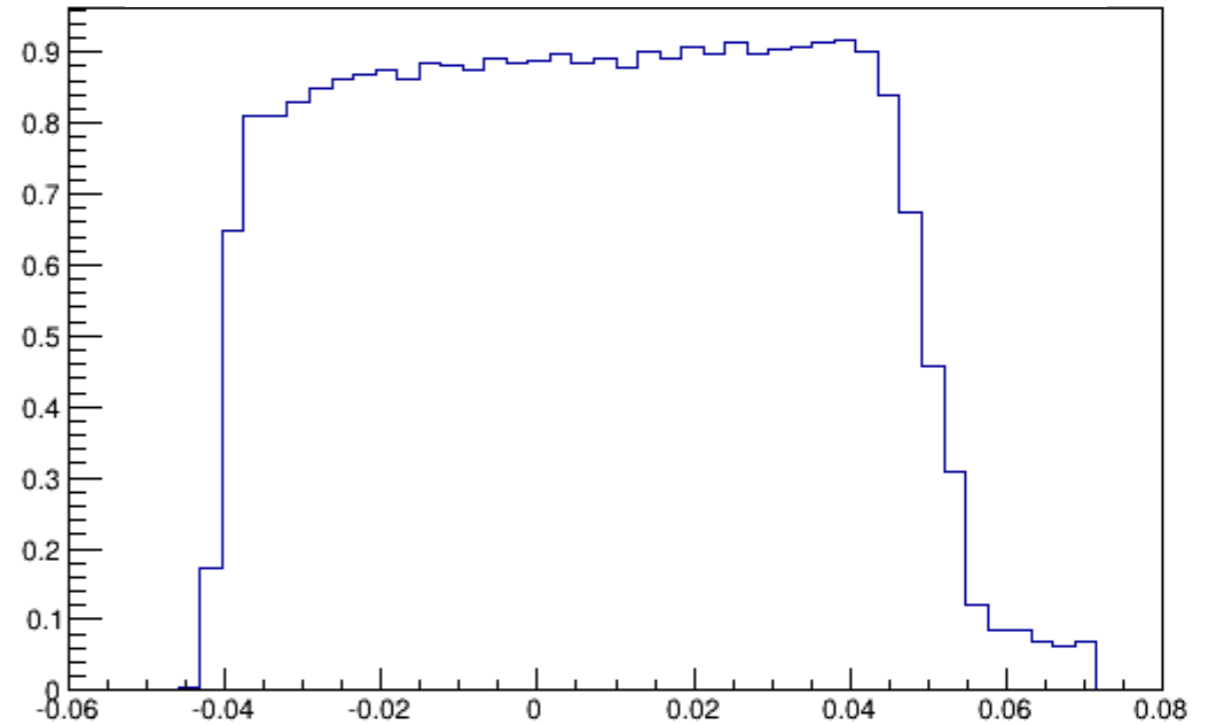
- -0.01 < theta < 0.03

Backups

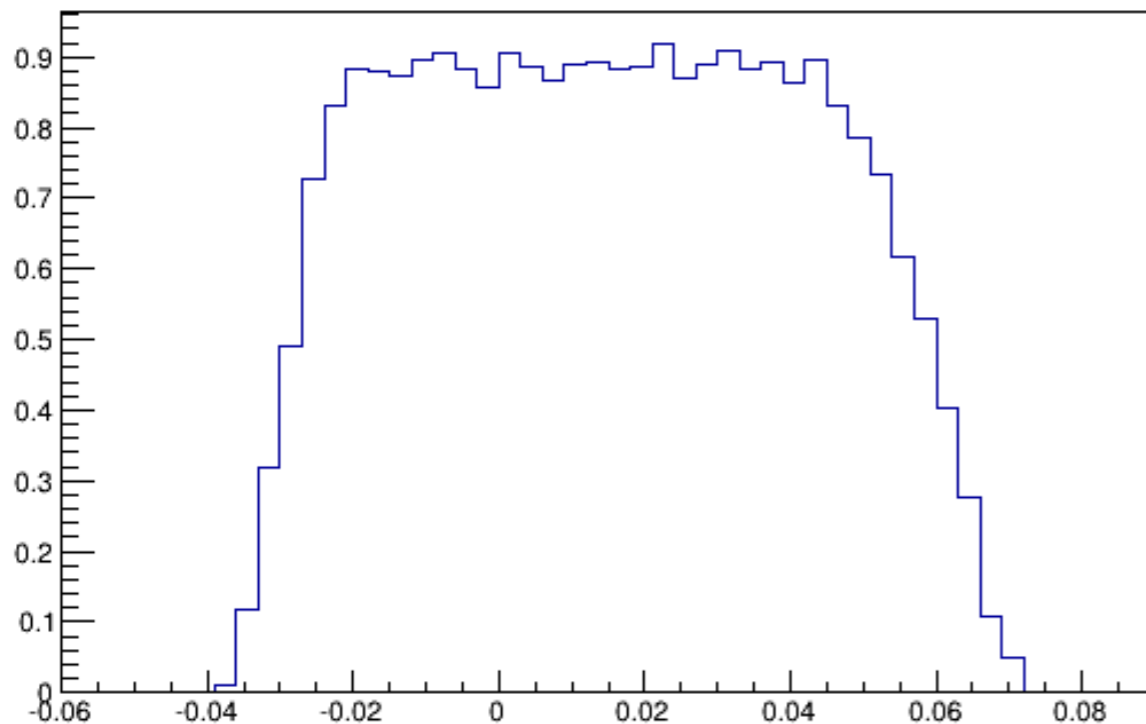
Acceptance Study

- Cut the center region:
 - $-0.01 < dp < 0.01$
 - $-0.01 < \theta < 0.03$
 - $-0.01 < \phi < 0.01$
- The acceptance of the center region is around 90%

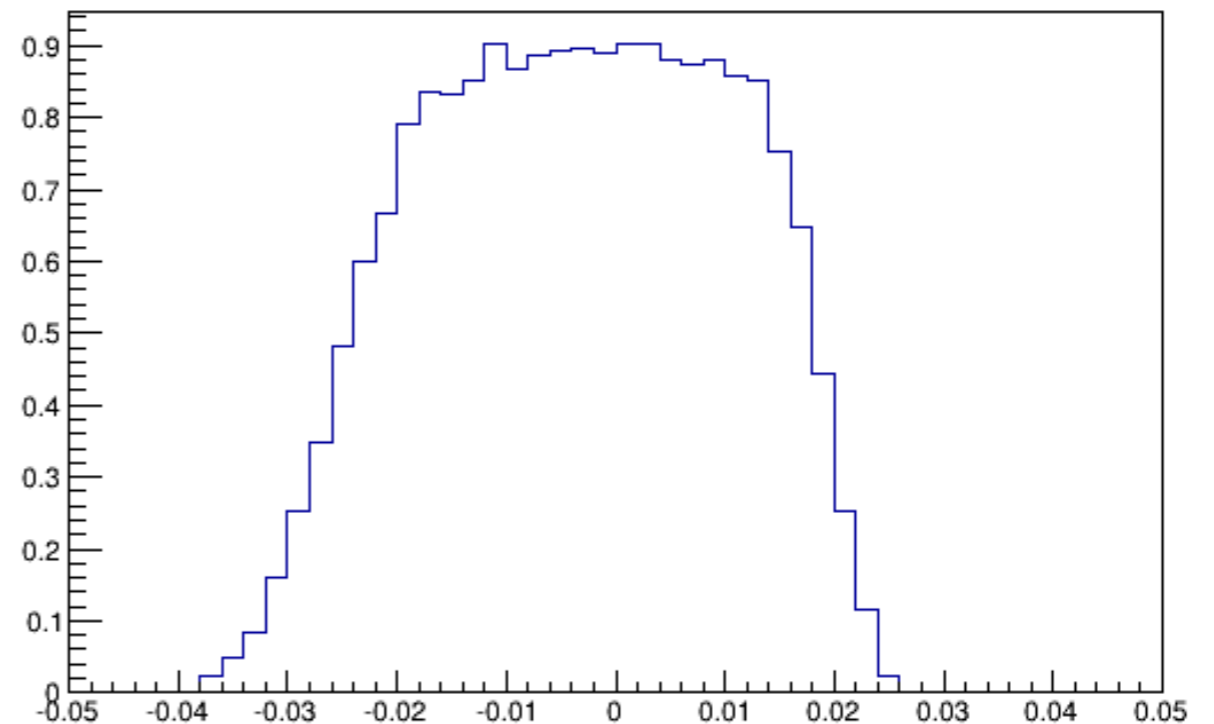
Delta (rad)



Theta (rad)



Phi (rad)

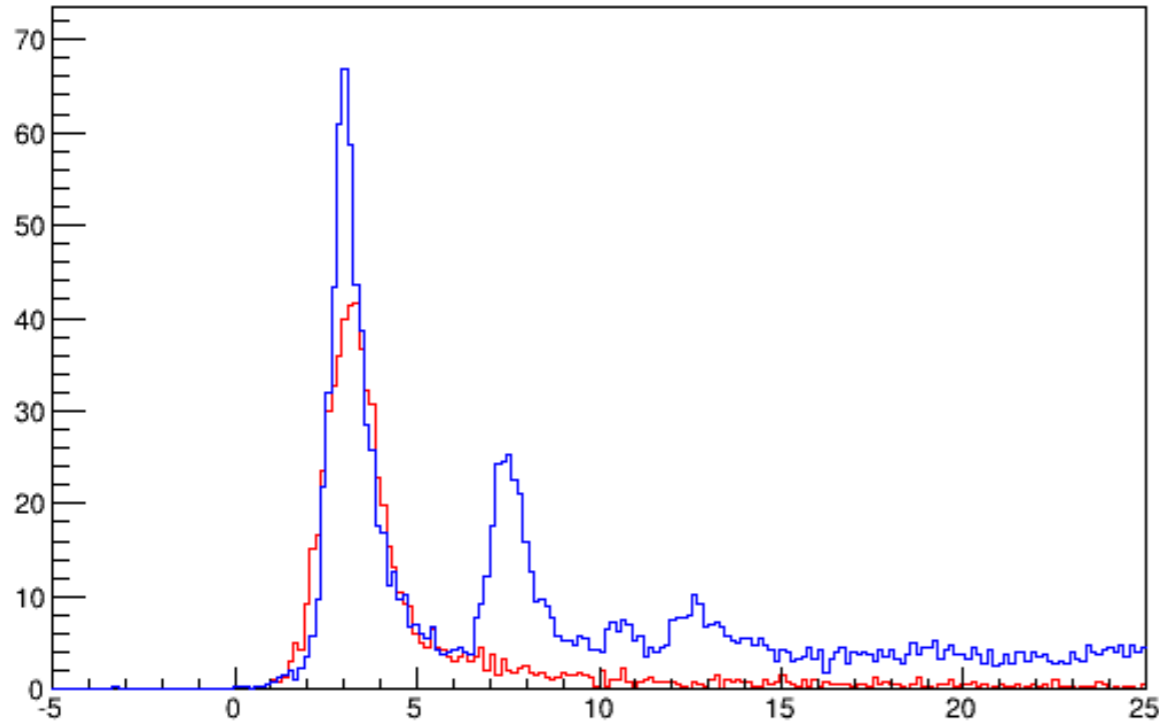


$-0.015 < \phi < -0.005$, no subtraction

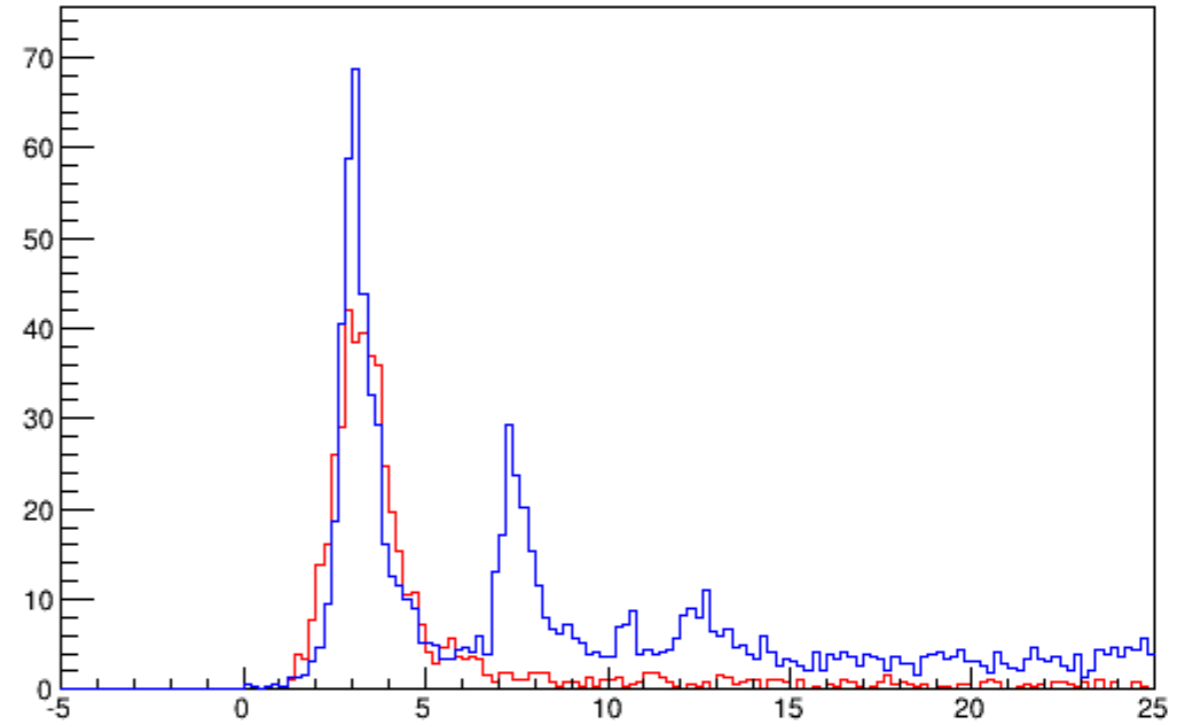
Acceptance Study

Sim
Data

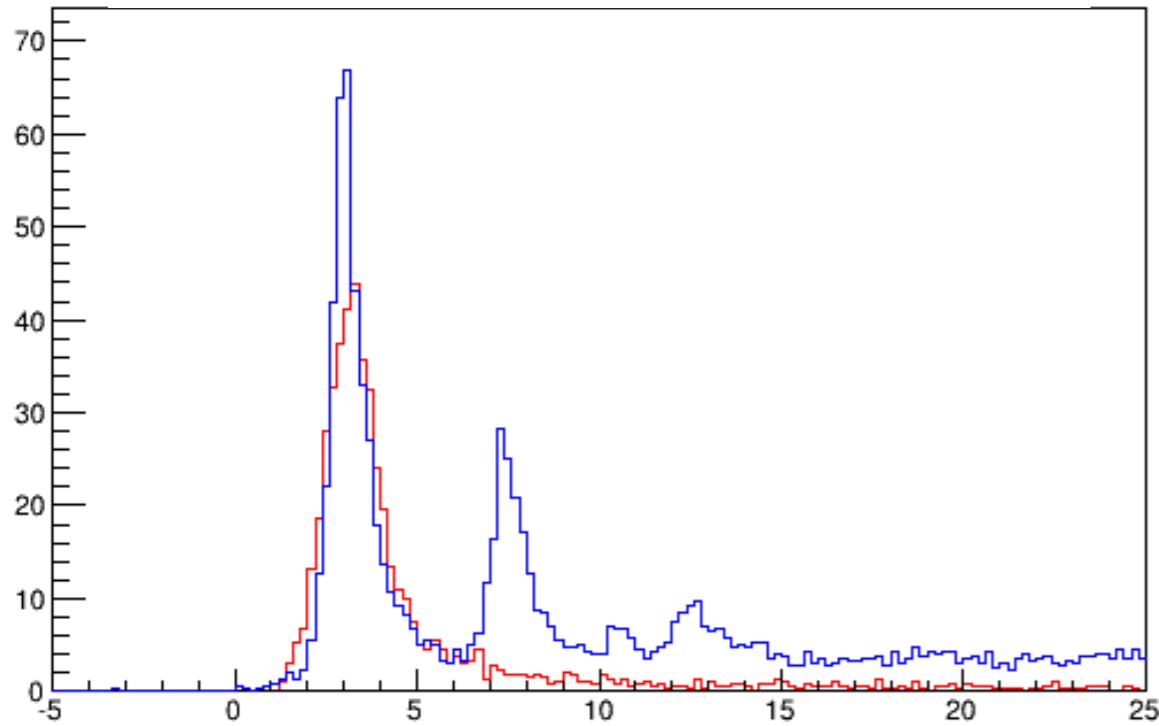
No raster cut



raster radius < 5 mm



raster radius < 8 mm



- $-0.01 < \theta < 0.03$

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