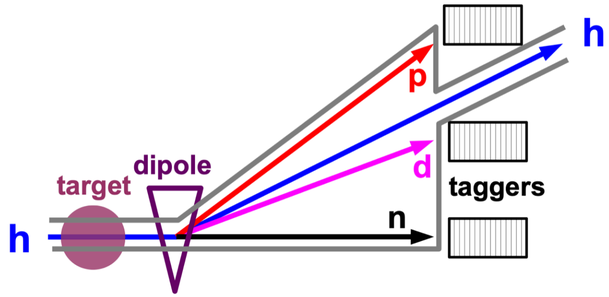
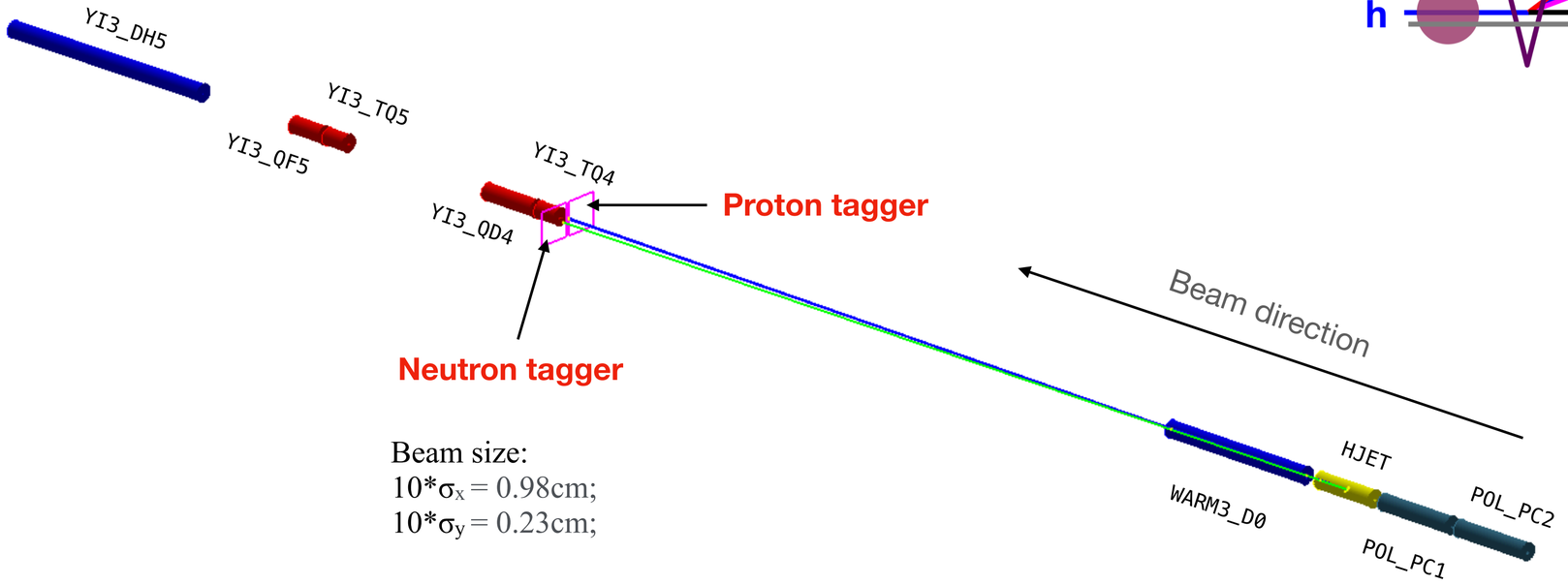
HJET Placement Update (ver4, June 30)

Zhengqiao Zhang

The layout of the HJET (Version 4)

- We need dipole and drift space to separate the breakup fragments from the beam line.



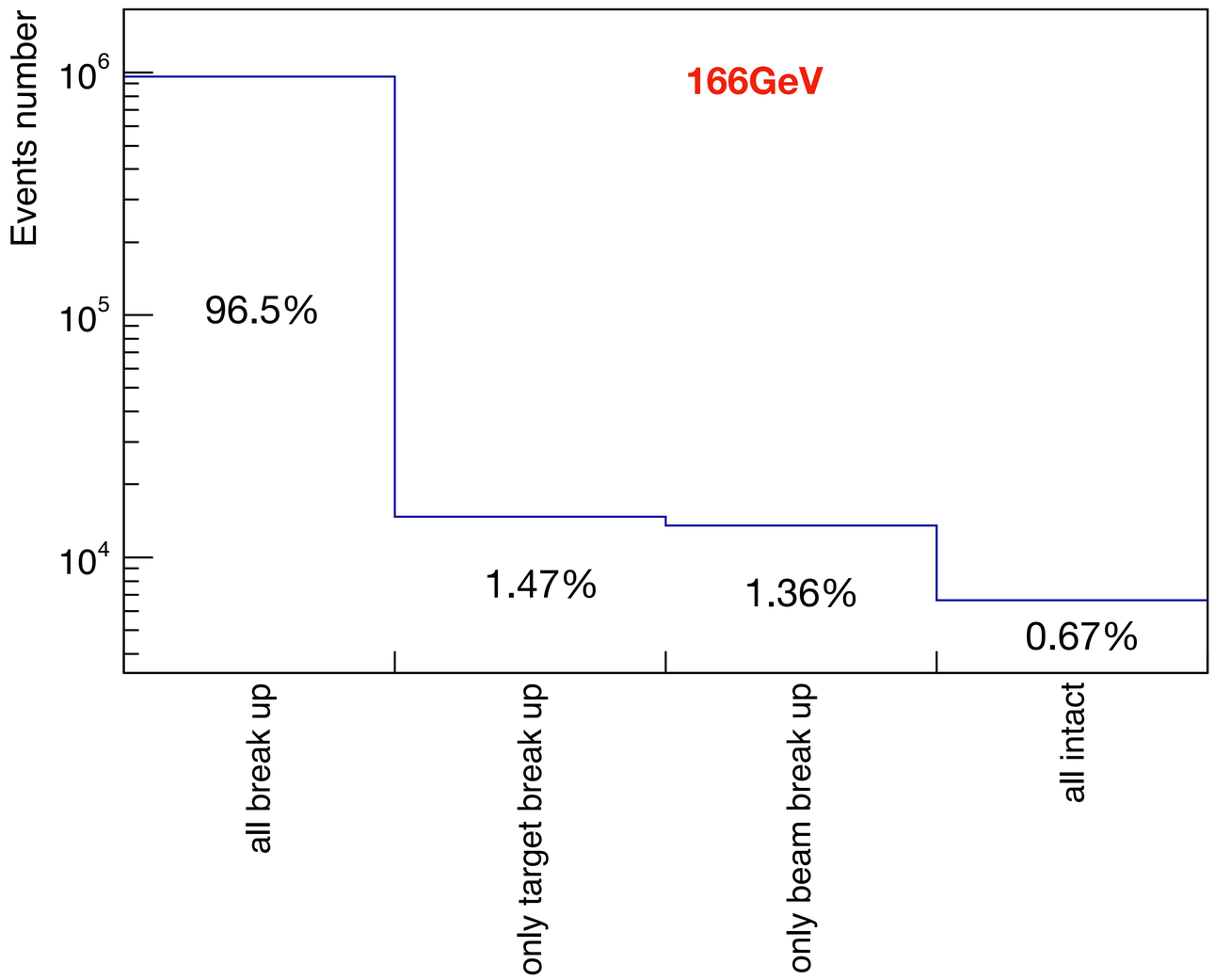


Beam size:
$10*\sigma_x = 0.98$cm;
$10*\sigma_y = 0.23$cm;

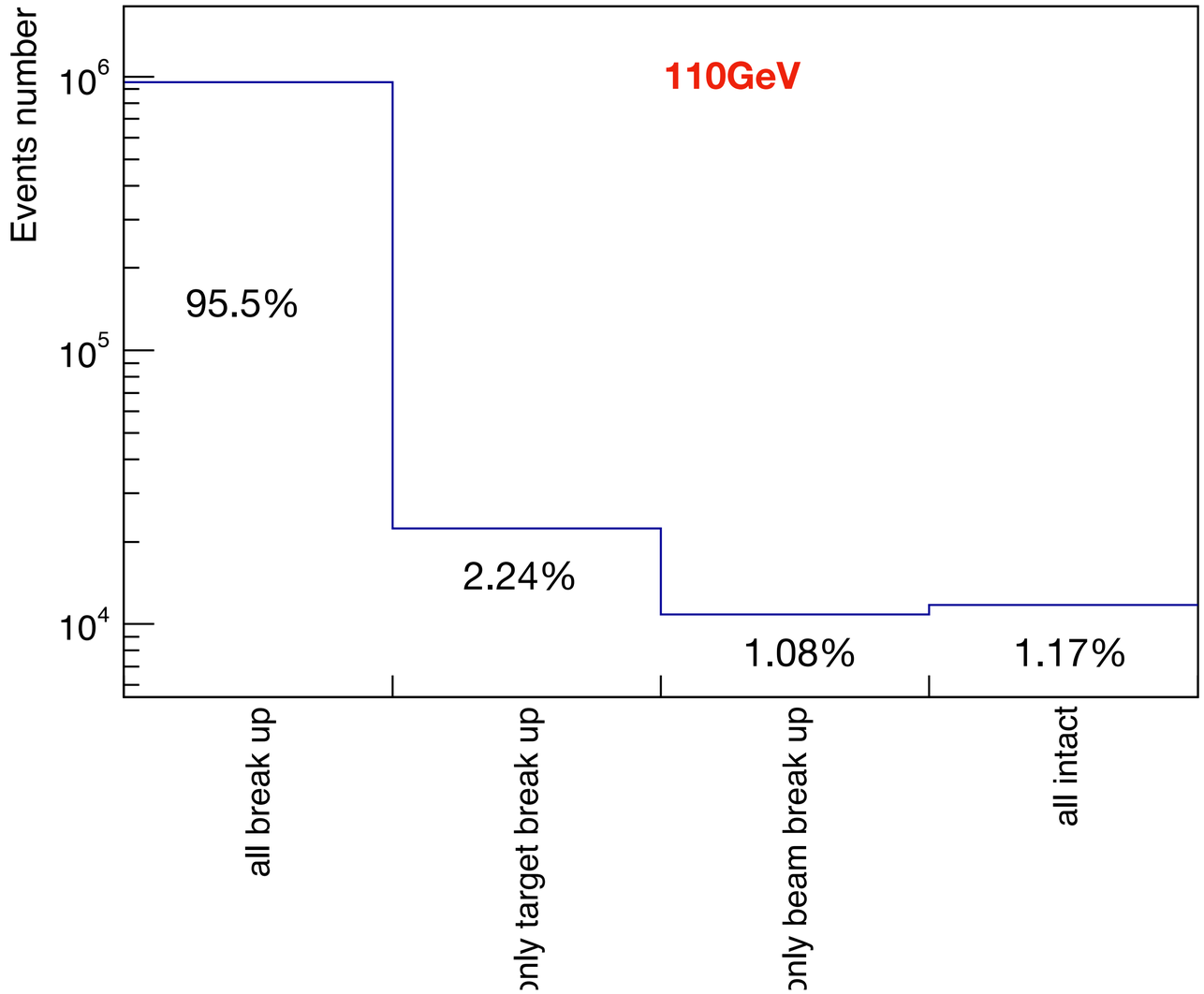
He3-He3 events in DMPJet model

Four cases in the DMPJet events:

- ✓All He3 break up;
- ✓Only target He3 break up
- ✓Only beam He3 break up
- ✓All He3 intact



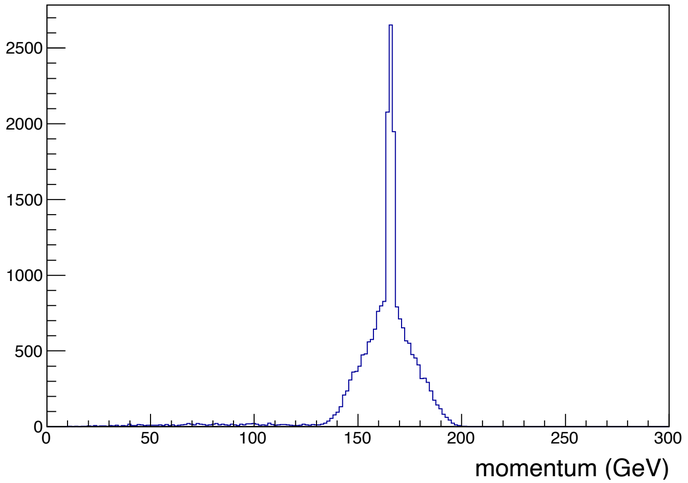
He3-He3 events in DMPJet model



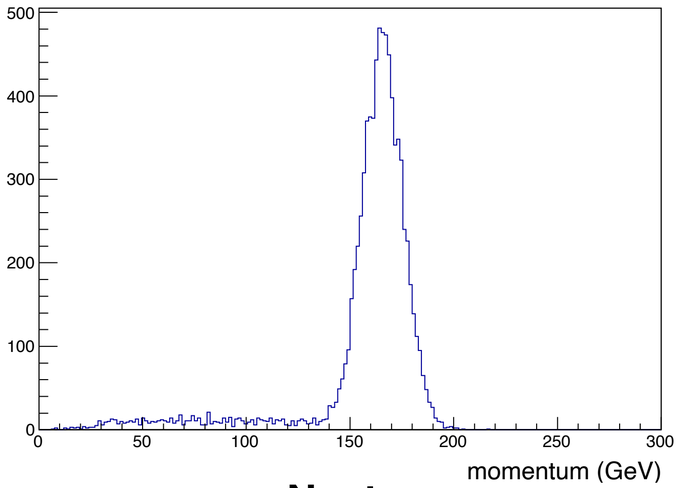
Decayed particles from break beam He3

Only beam He3 break up

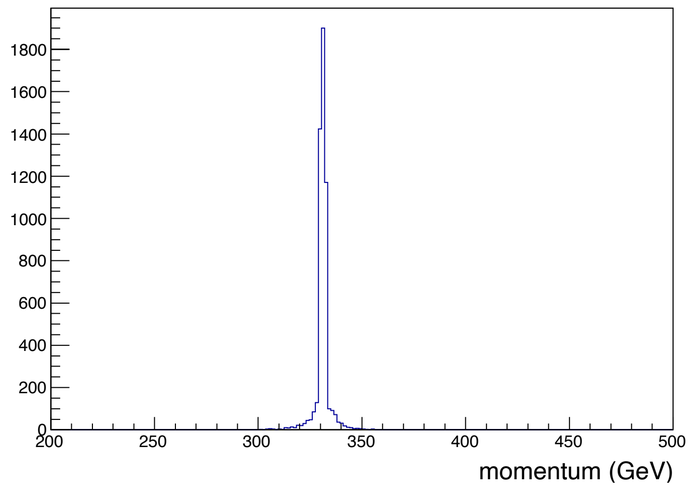
166GeV



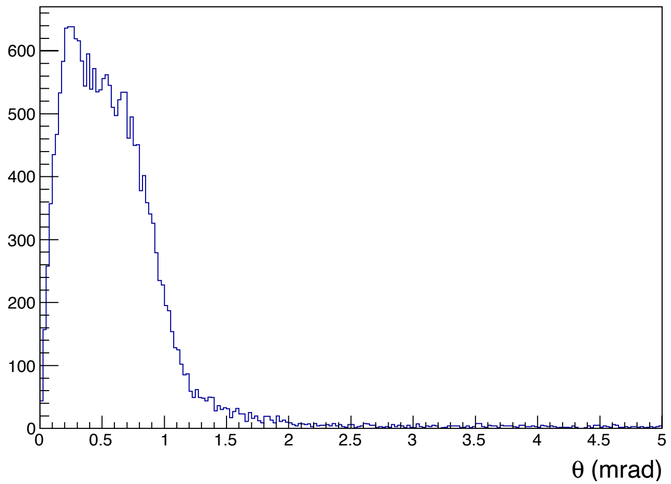
Proton

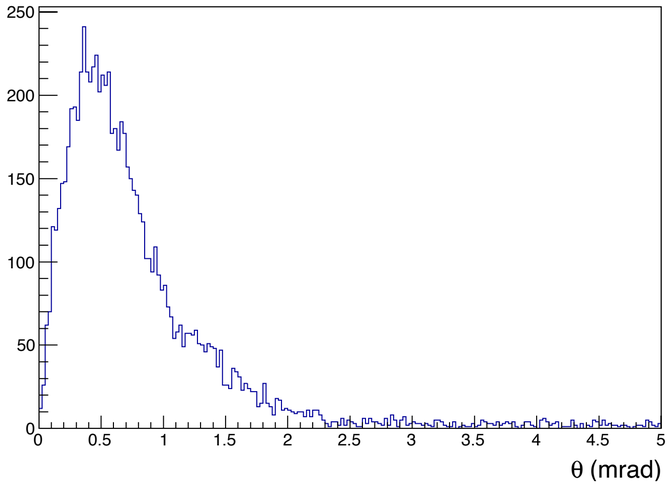


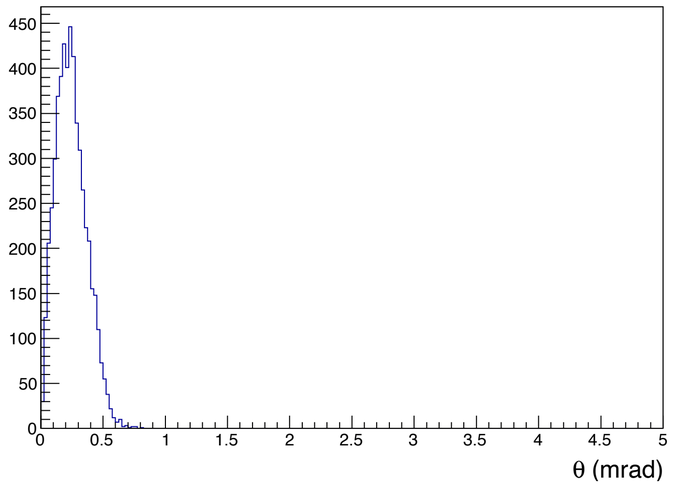
Neutron



Deuteron



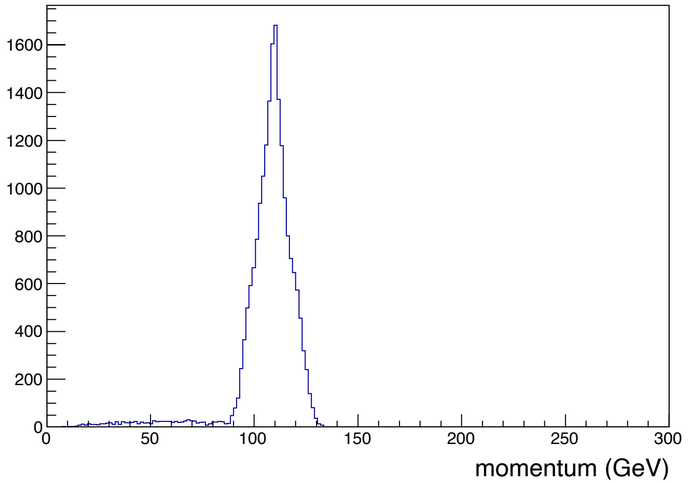




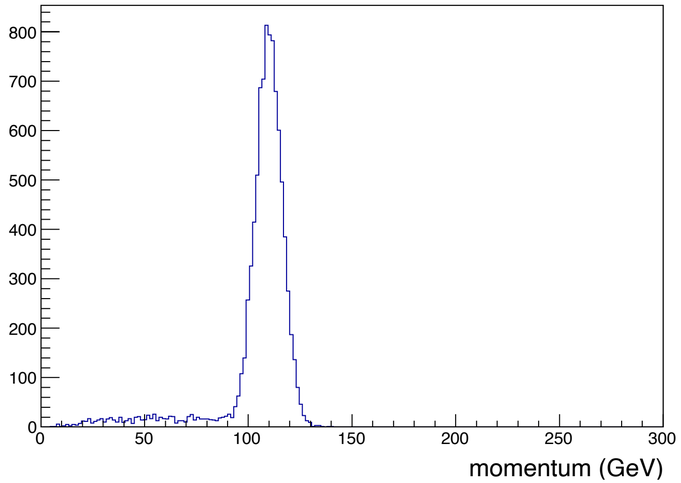
Decayed particles from break beam He3

Only beam He3 break up

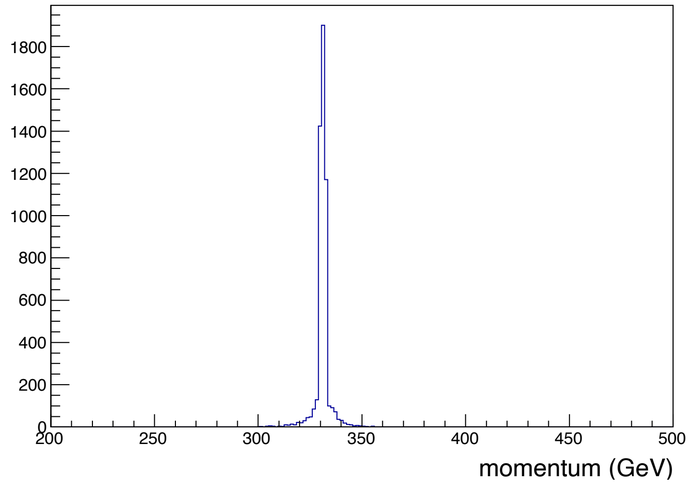
110GeV



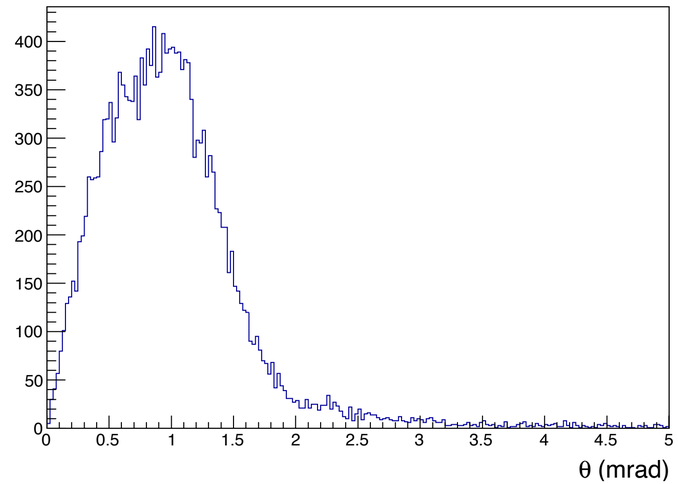
Proton

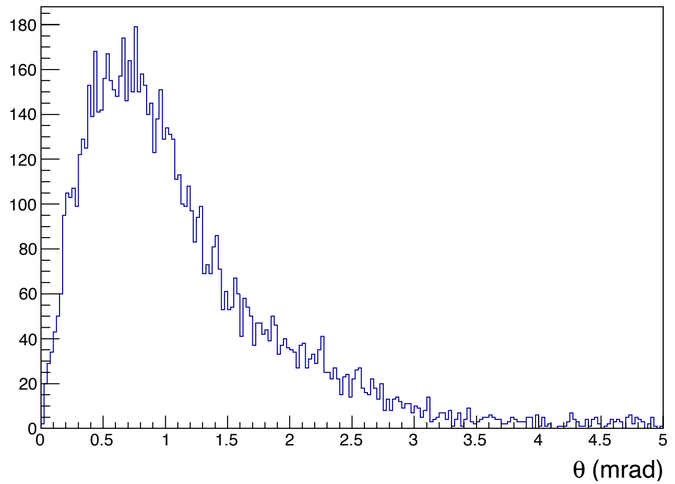


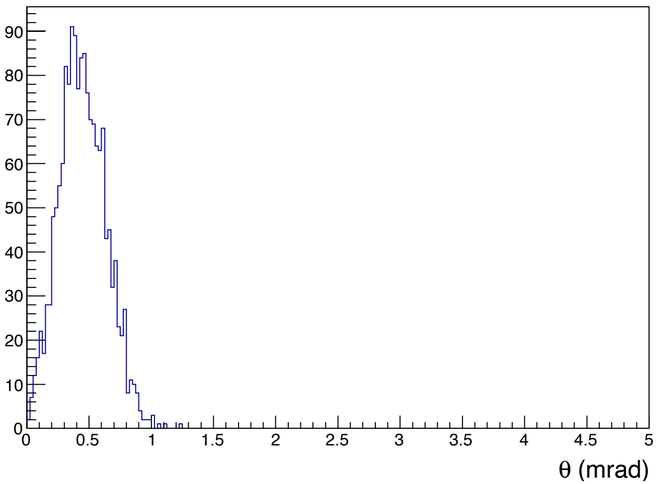
Neutron



Deuteron



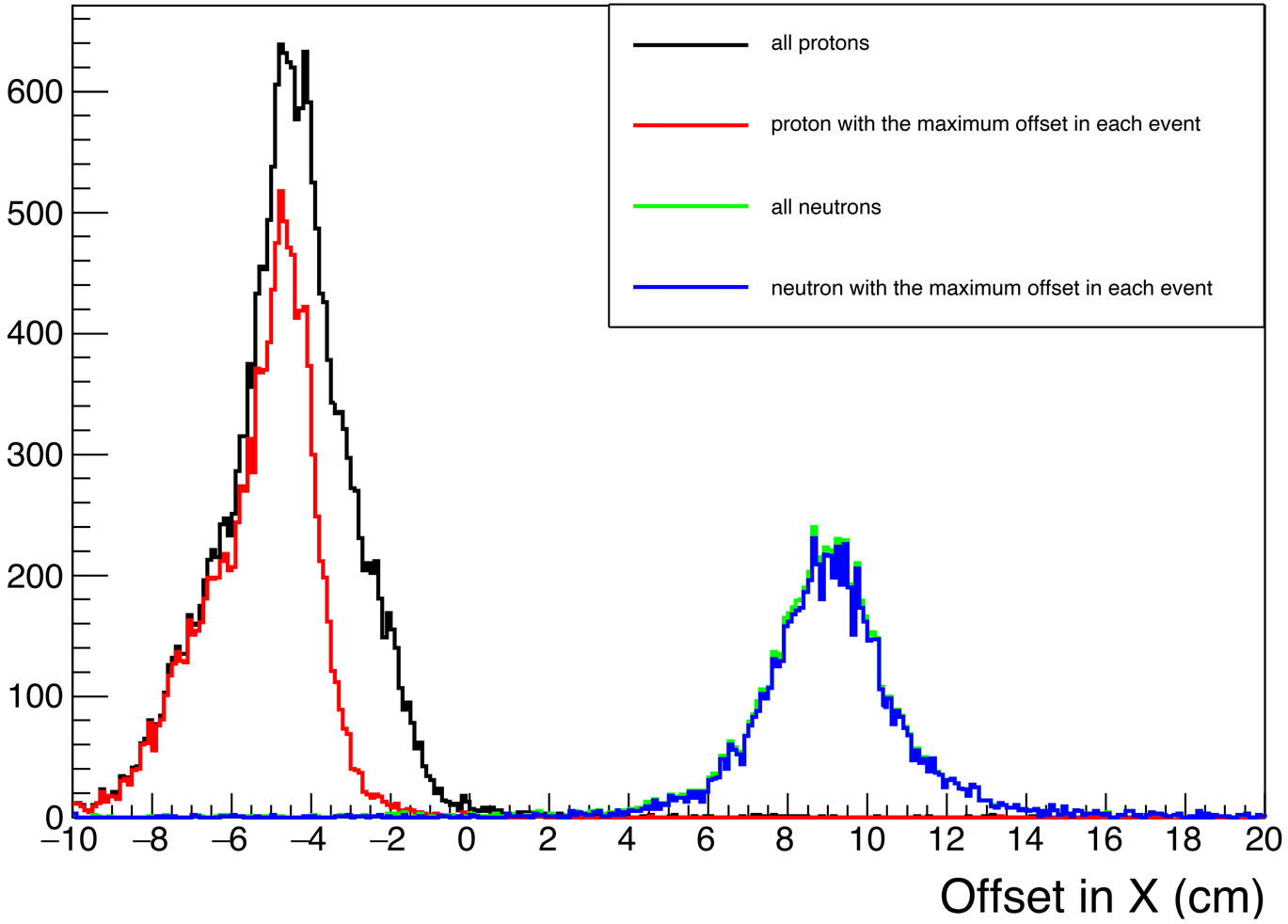




Offset in X for protons and neutrons

Only beam He3 break up

166GeV

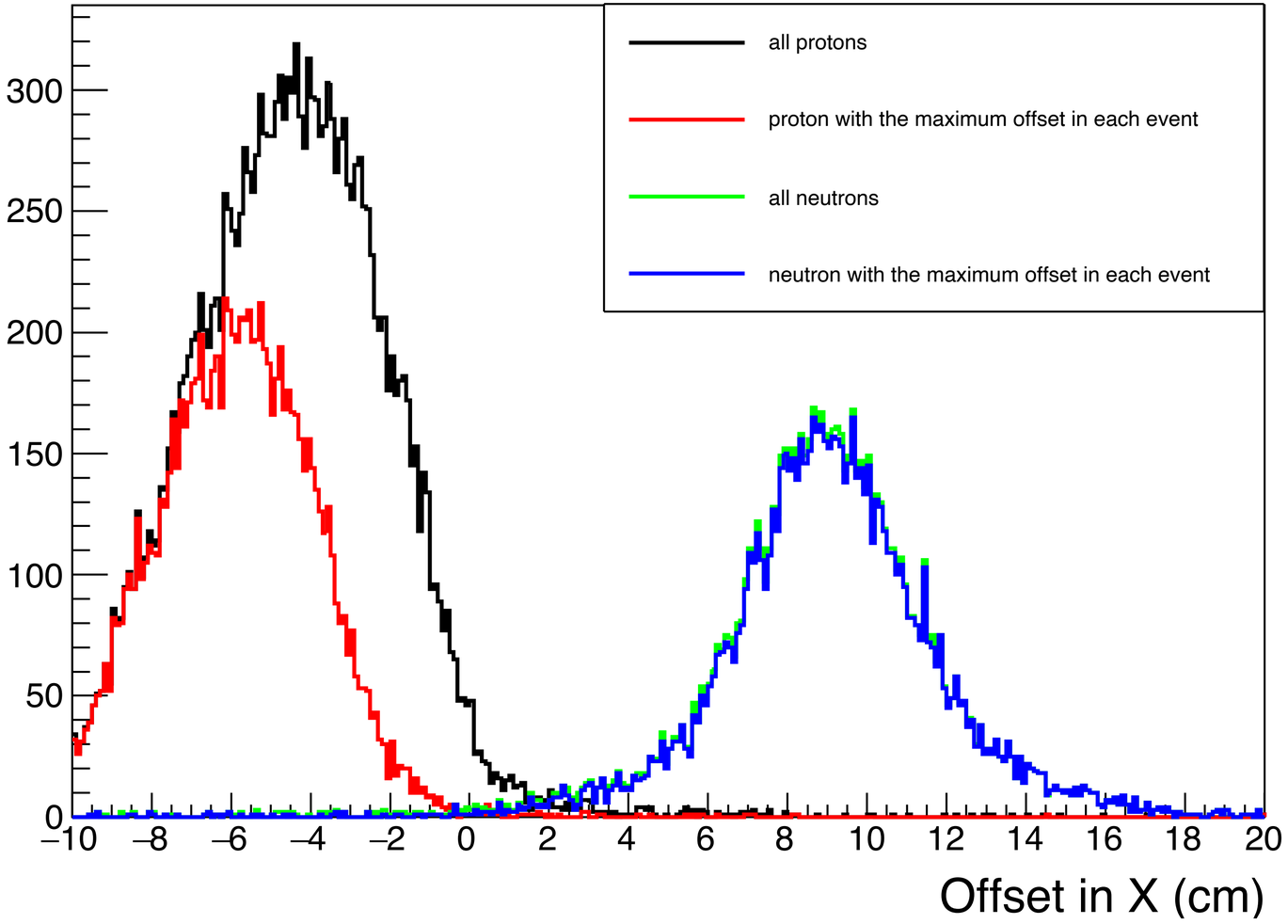


- We show the X (cm) offset in the taggers for the produced protons and neutrons. Here the event only has the beam He3 breaking up;
- For the red line case, we only choose the proton which has the maximum offset in each event;
- 99.4% events have at least one proton;
- 57.8% events have at least one neutron

Offset in X for protons and neutrons

Only beam He3 break up

110GeV



- We show the X (cm) offset in the taggers for the produced protons and neutrons. Here the event only has the beam He3 breaking up;
- For the red line case, we only choose the proton which has the maximum offset in each event;
- 99.1% events have at least one proton;
- 81.1% events have at least one neutron

Tagging efficiency

Taggers with the offset of the beam line		1.5cm	2.0cm	3.0cm	4.0cm
Only beam He3 break sup 166GeV	Tag at least one proton	97.6%	97.3%	95.6%	83.9%
	Tag at least one neutron	56.6%	56.6%	56.5%	56.3%
	Tag at least one proton or neutron	98.3%	98.2%	97.8%	90.4%
Only beam He3 breaks up 110GeV	Tag at least one proton	96.5%	95.5%	91.3%	81.3%
	Tag at least one neutron	79.3%	79.1%	78.4%	77.3%
	Tag at least one proton or neutron	97.5%	97.3%	96.0%	92.7%

Summary

- For the current setup, we have good tagging efficiency by tagging protons or both protons and neutrons;
- The deuteron tagger is not included in our setup;