

Basic electron cuts

Deuterium run 015053

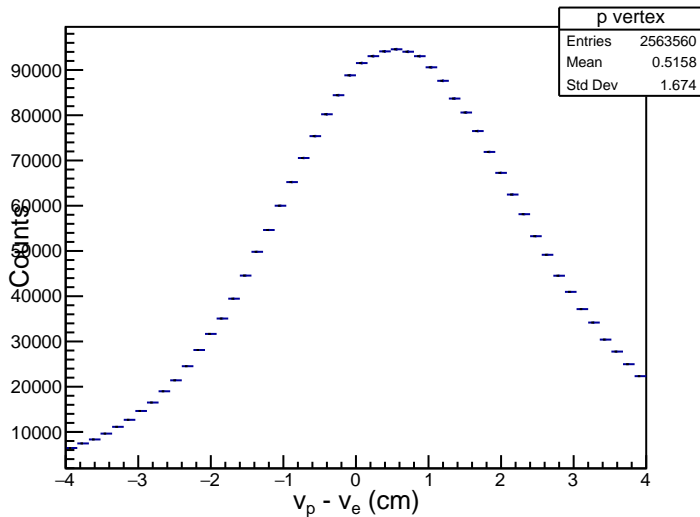
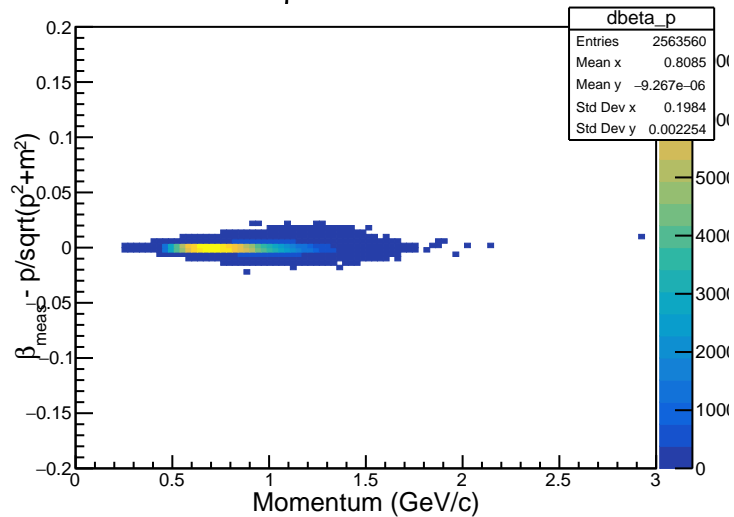
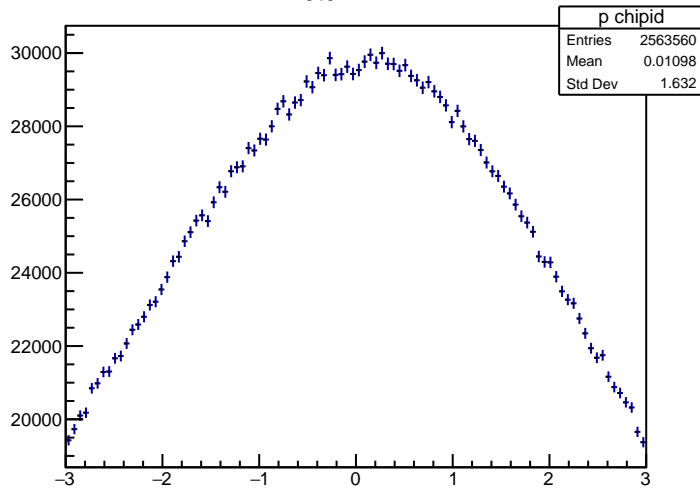
$d(e,e'p)n$

allow only PID=0,11,22,2212,2112

exactly 1p, 1e

proton in FD

Proton vertex - electron vertex

 $\Delta \beta$ vs MomentumProton χ^2 PID

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$d(e,e'p)n$

Require proton in FTOF

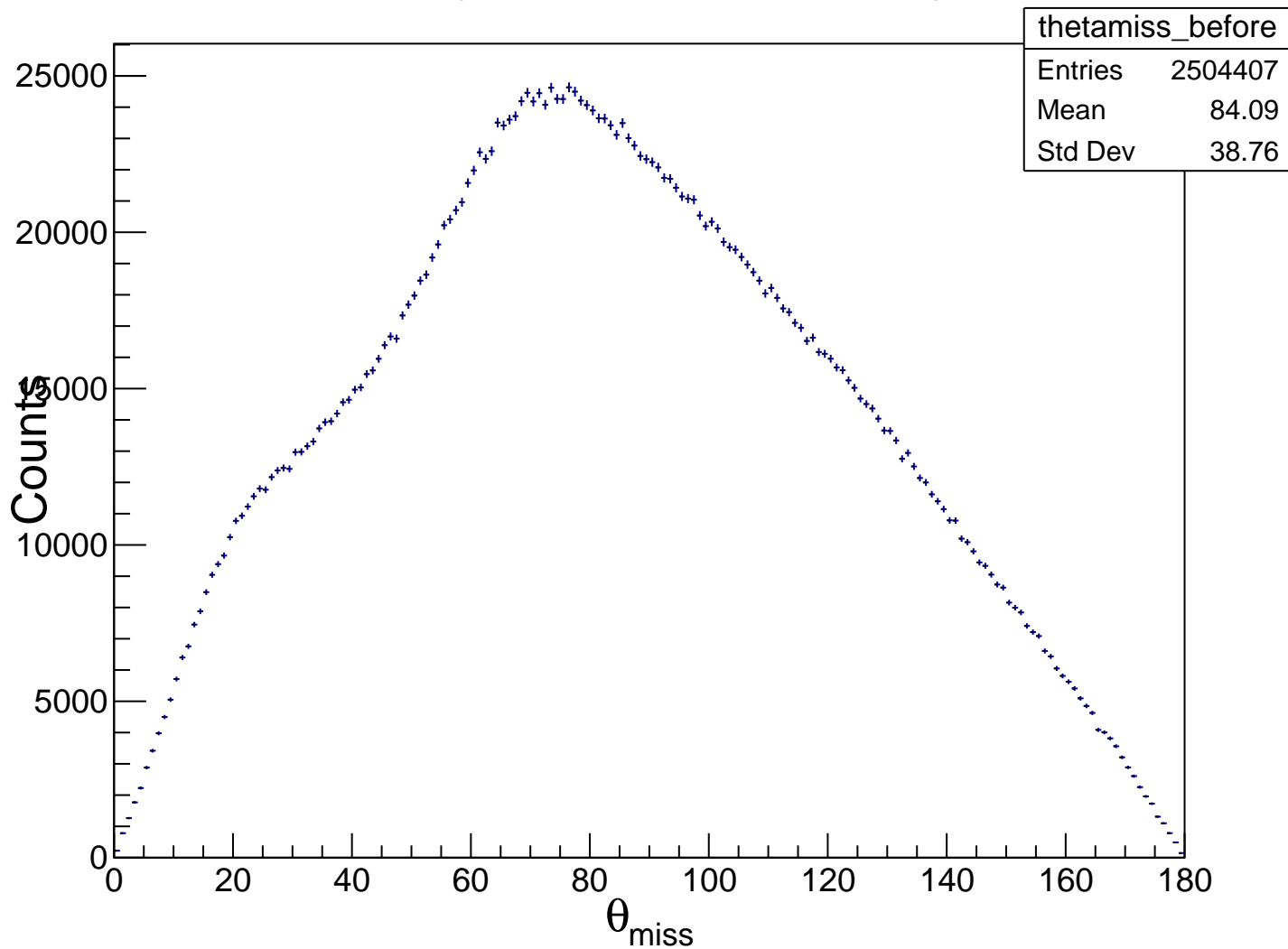
$$-4 \text{ cm} < v_p - v_e < 2 \text{ cm}$$

$$-0.02 < \Delta \beta < 0.02$$

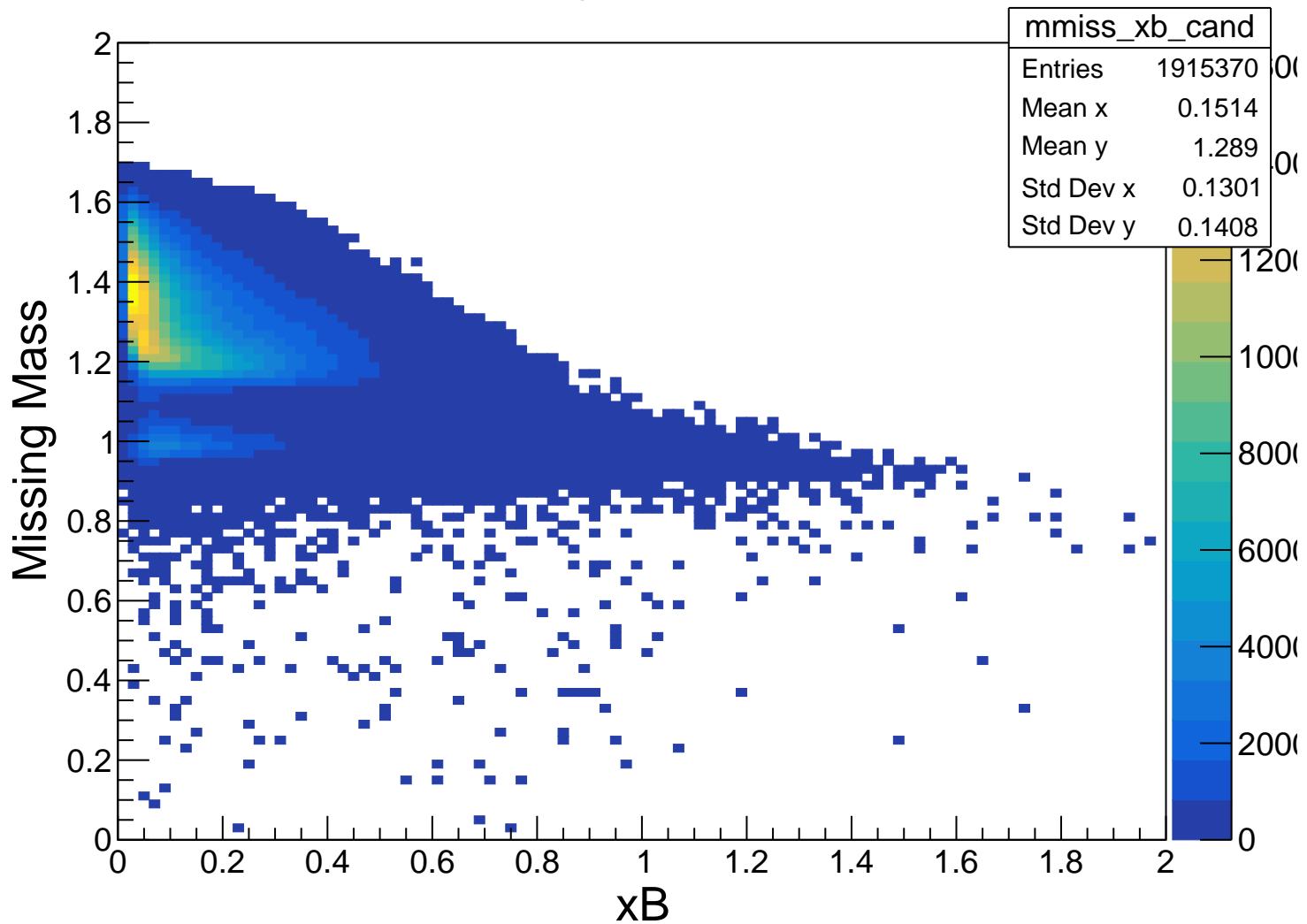
$$p_p > 0.3 \text{ GeV}/c$$

$$-3 < \text{proton } \chi^2_{\text{PID}} < 3$$

Missing Momentum Polar Angle



Missing Mass vs xB



Basic electron cuts

Deuterium run 015053

d(e,e'pn)

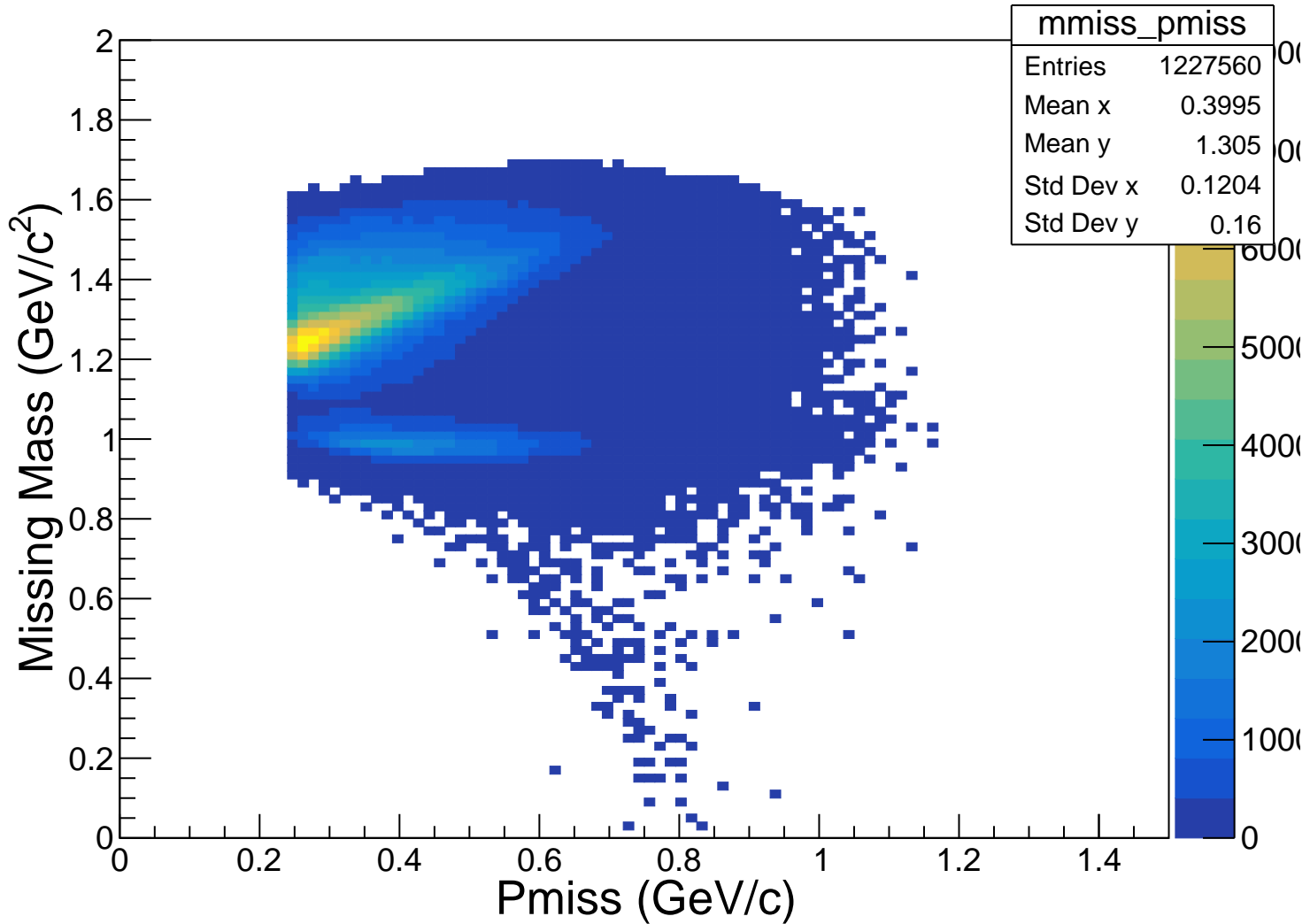
proton cuts

$40 \text{ deg} < \theta_{\text{miss}} < 140 \text{ deg}$

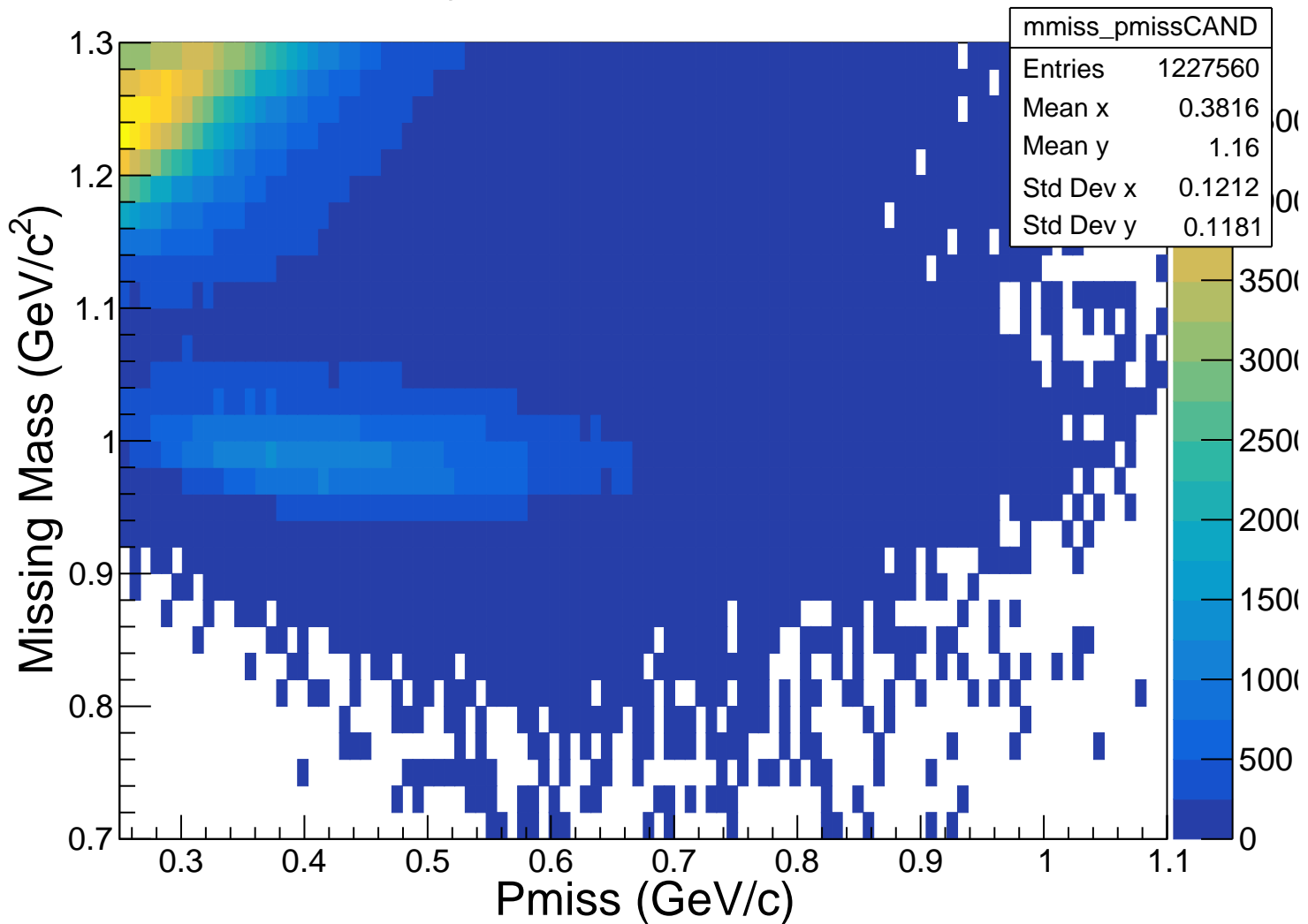
$0.24 \text{ GeV}/c < p_{\text{miss}} < 1.25 \text{ GeV}/c$

EFFICIENCY BY MOMENTUM - CANDIDATES

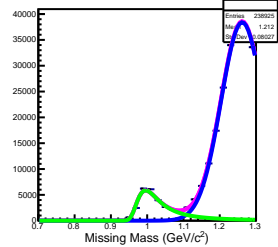
Missing Mass vs Pmiss d(e,e'p)n



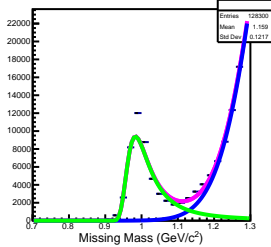
Missing Mass vs Pmiss d(e,e'p)n



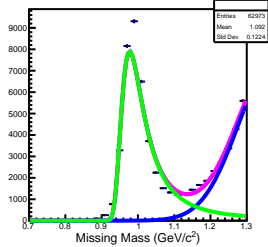
Missing Mass vs Pmiss d(e,e'p)n



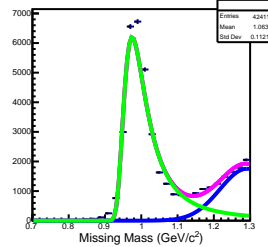
Missing Mass vs Pmiss d(e,e'p)n



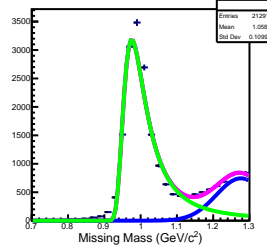
Missing Mass vs Pmiss d(e,e'p)n



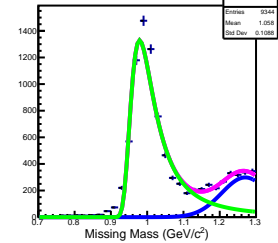
Missing Mass vs Pmiss d(e,e'p)n



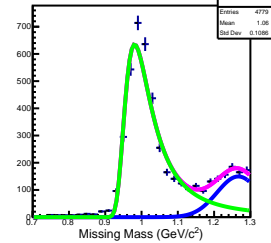
Missing Mass vs Pmiss d(e,e'p)n



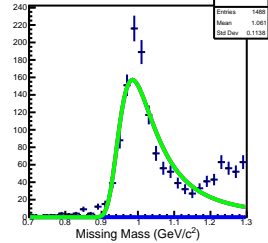
Missing Mass vs Pmiss d(e,e'p)n



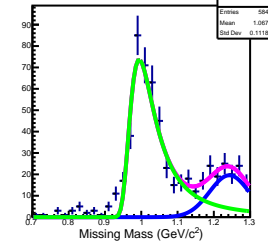
Missing Mass vs Pmiss d(e,e'p)n



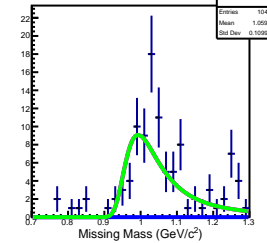
Missing Mass vs Pmiss d(e,e'p)n

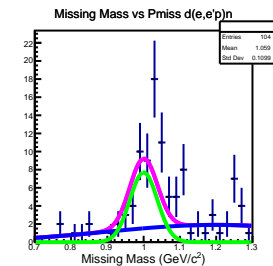
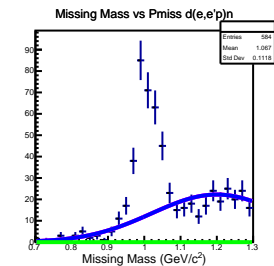
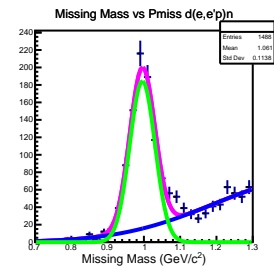
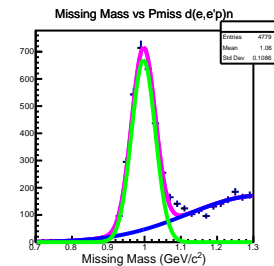
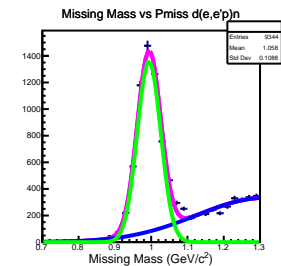
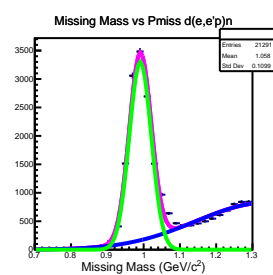
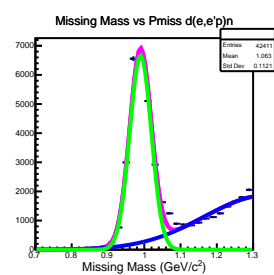
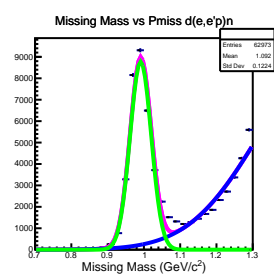
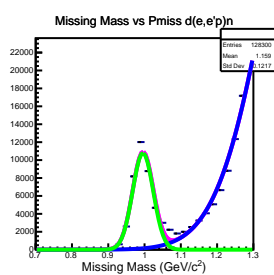
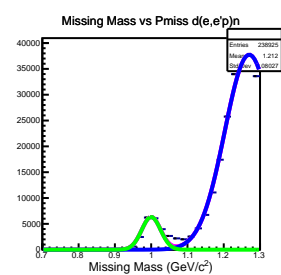


Missing Mass vs Pmiss d(e,e'p)n

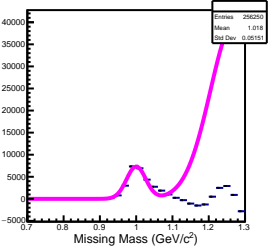


Missing Mass vs Pmiss d(e,e'p)n

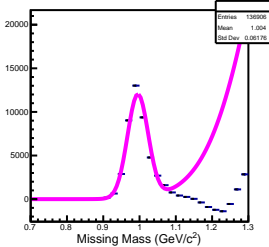




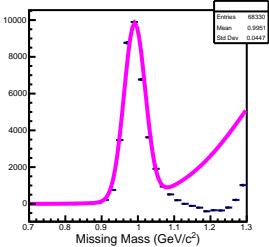
Missing Mass vs Pmiss d(e,e'p)n



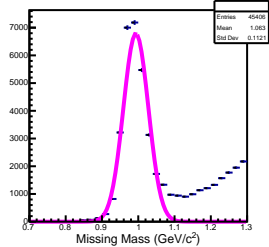
Missing Mass vs Pmiss d(e,e'p)n



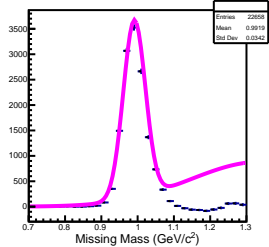
Missing Mass vs Pmiss d(e,e'p)n



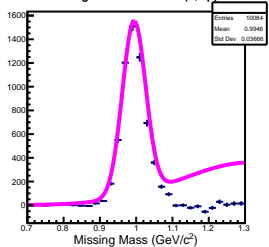
Missing Mass vs Pmiss d(e,e'p)n



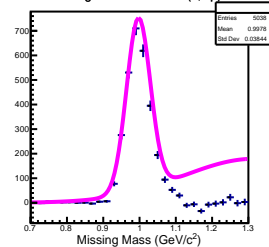
Missing Mass vs Pmiss d(e,e'p)n



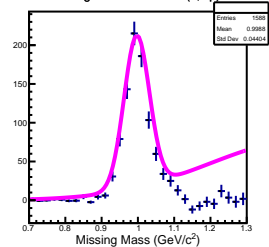
Missing Mass vs Pmiss d(e,e'p)n



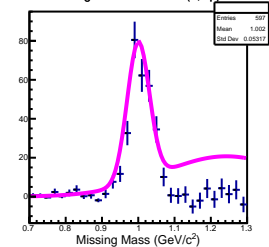
Missing Mass vs Pmiss d(e,e'p)n



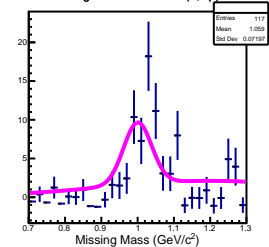
Missing Mass vs Pmiss d(e,e'p)n



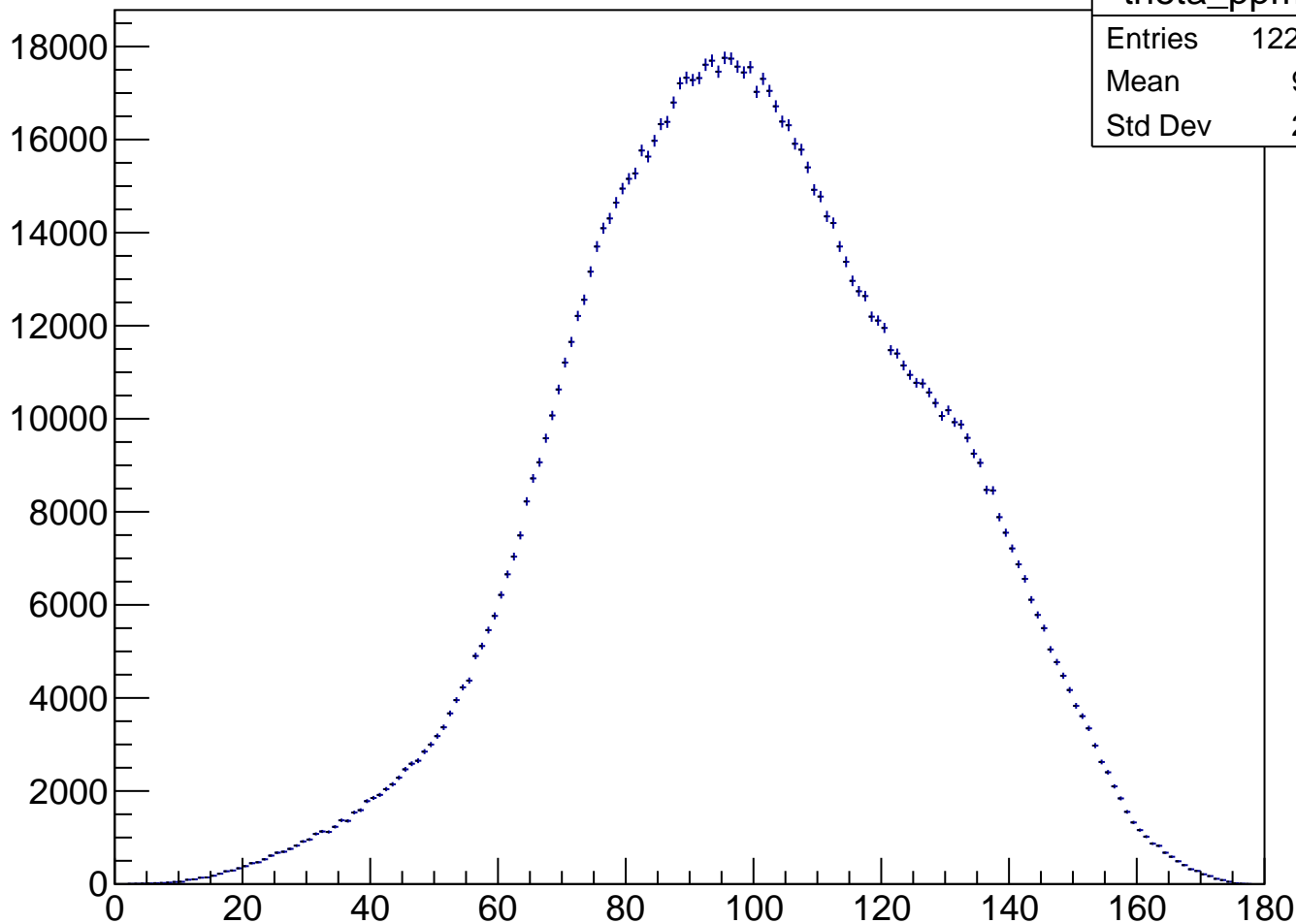
Missing Mass vs Pmiss d(e,e'p)n



Missing Mass vs Pmiss d(e,e'p)n



Angle between p_p and p_{miss}



theta_ppmiss

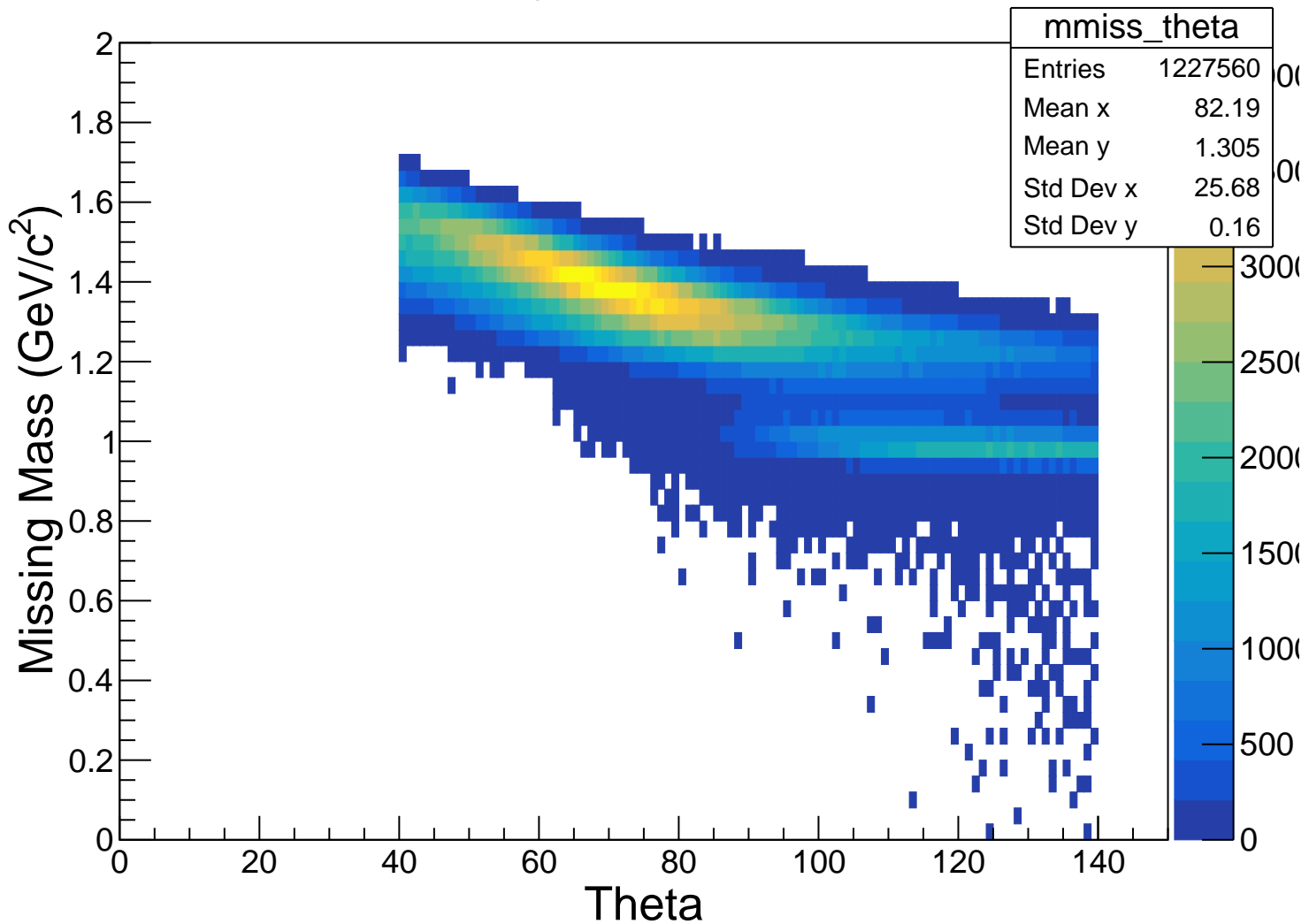
Entries 1227560

Mean 99.02

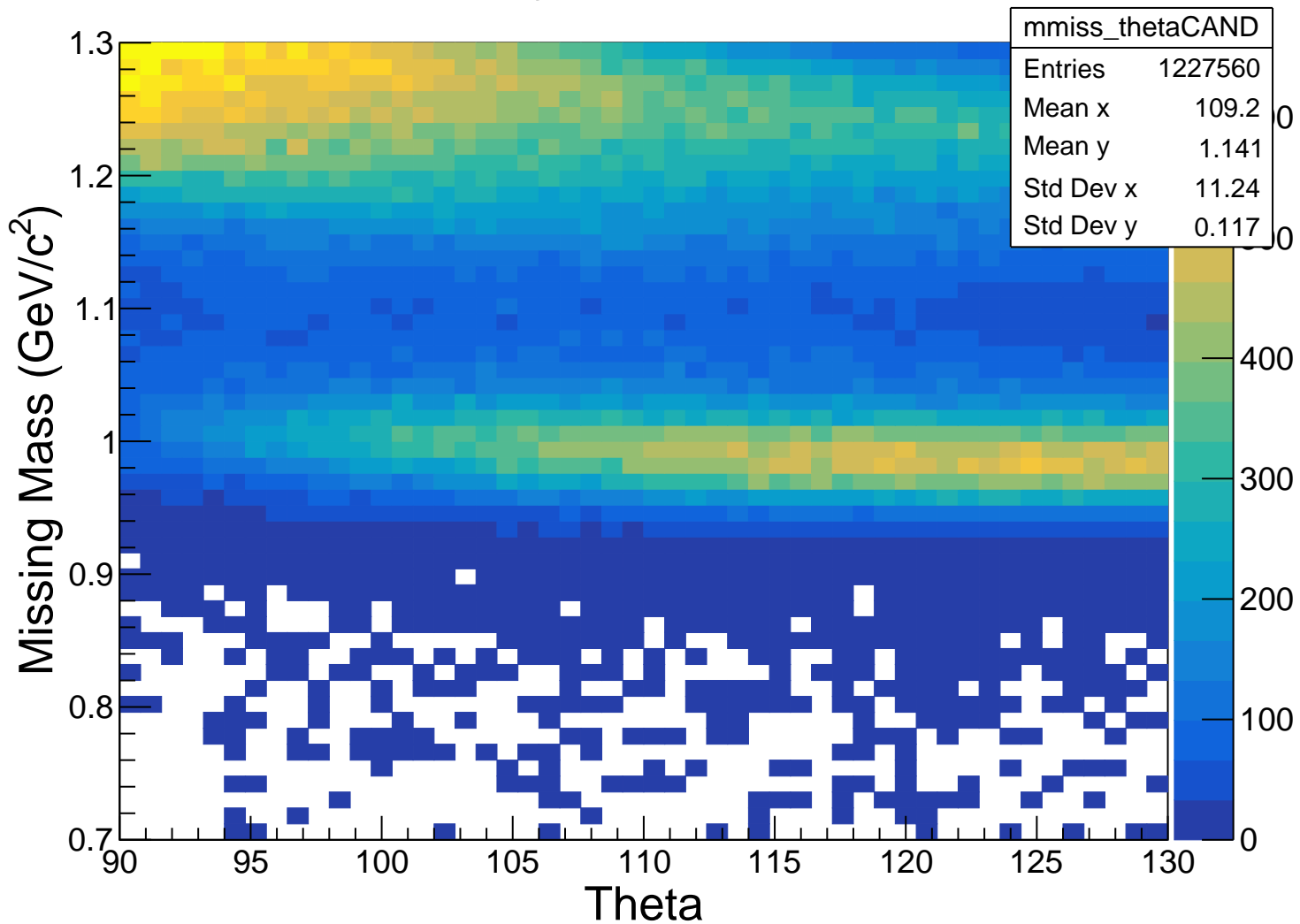
Std Dev 27.34

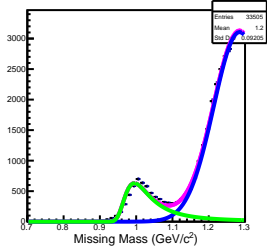
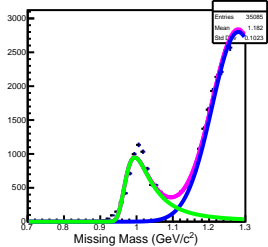
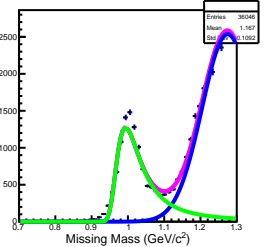
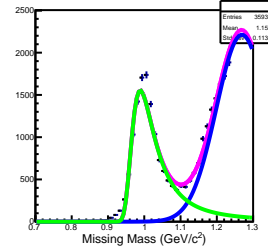
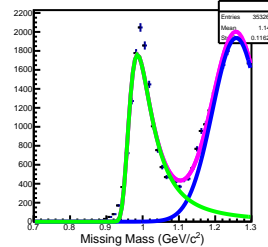
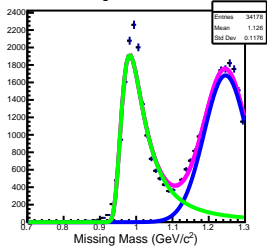
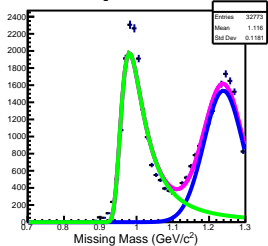
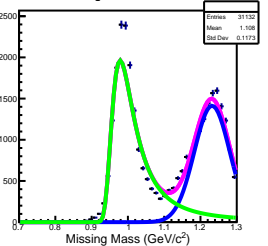
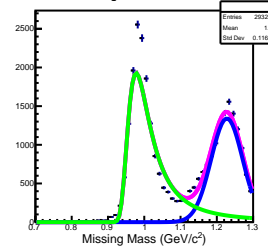
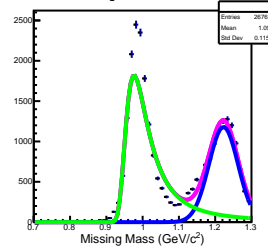
EFFICIENCY BY THETA - CANDIDATES

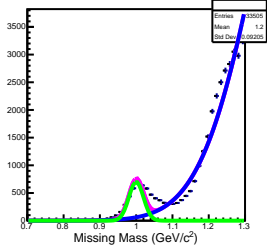
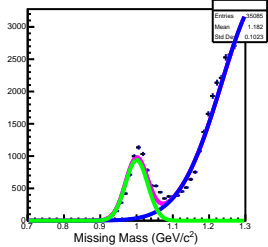
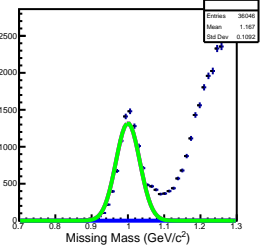
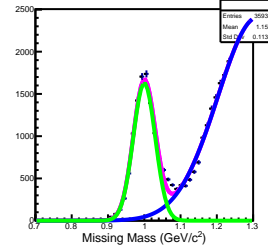
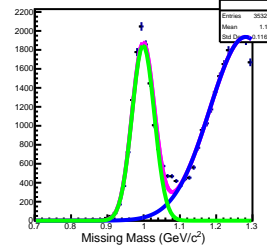
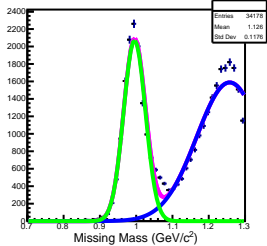
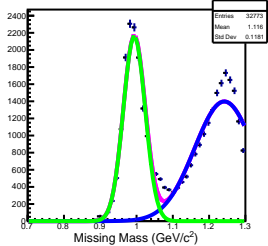
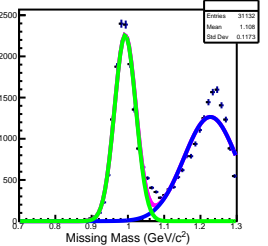
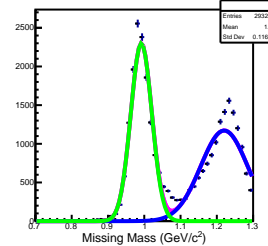
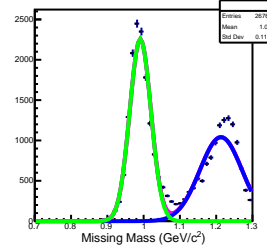
Missing Momentum vs θ

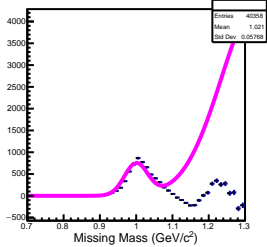
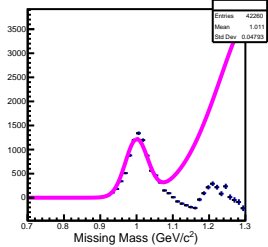
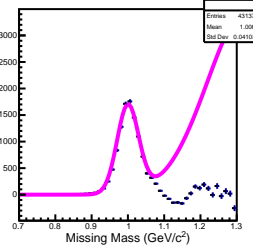
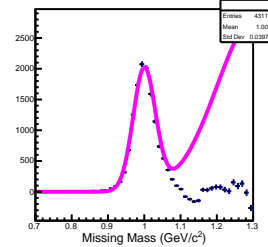
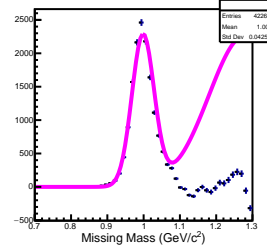
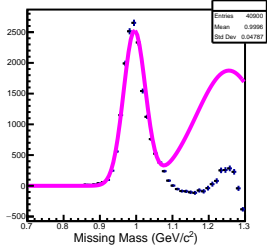
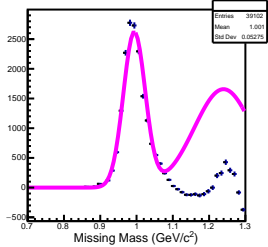
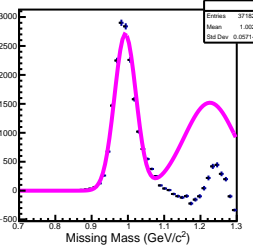
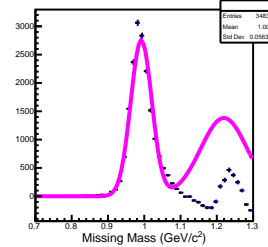
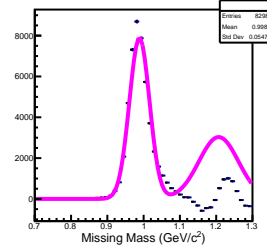


Missing Momentum vs θ



Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ 

Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ 

Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ 

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$d(e,e'pn)$

proton cuts

p_{miss} cuts

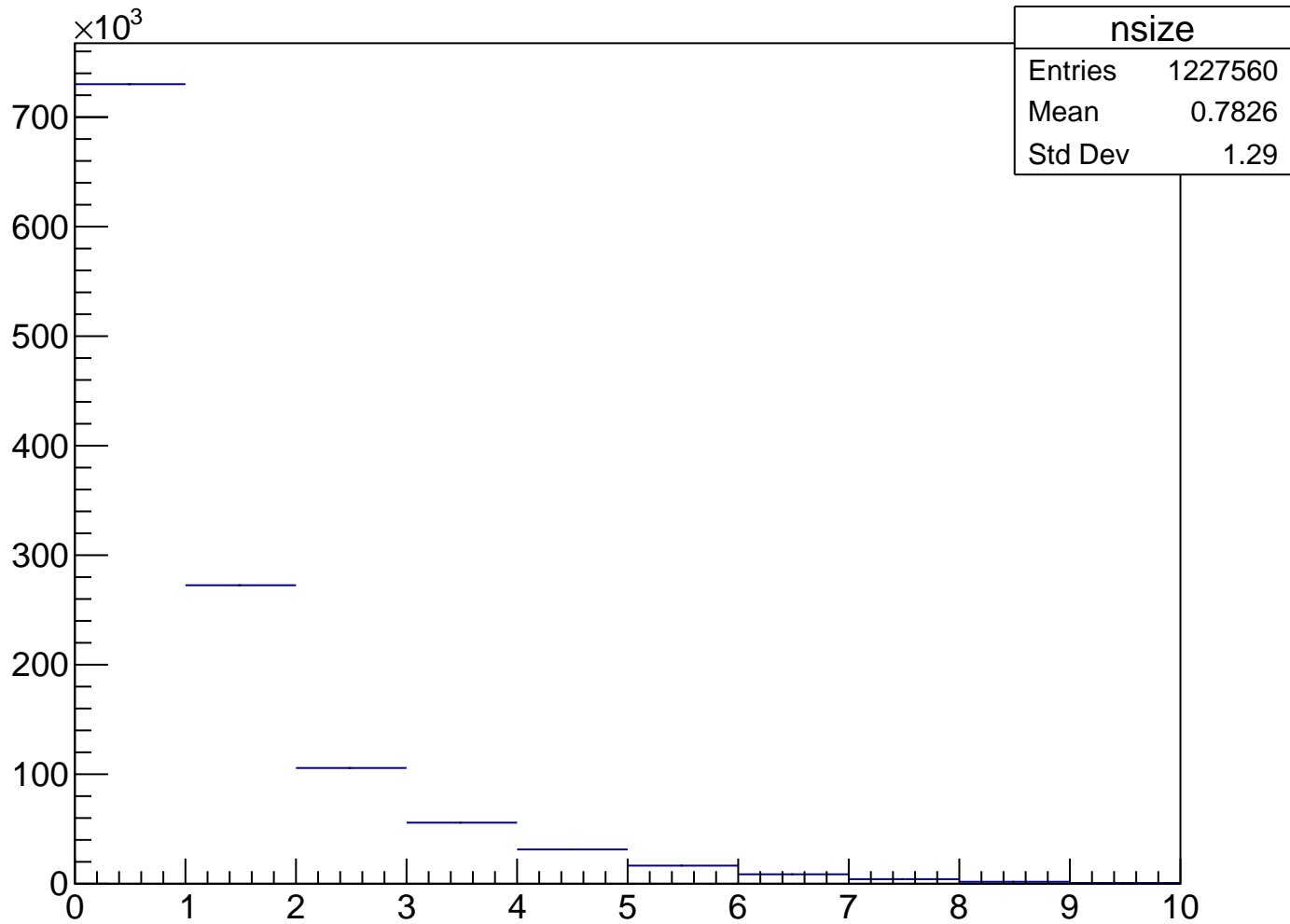
Require neutron in CND

exclude $\theta_n=0$, $\phi_n=0$

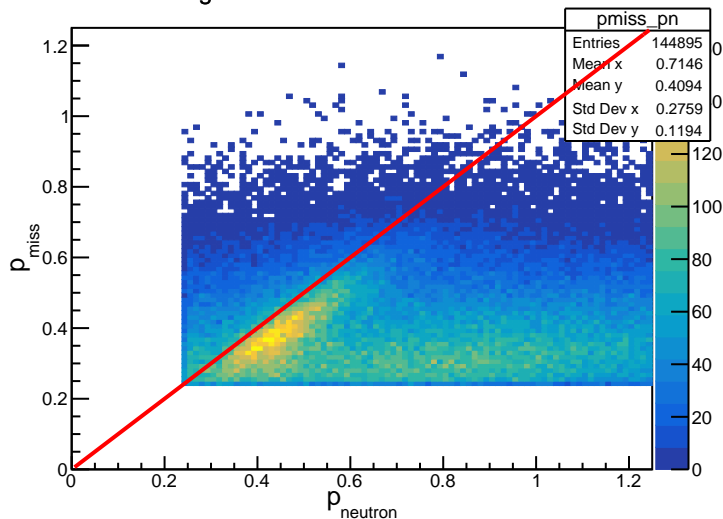
$40 \text{ deg} < \theta_n < 140 \text{ deg}$

$0.25 < \beta_n < 0.8$

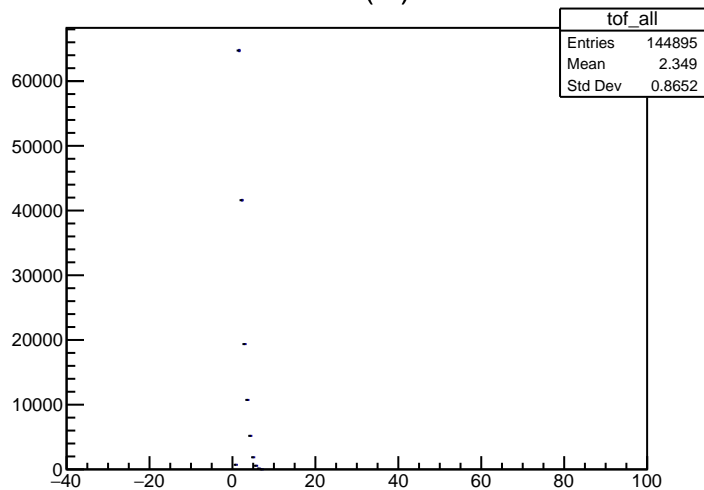
Number of reconstructed neutrons



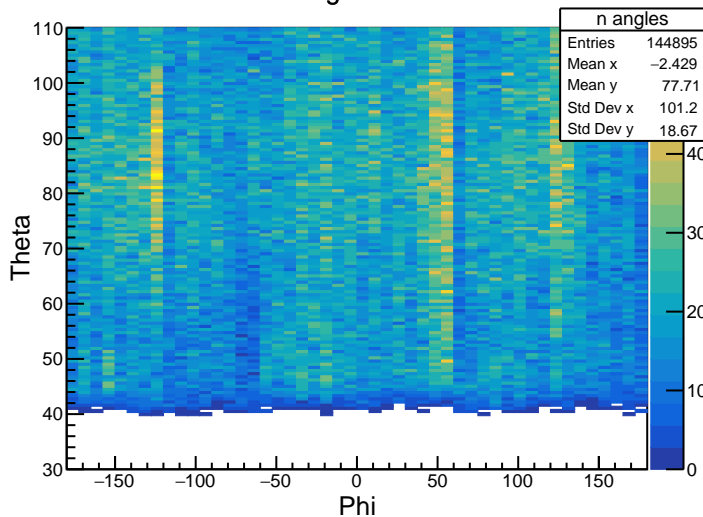
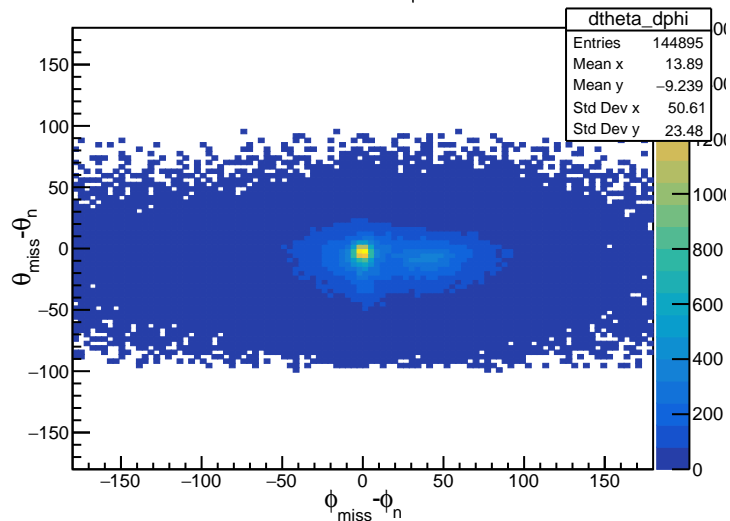
Missing Momentum vs Neutron Momentum



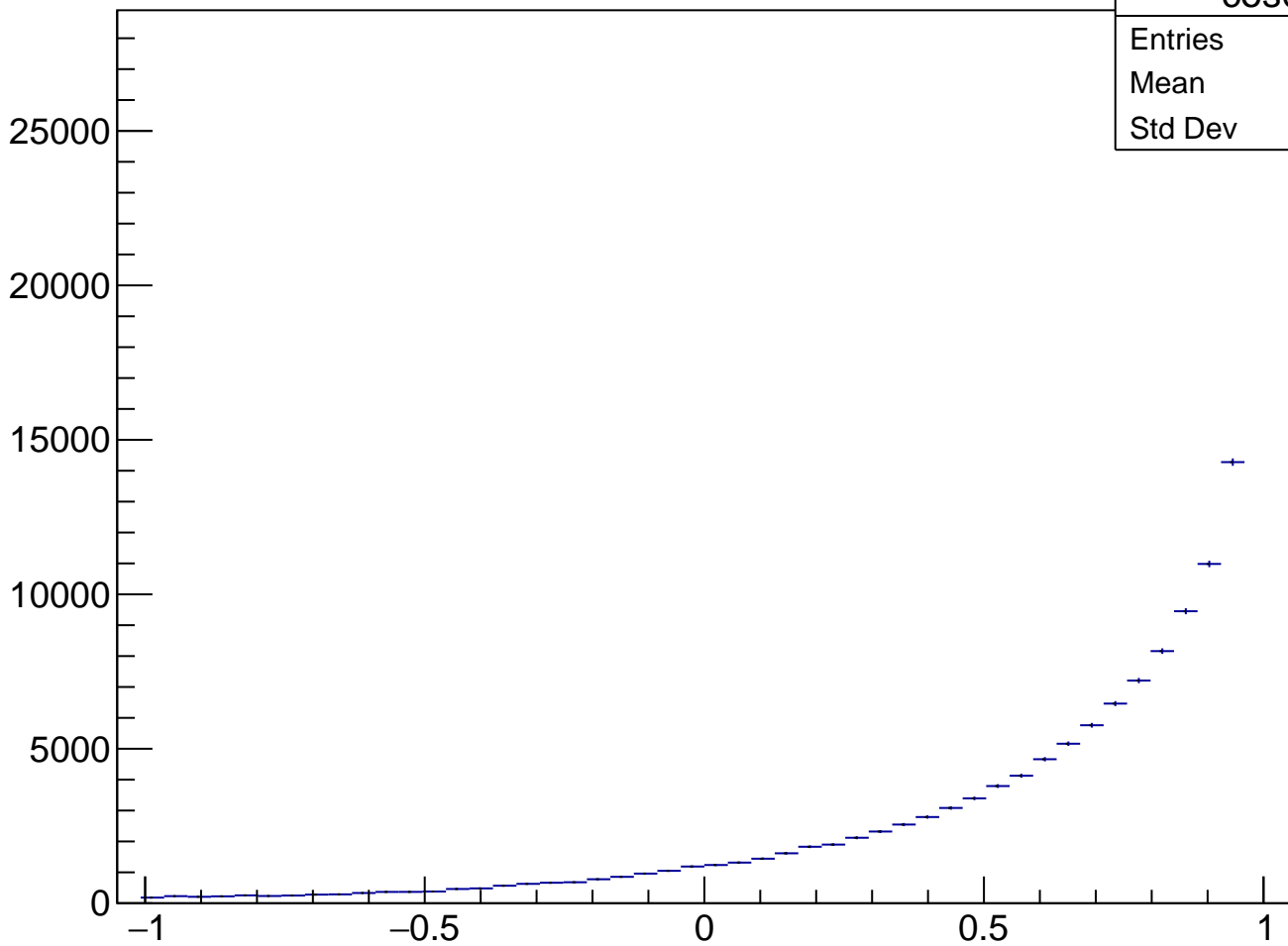
TOF (ns)



Neutron Angular Distribution

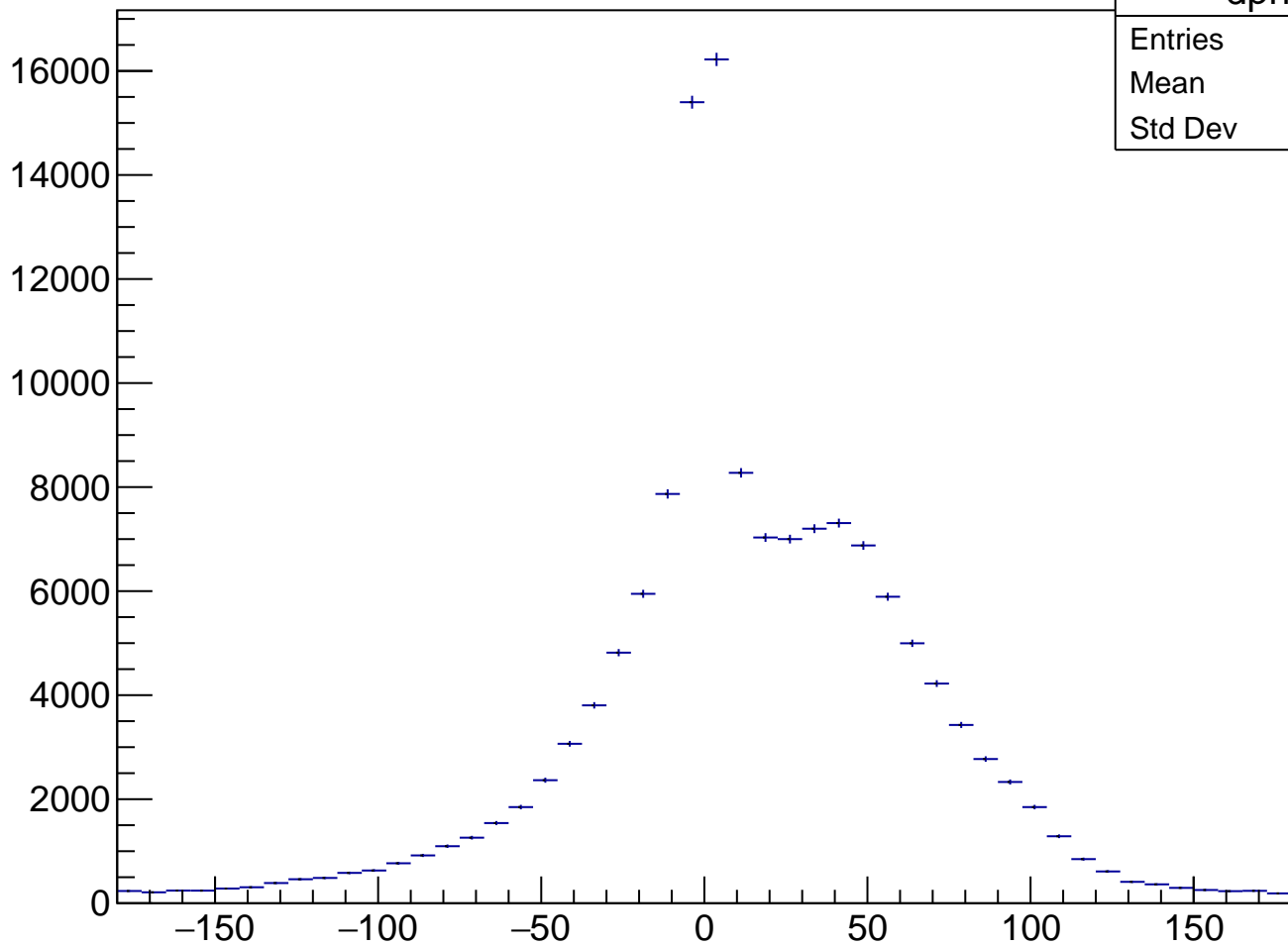
 $\Delta \theta$ vs $\Delta \phi$ 

$\cos \theta_{\text{pmiss,pneutron}}$



cos0	
Entries	144895
Mean	0.6467
Std Dev	0.393

$$\Delta \phi = \phi_{\text{pmiss}} - \phi_n$$



dphi	
Entries	144895
Mean	13.89
Std Dev	50.61

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$d(e,e'pn)$

proton cuts

p_{miss} cuts

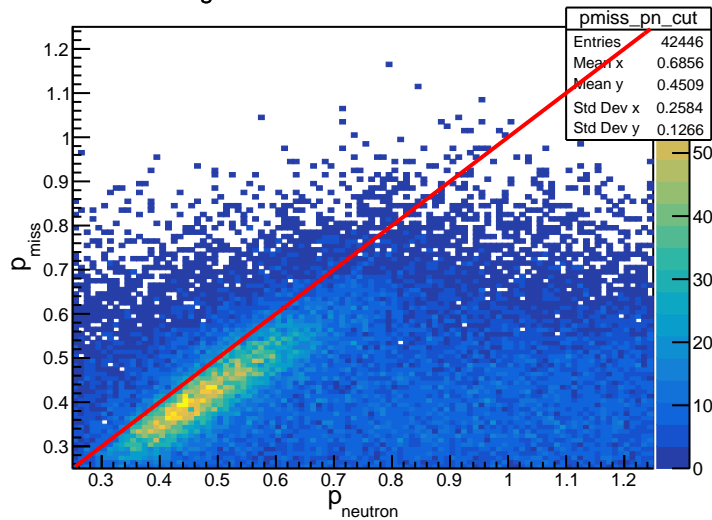
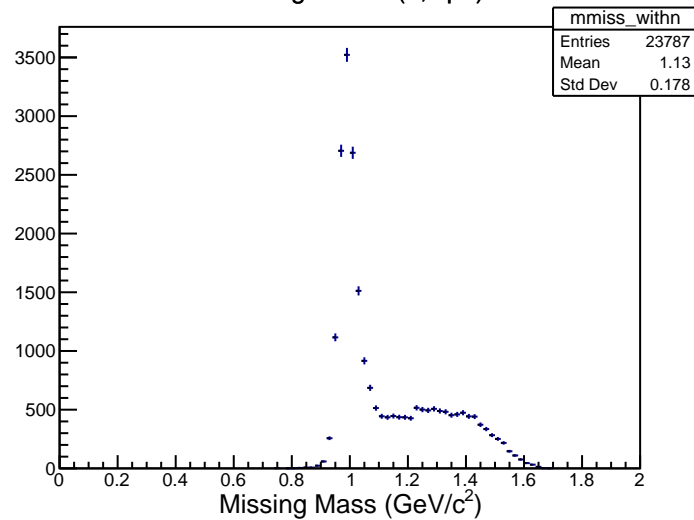
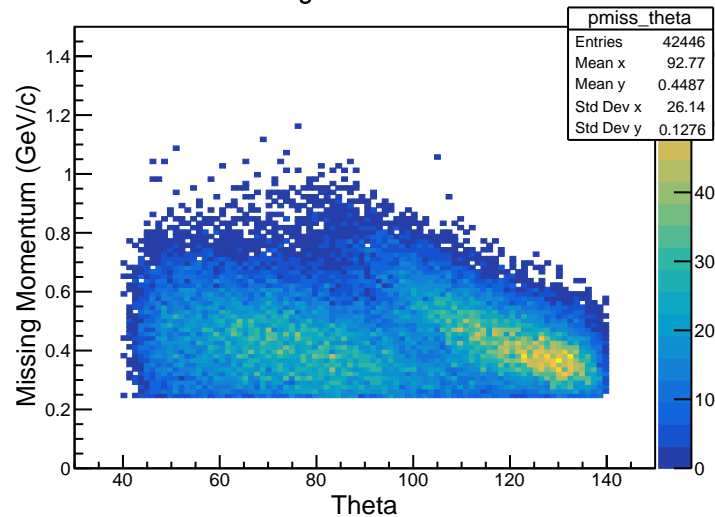
exclude $\theta_n=0$, $\phi_n=0$

$40 \text{ deg} < \theta_n < 140 \text{ deg}$

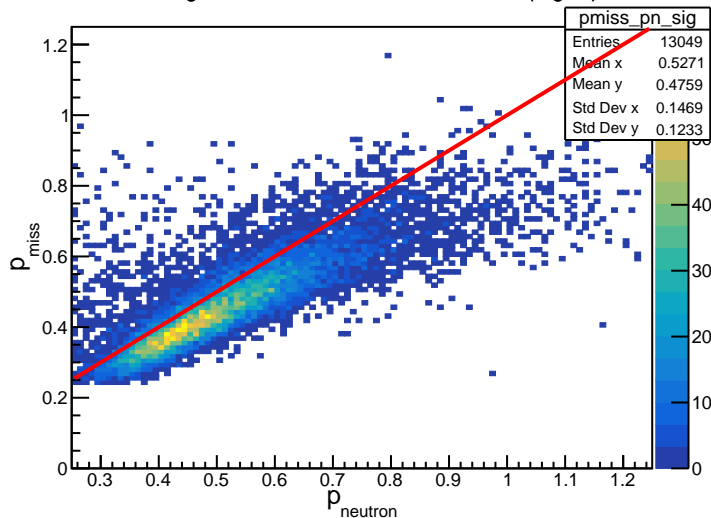
$0.25 < \beta_n < 0.8$

$\cos \theta_{p\text{miss},pn} > 0.9$, $-20 < \Delta \phi < 20$

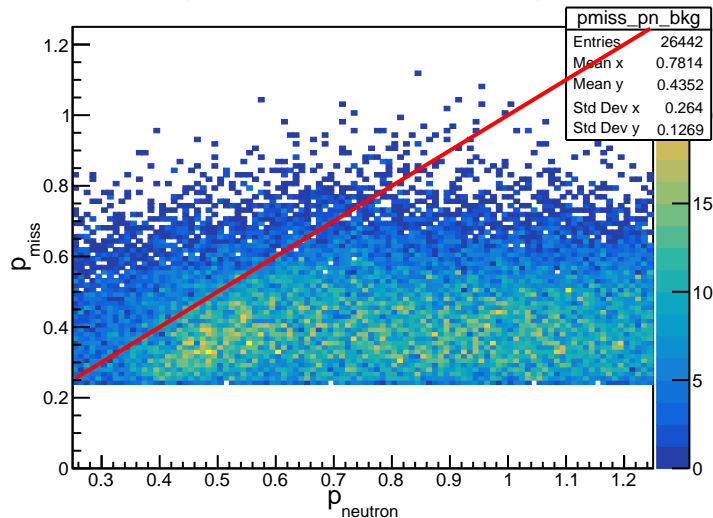
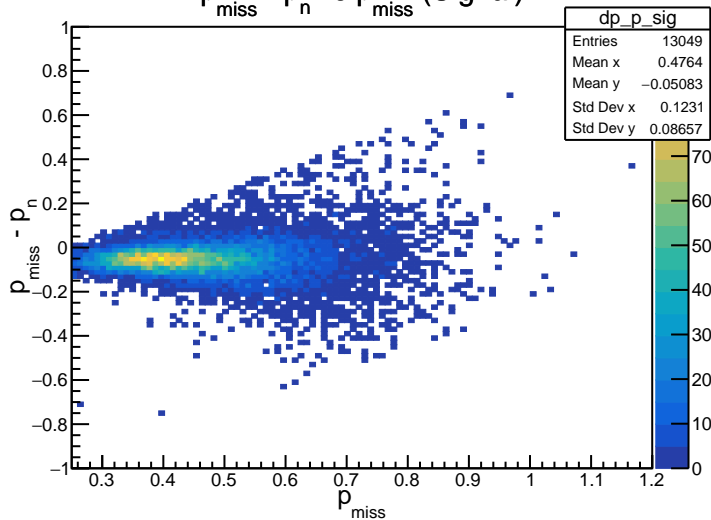
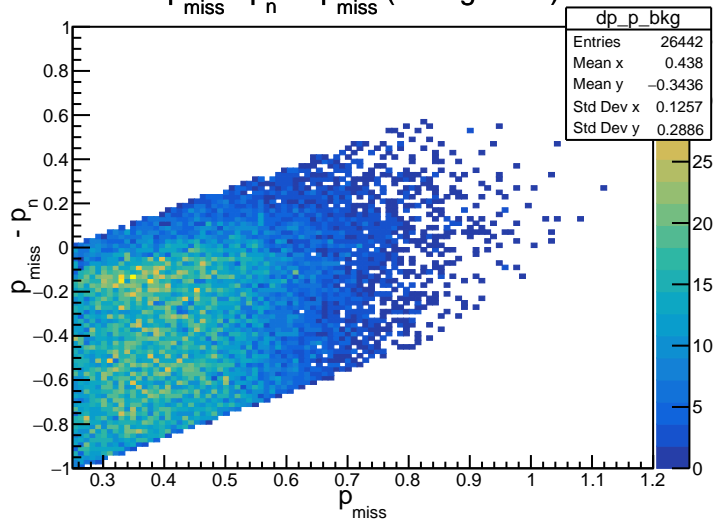
Missing Momentum vs Neutron Momentum

Missing Mass $d(e,e'pn)$ Missing Momentum vs θ 

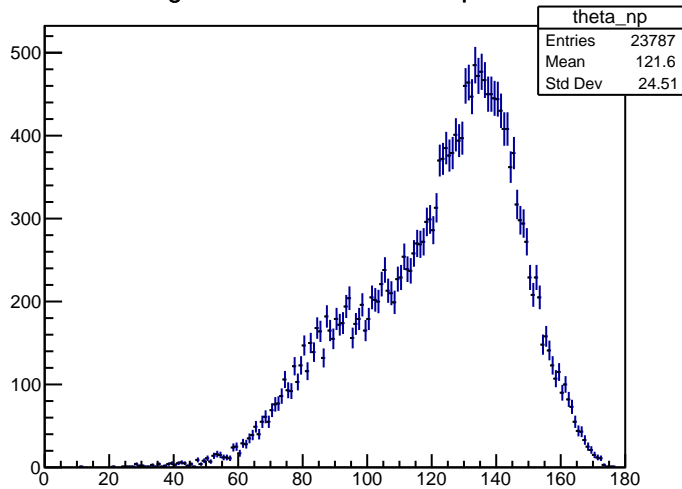
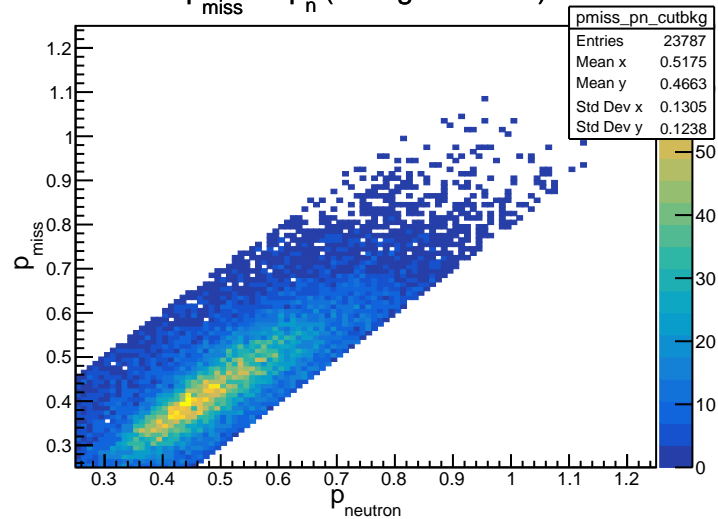
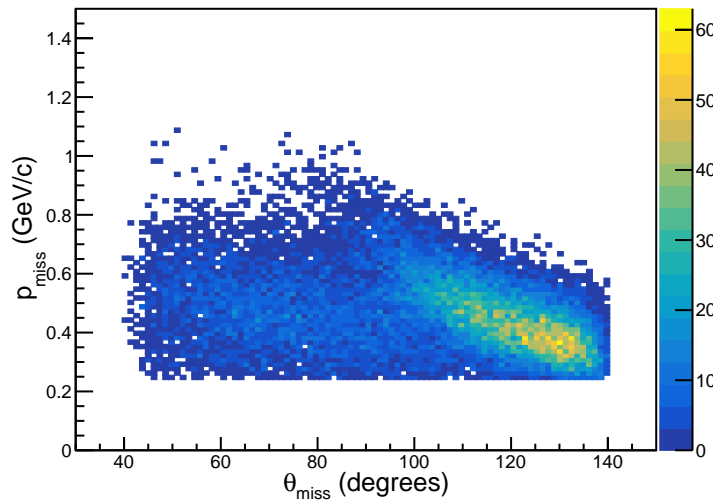
Missing Momentum vs Neutron Momentum (Signal)



Missing Momentum vs Neutron Momentum (Background)

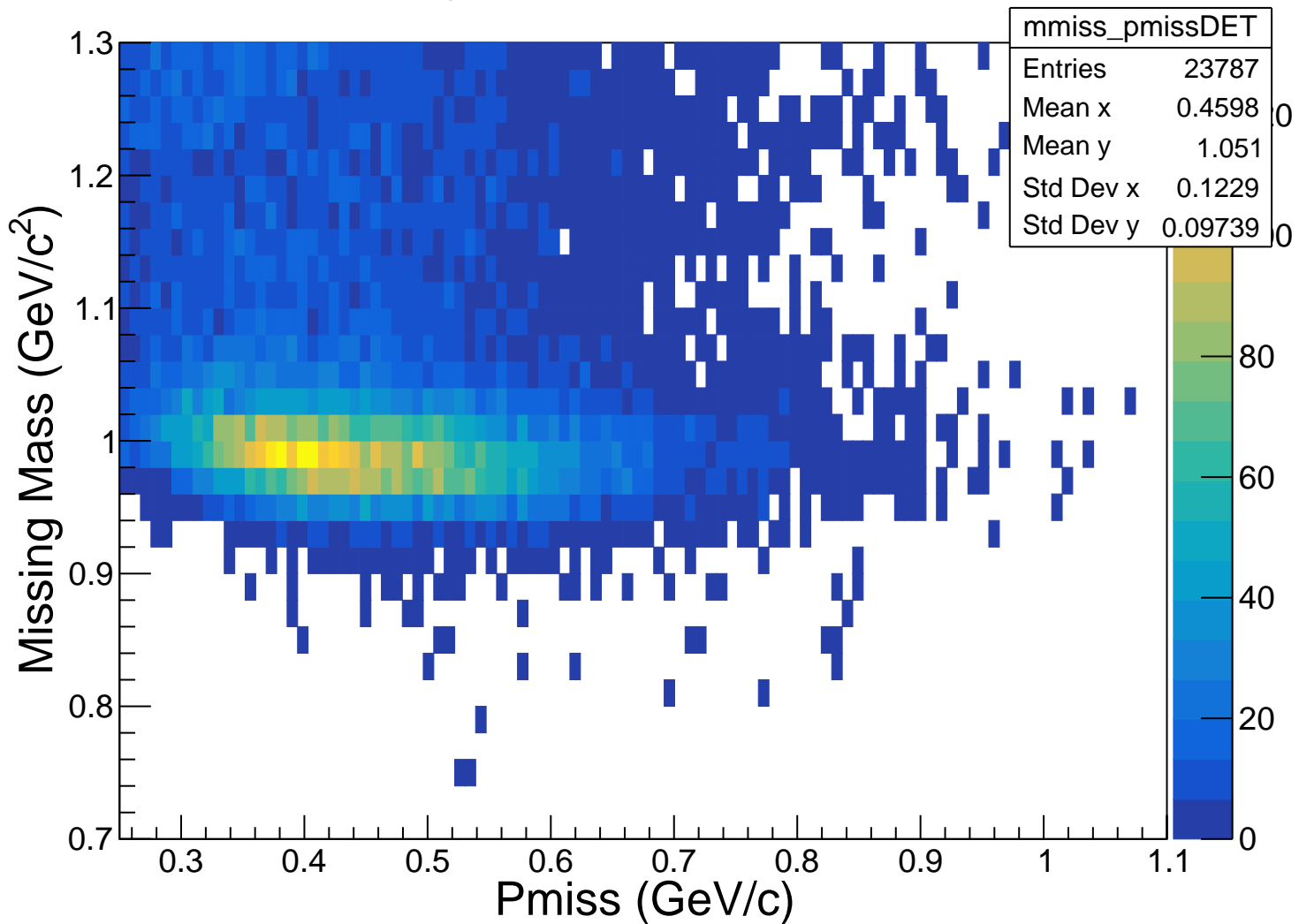
 $p_{\text{miss}} - p_{\text{n}}$ vs p_{miss} (Signal) $p_{\text{miss}} - p_{\text{n}}$ vs p_{miss} (Background)

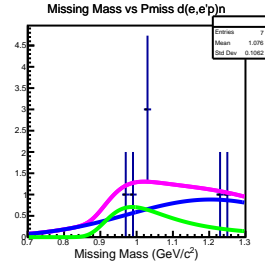
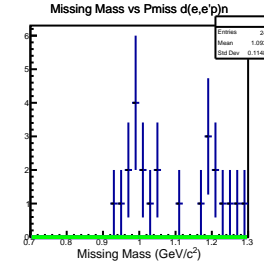
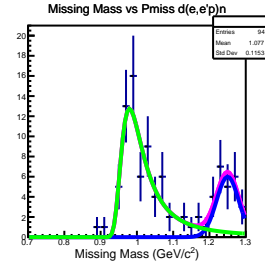
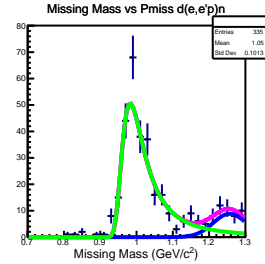
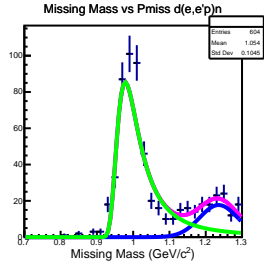
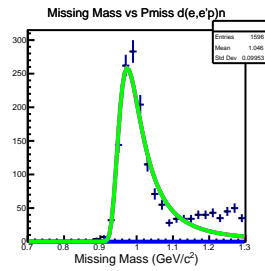
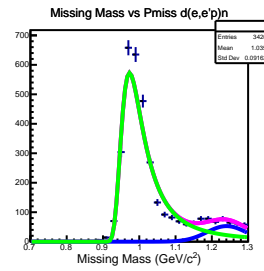
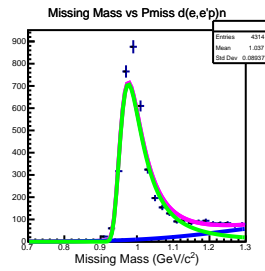
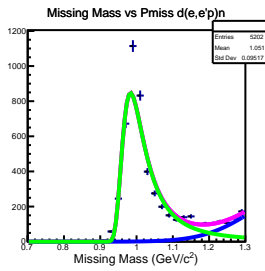
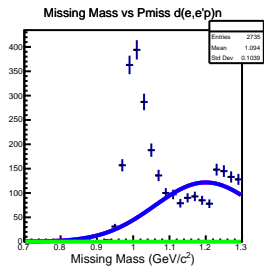
Angle between neutron and proton

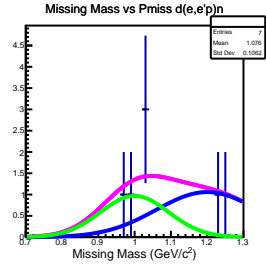
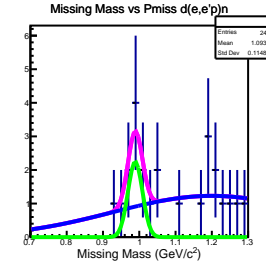
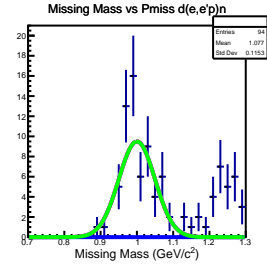
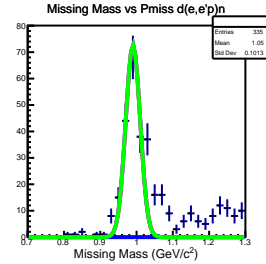
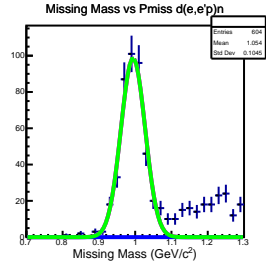
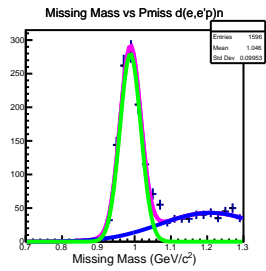
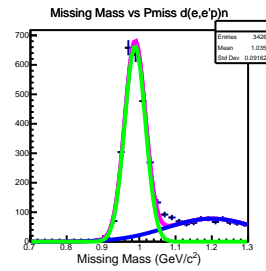
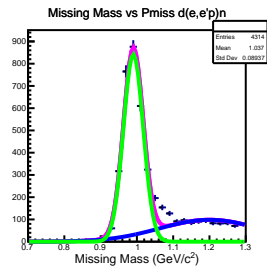
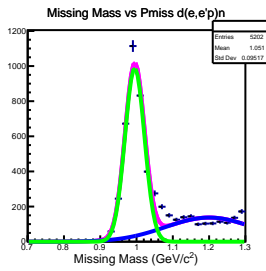
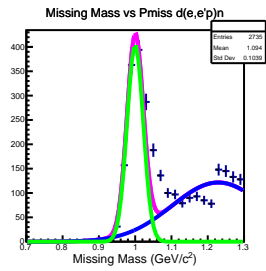
 p_{miss} vs p_n (background cut)Missing Momentum vs p_{miss} Polar Angle

EFFICIENCY BY MOMENTUM - DETECTED

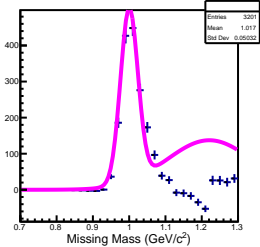
Missing Mass vs Pmiss d(e,e'p)n



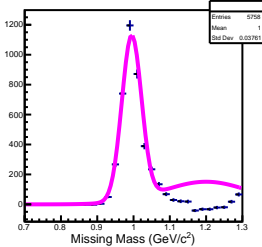




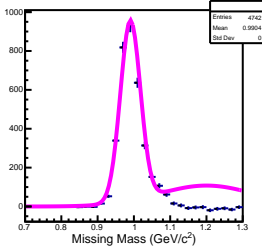
Missing Mass vs Pmiss d(e,e'p)n



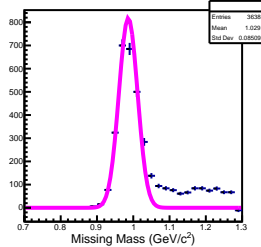
Missing Mass vs Pmiss d(e,e'p)n



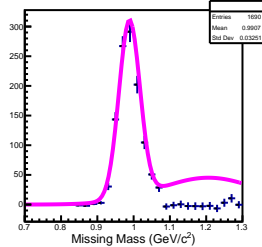
Missing Mass vs Pmiss d(e,e'p)n



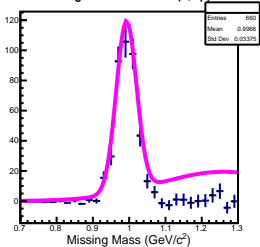
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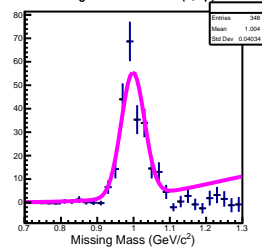
Missing Mass vs Pmiss d(e,e'p)n



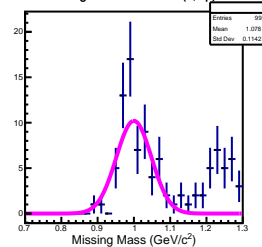
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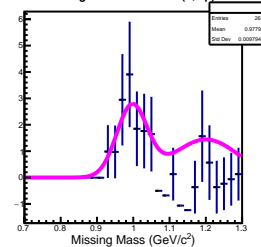
Missing Mass vs Pmiss d(e,e'p)n



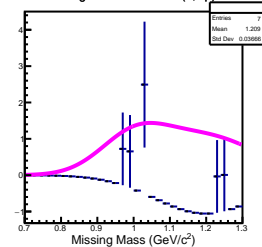
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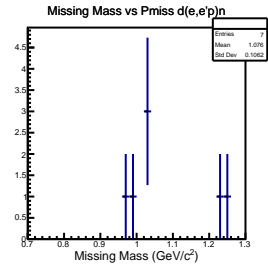
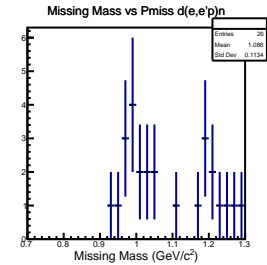
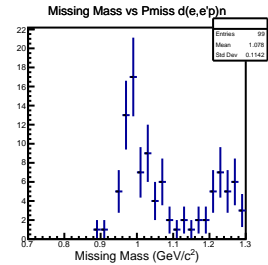
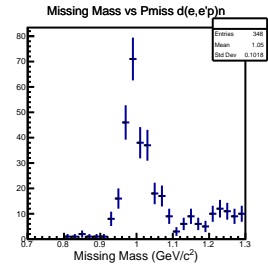
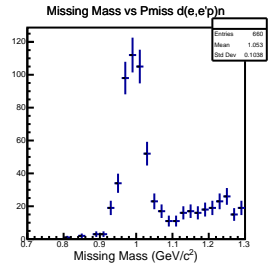
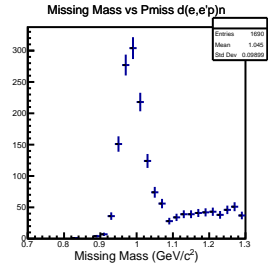
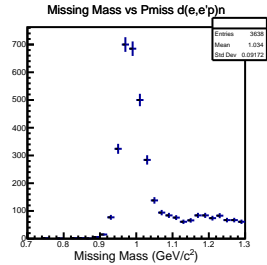
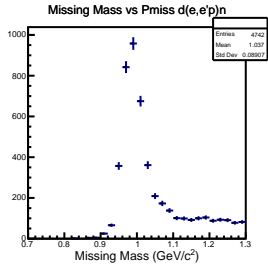
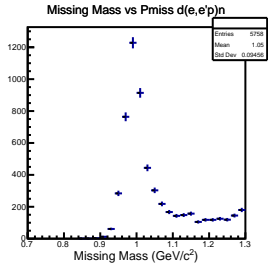
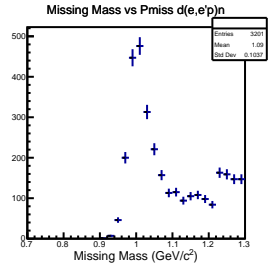


Missing Mass vs Pmiss d(e,e'p)n



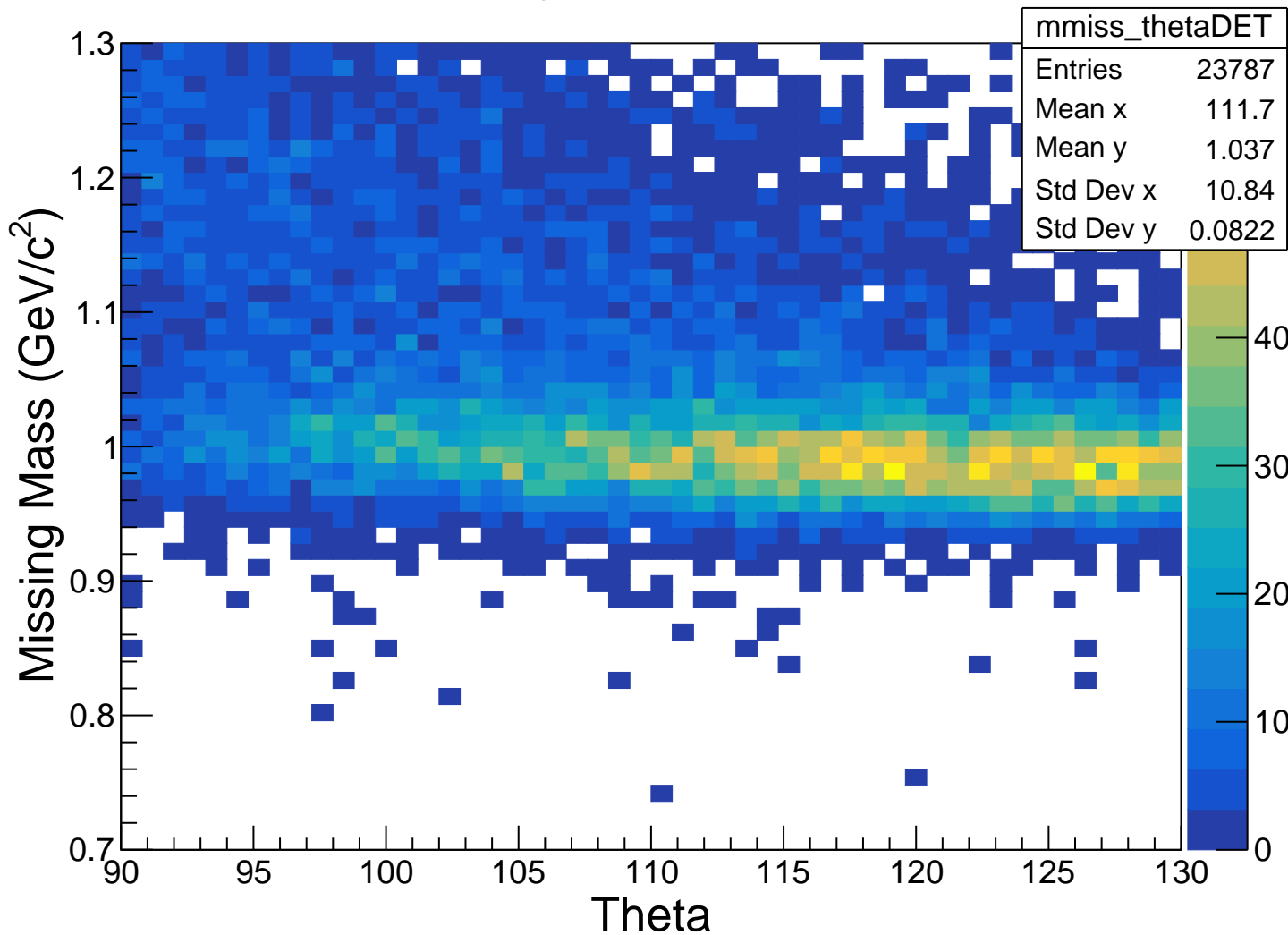
Missing Mass vs Pmiss d(e,e'p)n

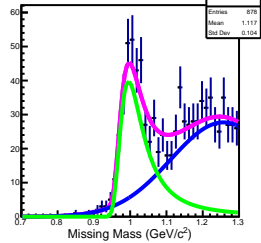
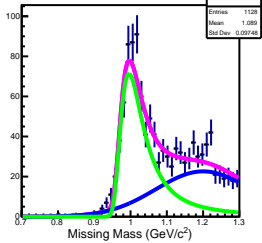
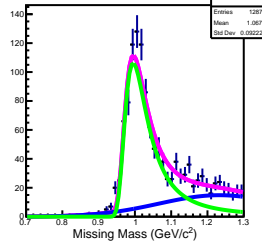
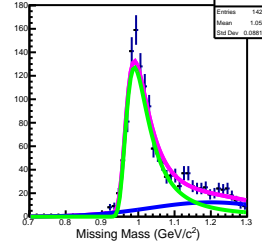
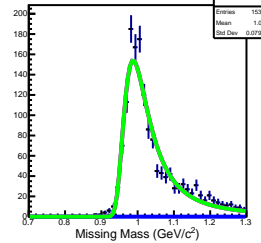
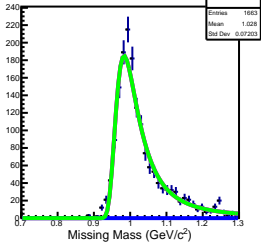
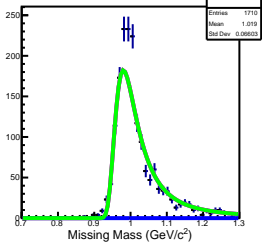
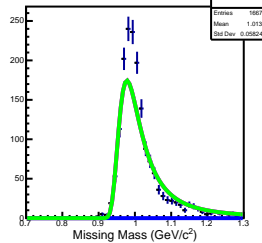
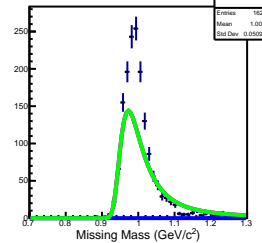
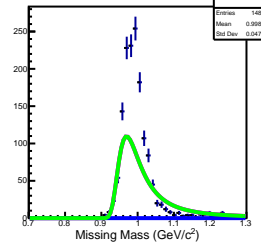


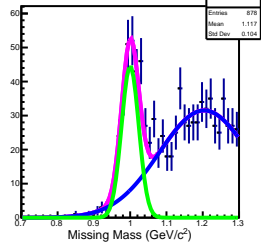
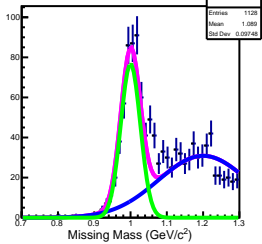
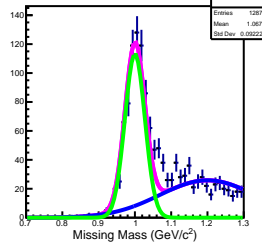
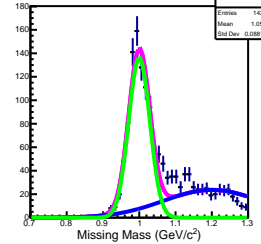
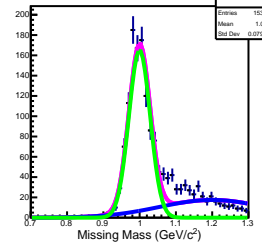
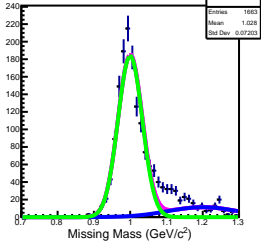
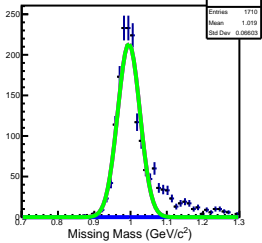
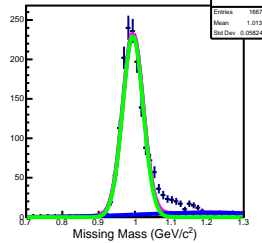
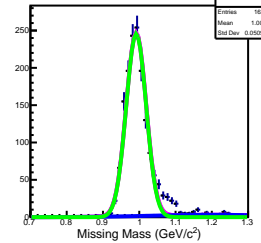
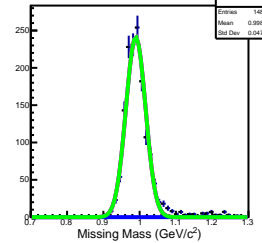


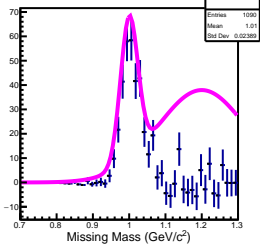
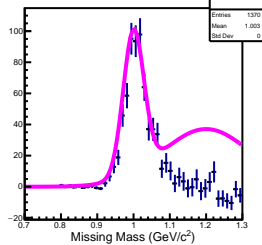
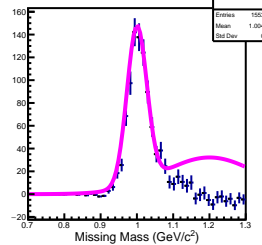
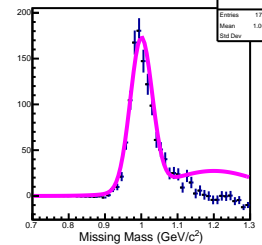
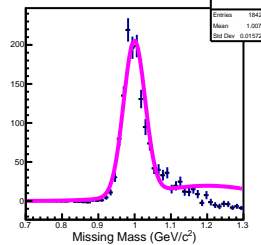
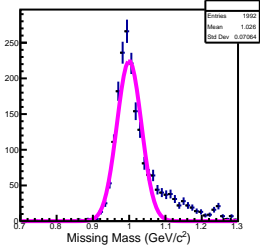
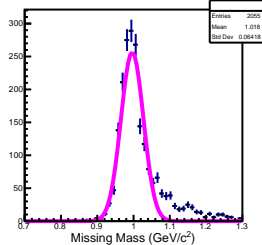
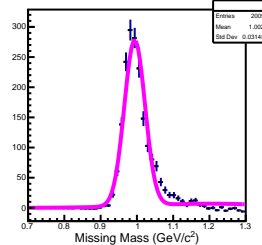
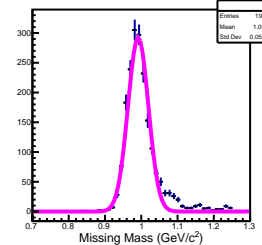
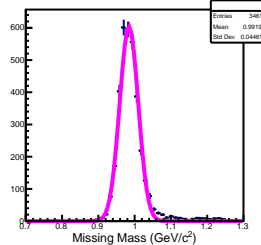
EFFICIENCY BY THETA - DETECTED

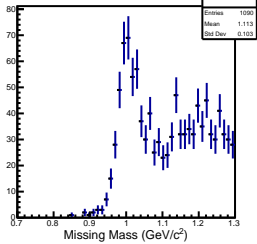
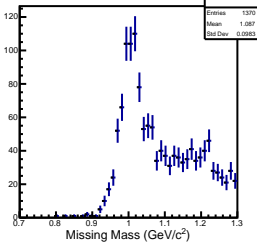
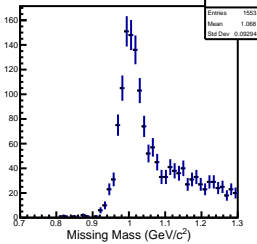
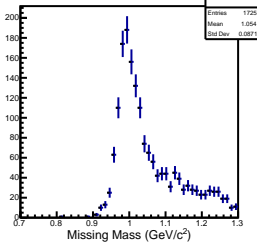
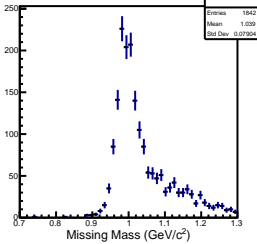
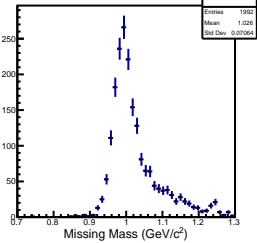
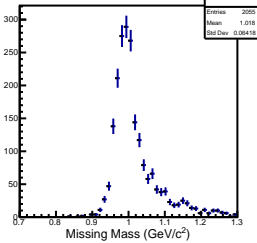
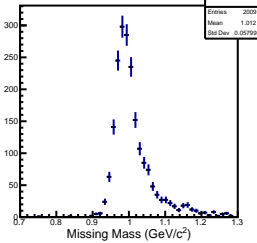
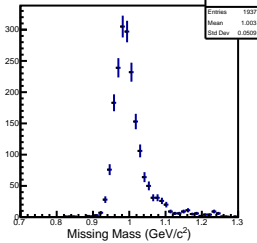
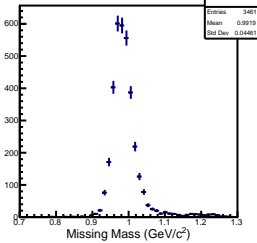
Missing Momentum vs θ



Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ 

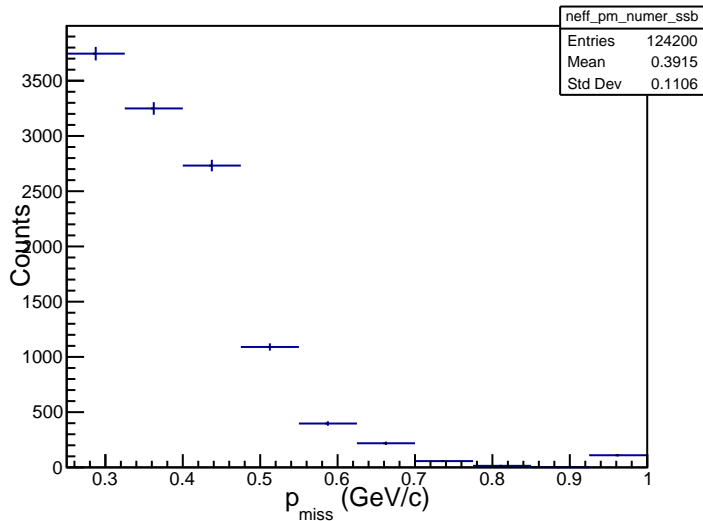
Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ 

Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ 

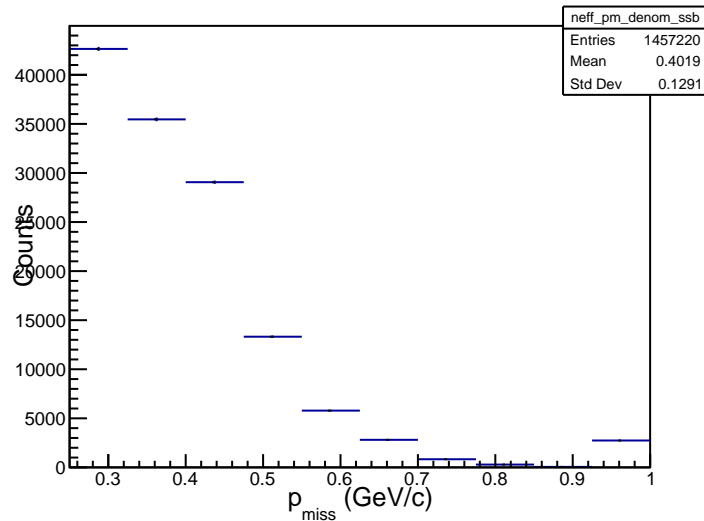
Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ Missing Momentum vs θ 

EFFICIENCY RESULTS

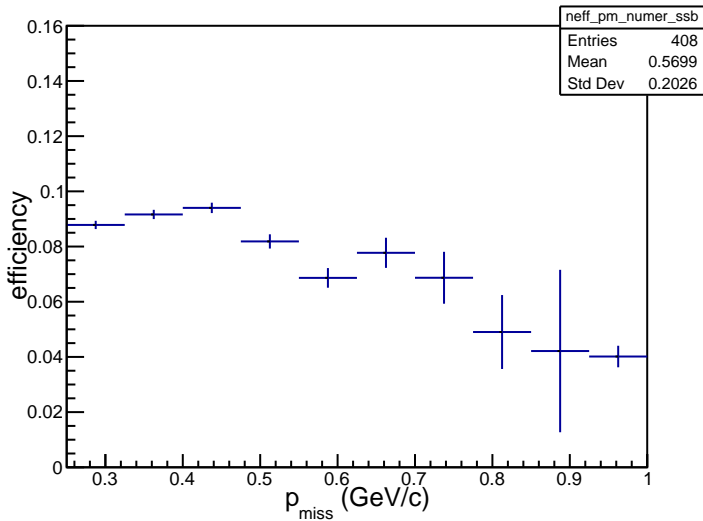
Neutrons



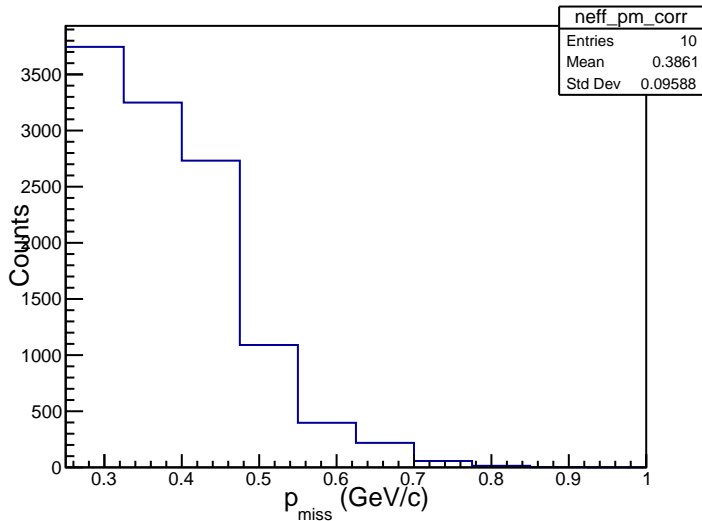
Neutron Candidates



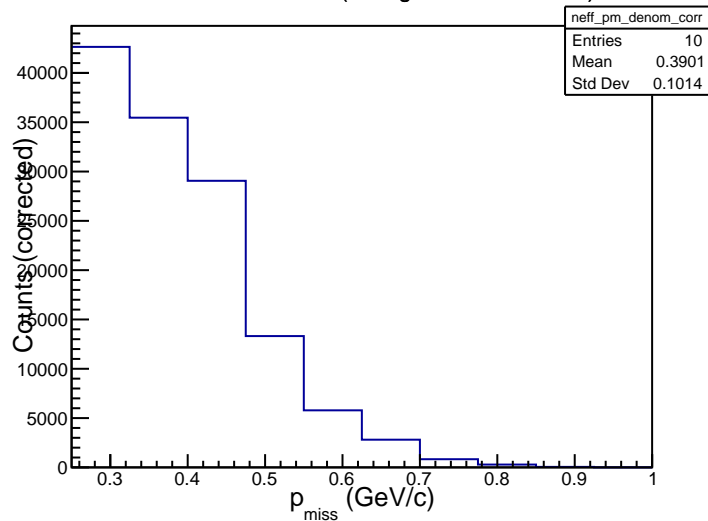
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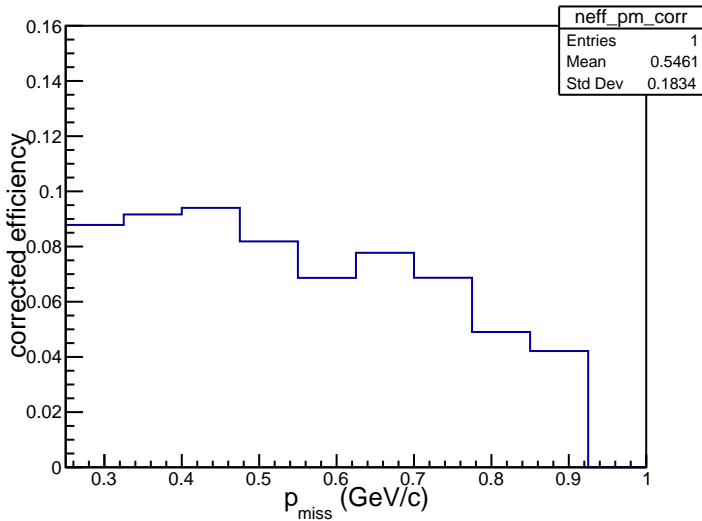
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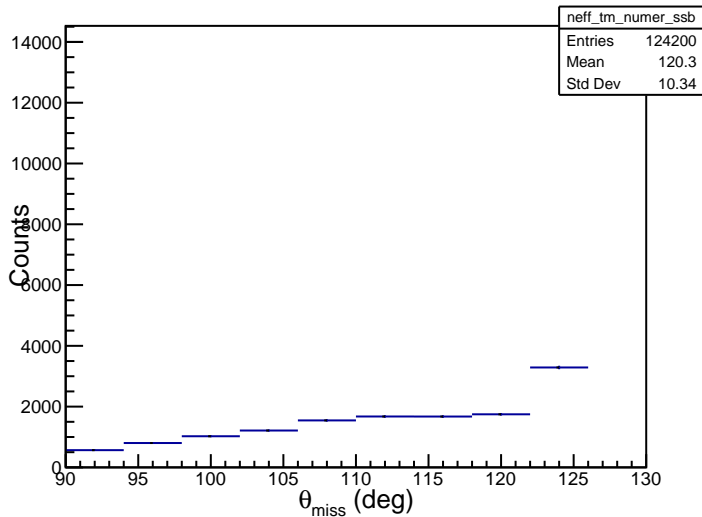
Neutron Candidates (Background Subtracted)



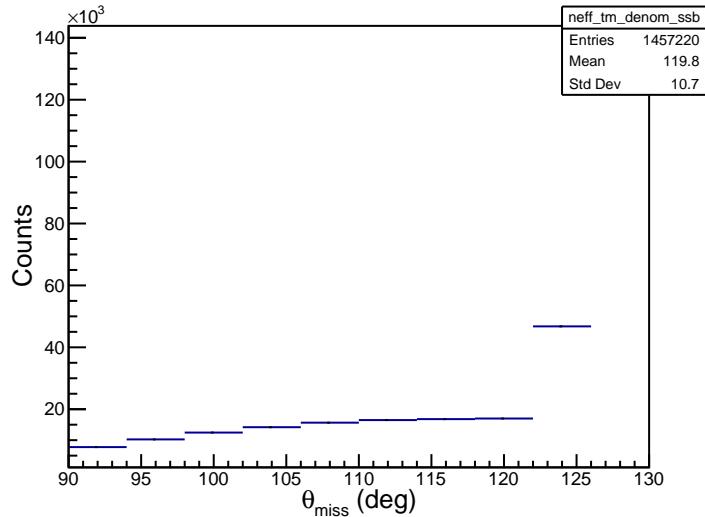
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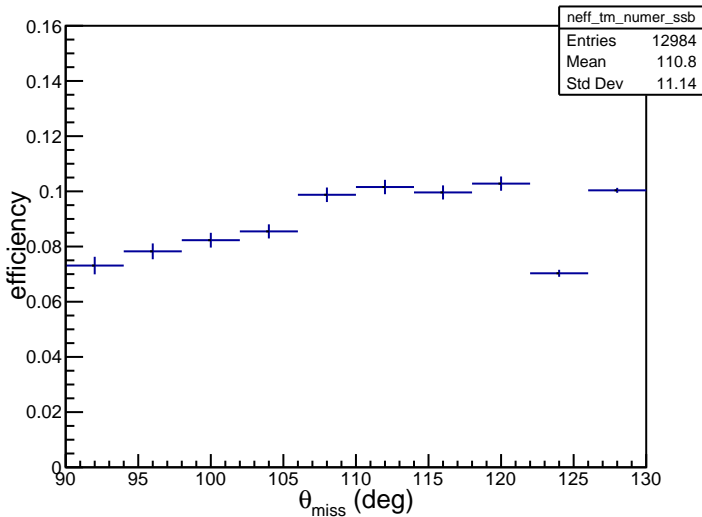
Detected Neutrons



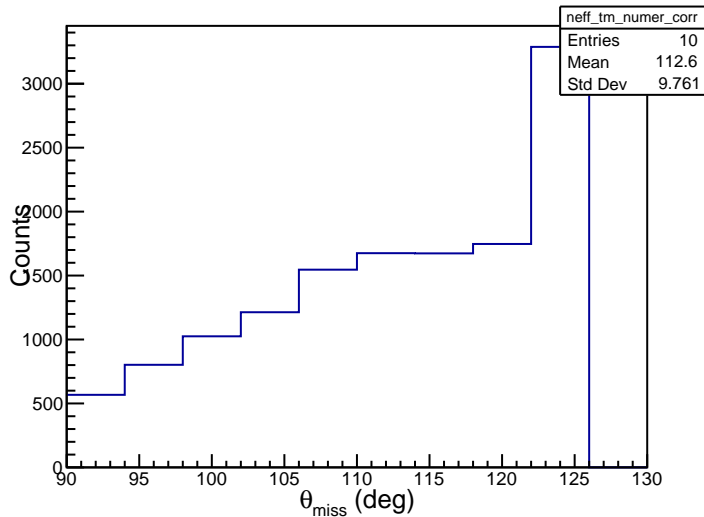
Neutron Candidates



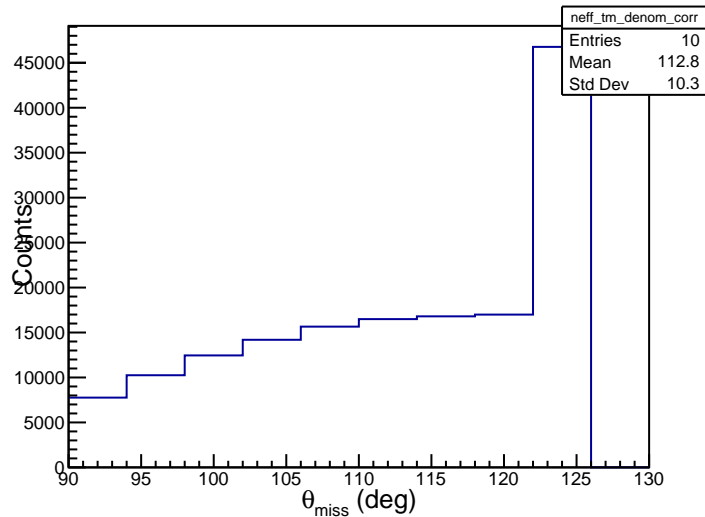
Detected Neutrons



Detected Neutrons



Neutron Candidates



Detected Neutrons

