

# 5 GeV (10%)

Gen ctau 1mm: 378(c1:291(76.98%[76.98%]),c2:6(1.59%[2.06%]),c3:2(0.53%[33.33%]),c4:0(0.00%[0.00%]))

Reco ctau 1mm: 378(c1:220(58.20%[58.20%]),c2:5(1.32%[2.27%]),c3:2(0.53%[40.00%]),c4:0(0.00%[0.00%]))

Gen ctau 10mm: 378(c1:281(74.34%[74.34%]),c2:3(0.79%[1.07%]),c3:1(0.26%[33.33%]),c4:0(0.00%[0.00%]))

Reco ctau 10mm: 378(c1:223(58.99%[58.99%]),c2:0(0.00%[0.00%]),c3:0(0.00%[0.00%]),c4:0(0.00%[0.00%]))

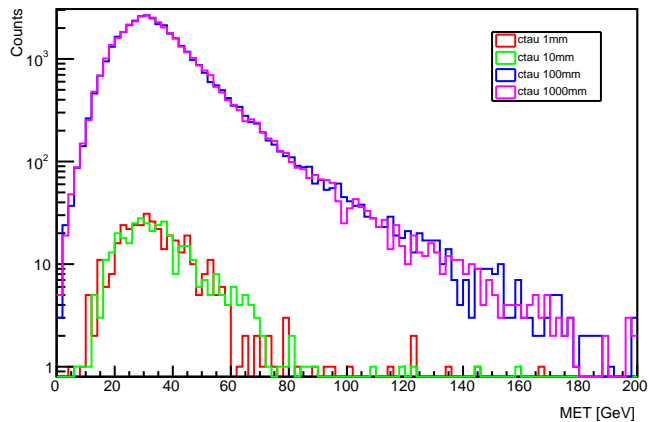
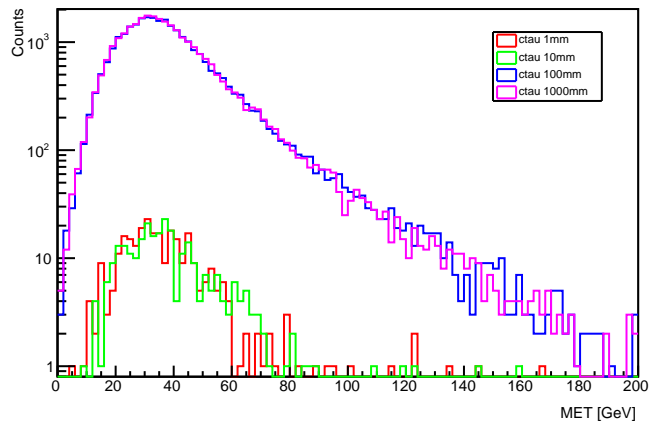
Gen ctau 100mm: 37978(c1:28583(75.26%[75.26%]),c2:276(0.73%[0.97%]),c3:170(0.45%[61.59%]),c4:40(0.11%[23.53%]))

Reco ctau 100mm: 37978(c1:21756(57.29%[57.29%]),c2:240(0.63%[1.10%]),c3:145(0.38%[60.42%]),c4:14(0.04%[9.66%]))

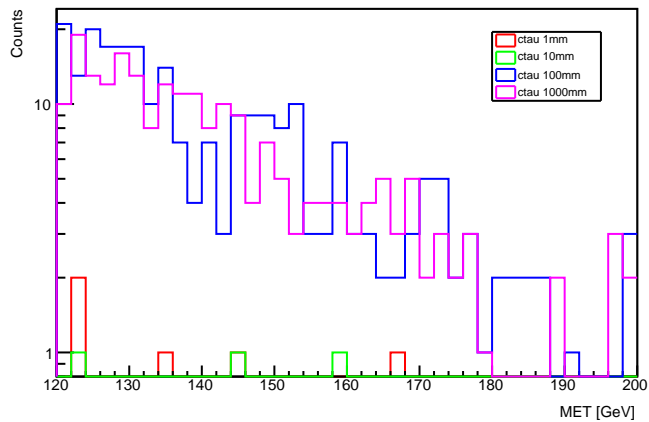
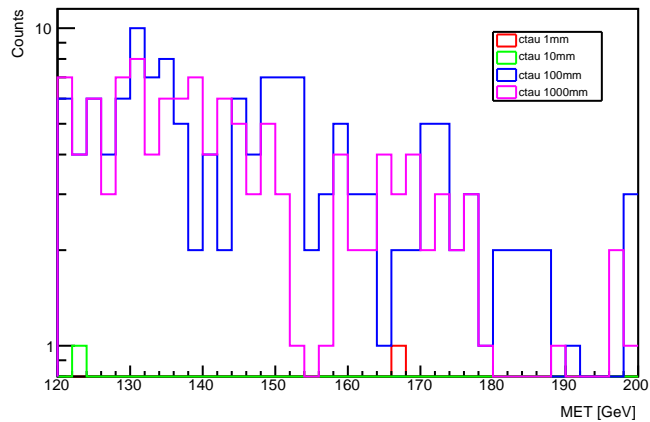
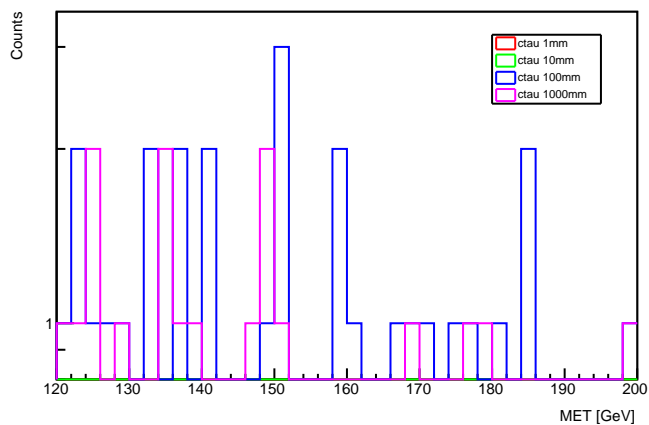
Gen ctau 1000mm: 38103(c1:28840(75.69%[75.69%]),c2:246(0.65%[0.85%]),c3:143(0.38%[58.13%]),c4:21(0.06%[14.69%]))

Reco ctau 1000mm: 38103(c1:21729(57.03%[57.03%]),c2:253(0.66%[1.16%]),c3:137(0.36%[54.15%]),c4:4(0.01%[2.92%]))

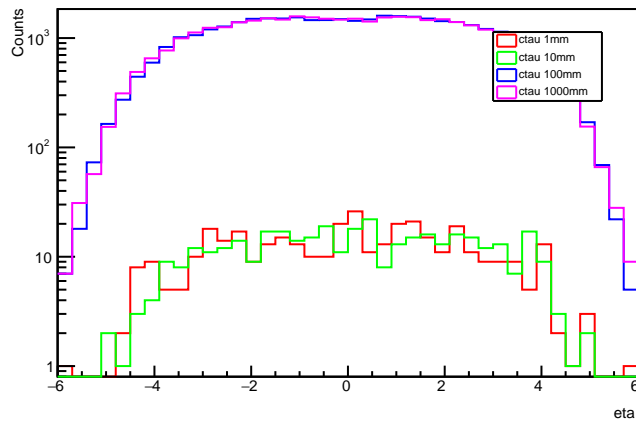
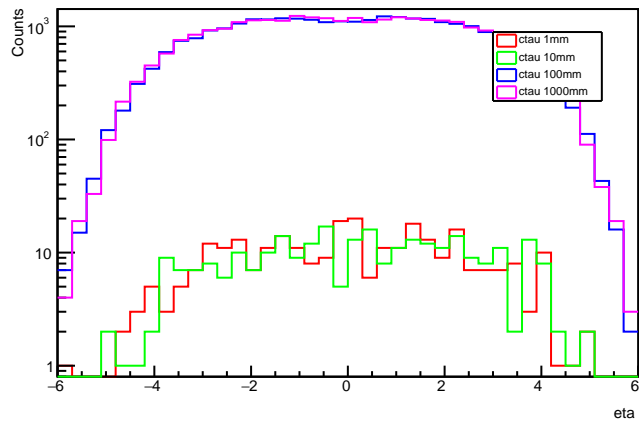
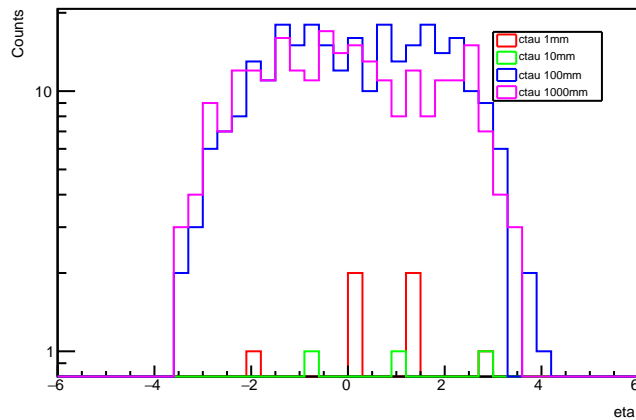
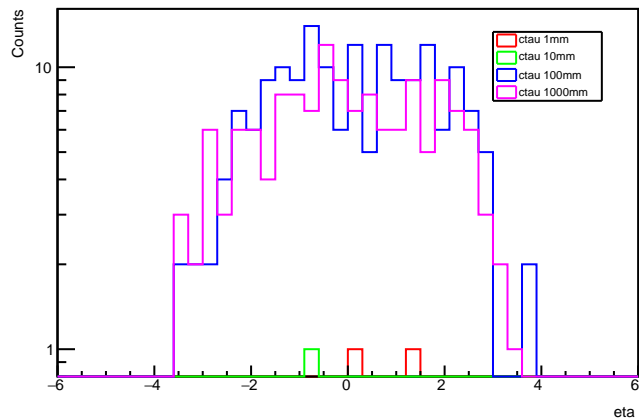
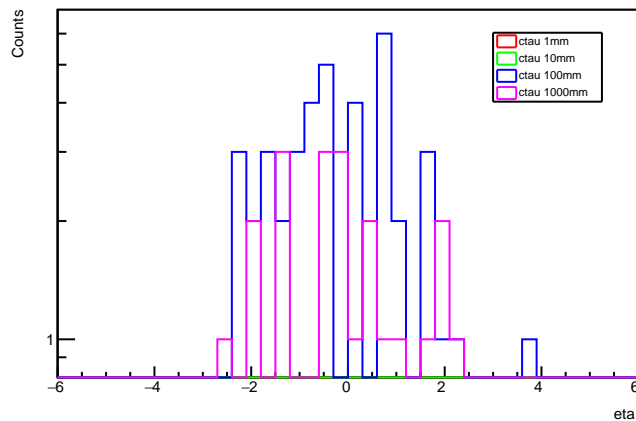
gen leading MET: no cuts

gen leading MET:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

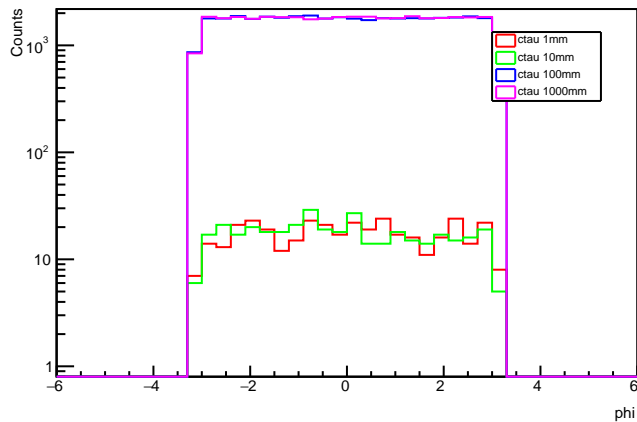
gen leading MET: MET &gt; 120 GeV

gen leading MET:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVgen leading MET: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta_a| < 2.4$ 

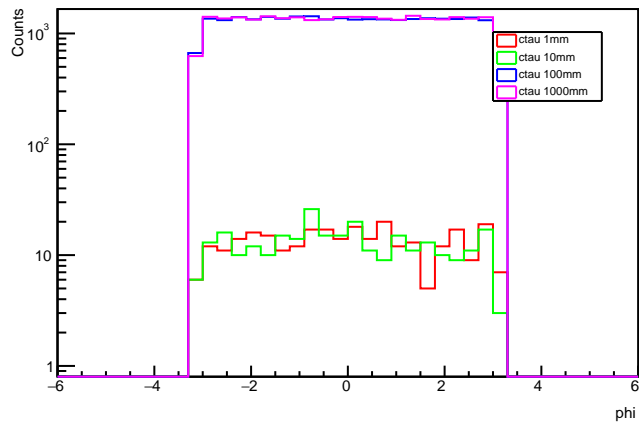
gen leading Met eta: no cuts

gen leading Met eta:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeVgen leading Met eta:  $\text{MET} > 120$  GeVgen leading Met eta:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVgen leading Met eta: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\text{eta}| < 2.4$ 

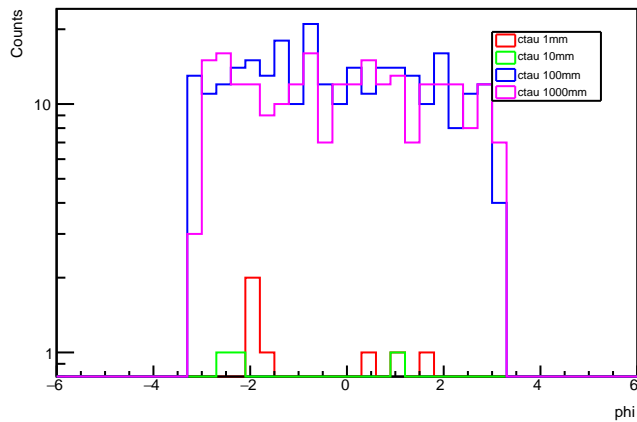
gen leading Met phi: no cuts



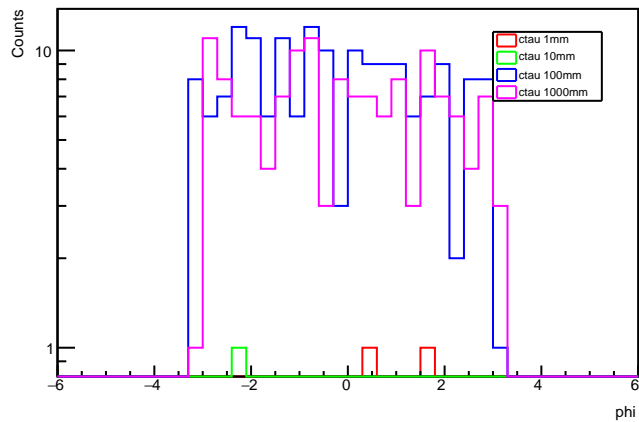
gen leading Met phi: n\_jet &gt;=1, j1pt &gt; 30 GeV



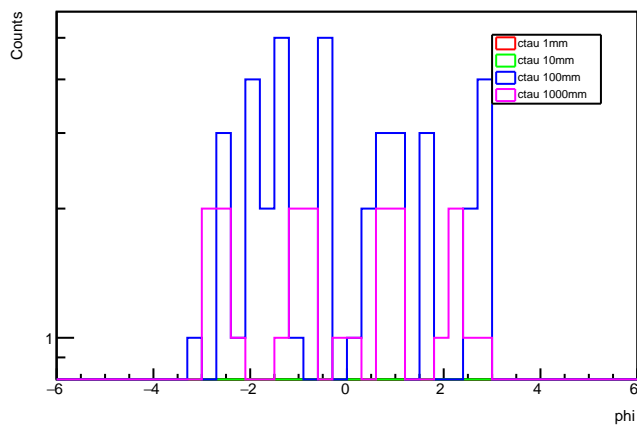
gen leading Met phi: MET &gt; 120 GeV



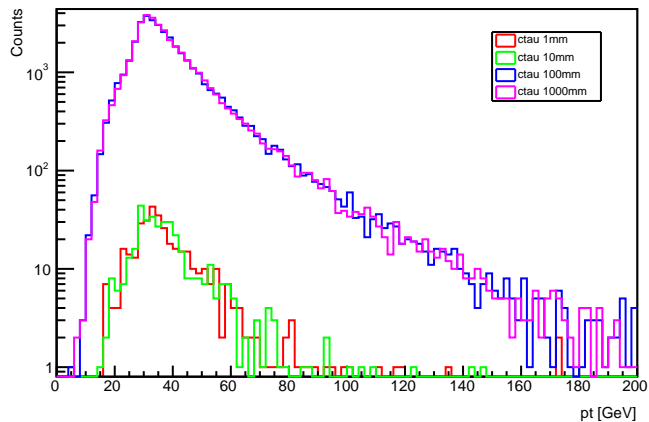
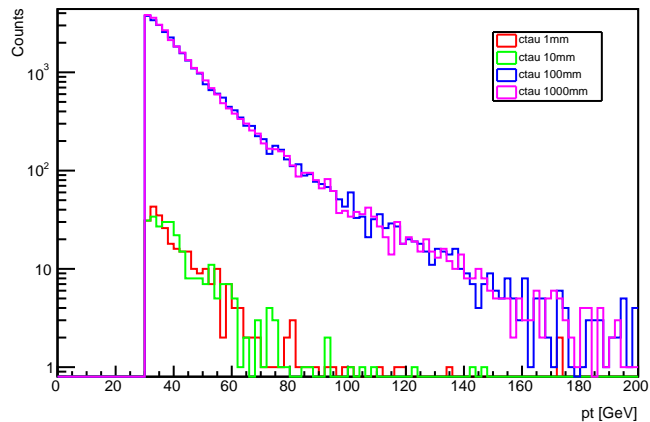
gen leading Met phi: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



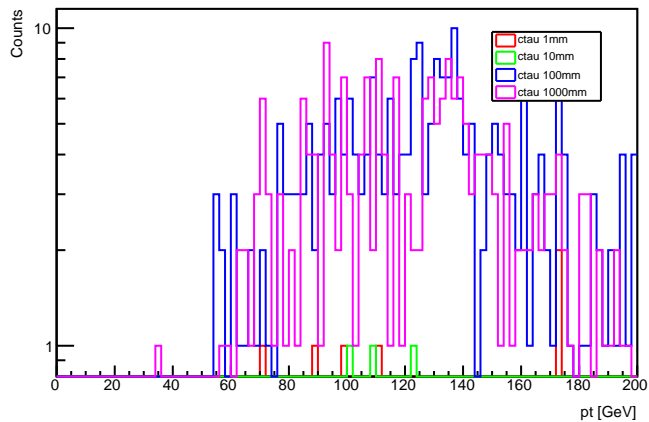
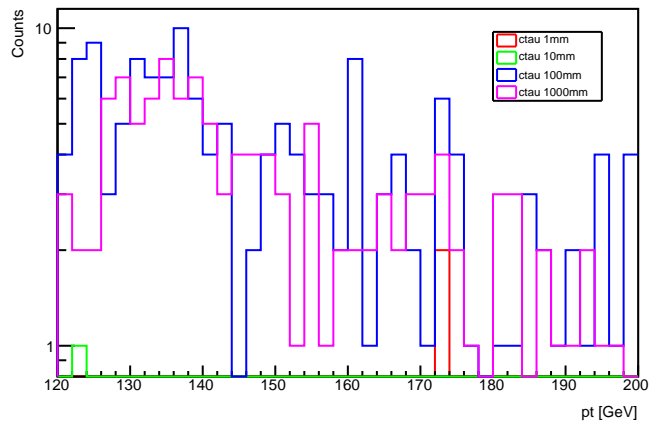
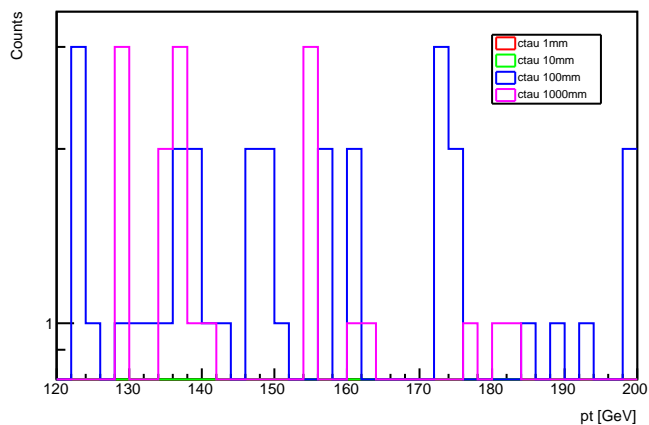
gen leading Met phi: at least 2 mu w/ vx &lt; 740 cm, |vz| &lt; 960 cm &amp; |eta| &lt; 2.4



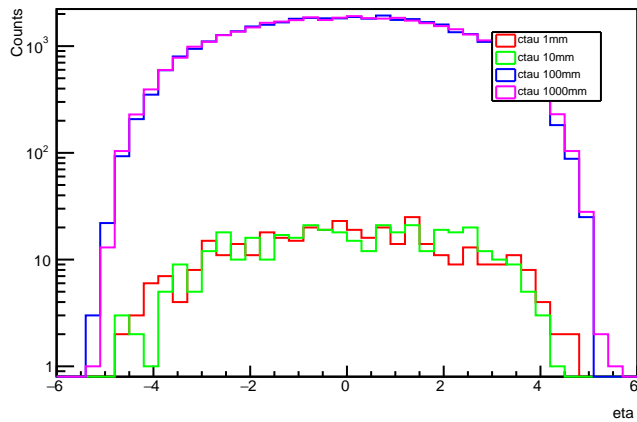
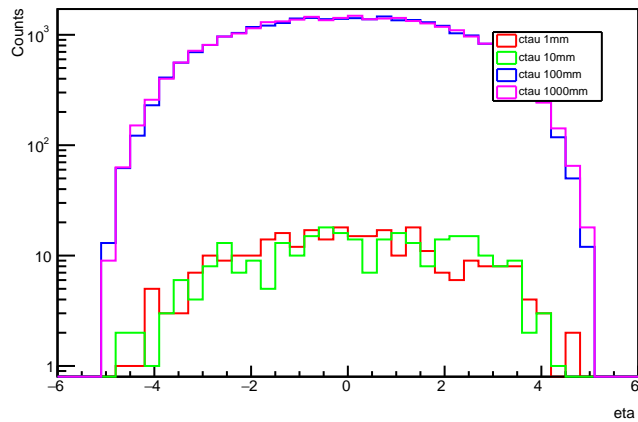
gen leading Jet pt: no cuts

gen leading Jet pt:  $n_{\text{jet}} \geq 1$ ,  $j1pt > 30$  GeV

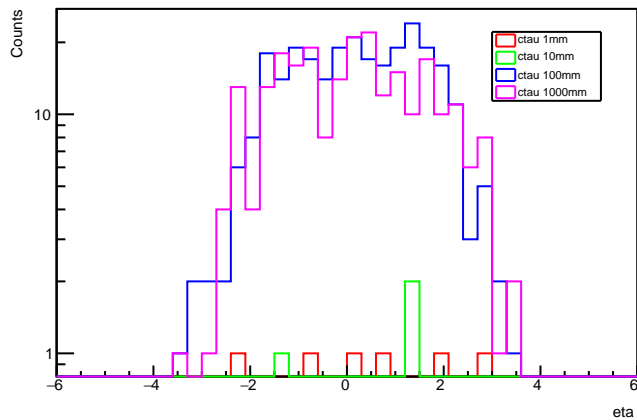
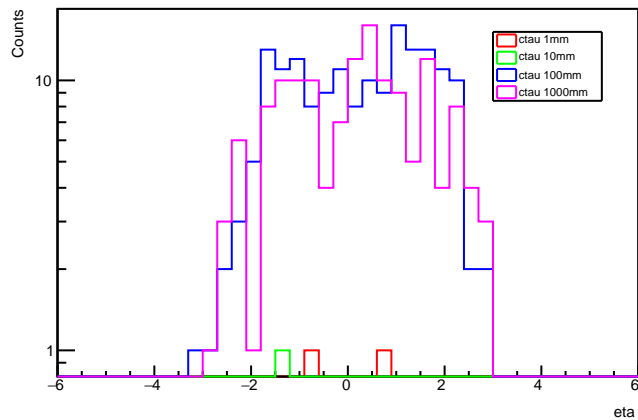
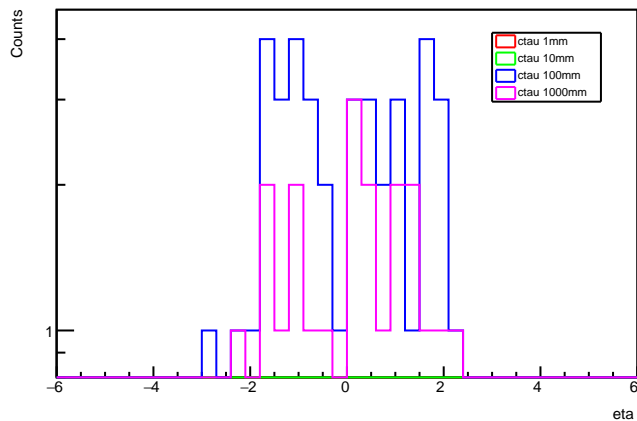
gen leading Jet pt: MET &gt; 120 GeV

gen leading Jet pt:  $j1pt > 120$ , at most 2 jets w/ pt > 30 GeVgen leading Jet pt: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta_a| < 2.4$ 

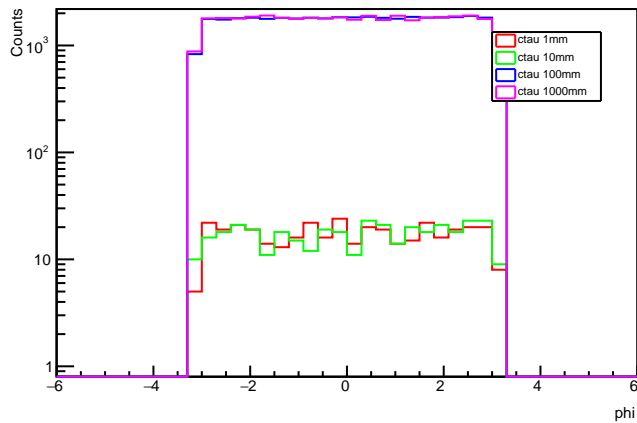
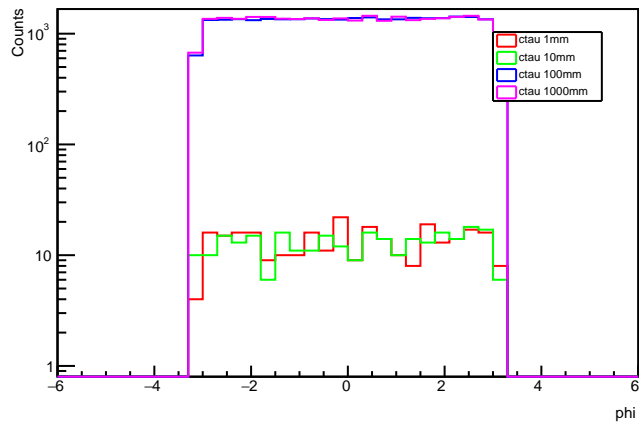
gen leading Jet eta: no cuts

gen leading Jet eta:  $n_{\text{jet}} \geq 1$ ,  $j1pt > 30$  GeV

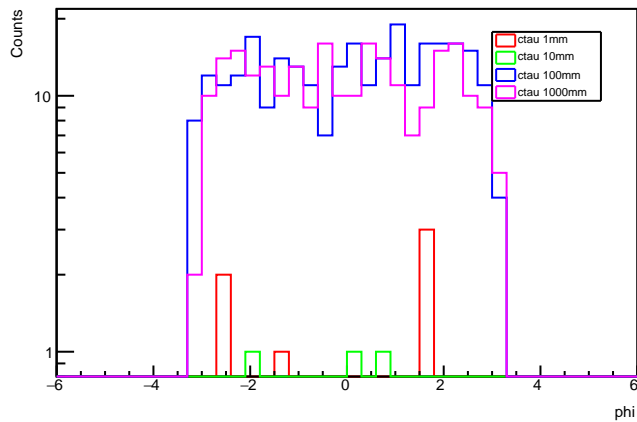
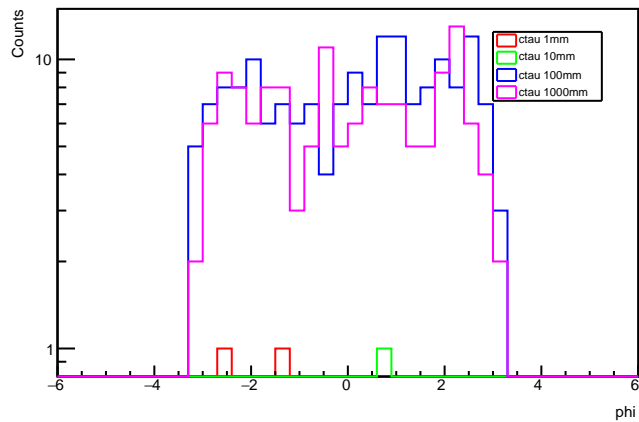
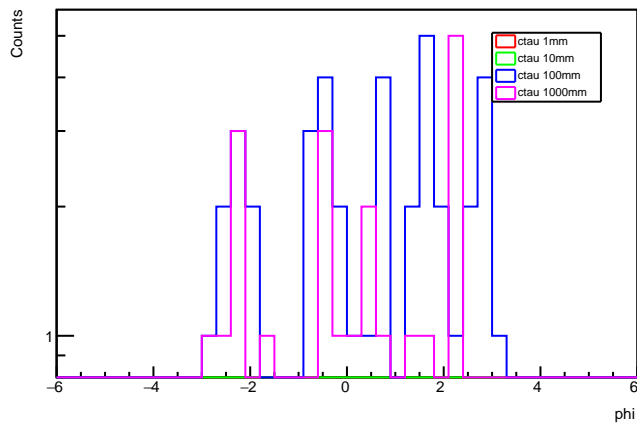
gen leading Jet eta: MET &gt; 120 GeV

gen leading Jet eta:  $j1pt > 120$ , at most 2 jets w/  $pt > 30$  GeVgen leading Jet eta: at least 2 mu w/  $vxy < 740$  cm,  $|vz| < 960$  cm &  $|\eta| < 2.4$ 

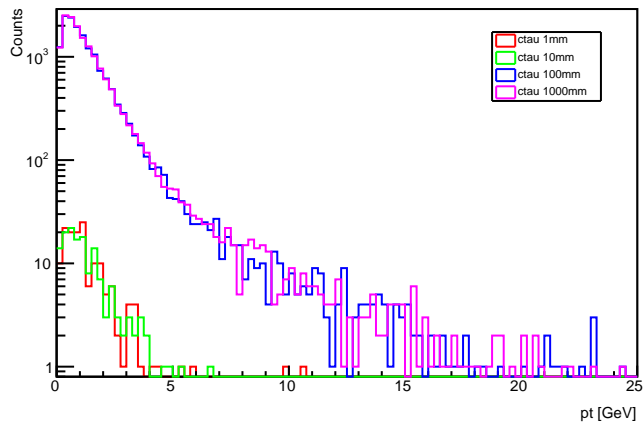
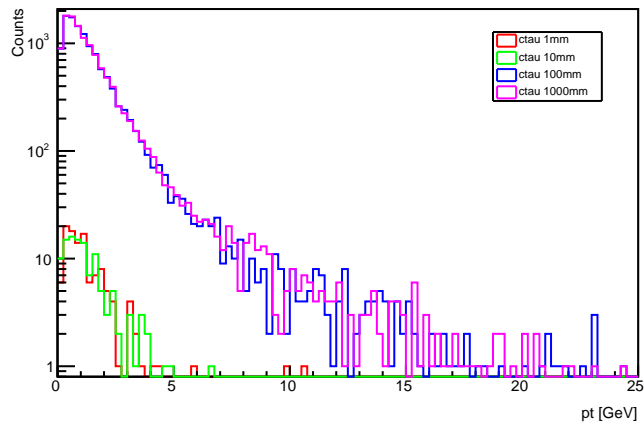
gen leading Jet phi: no cuts

gen leading Jet phi:  $n_{\text{jet}} \geq 1$ ,  $j1pt > 30$  GeV

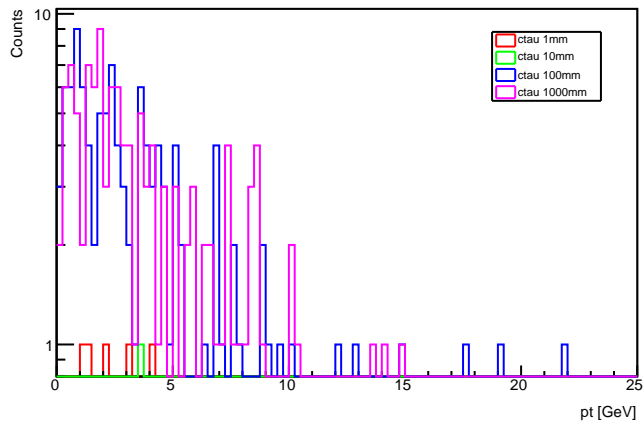
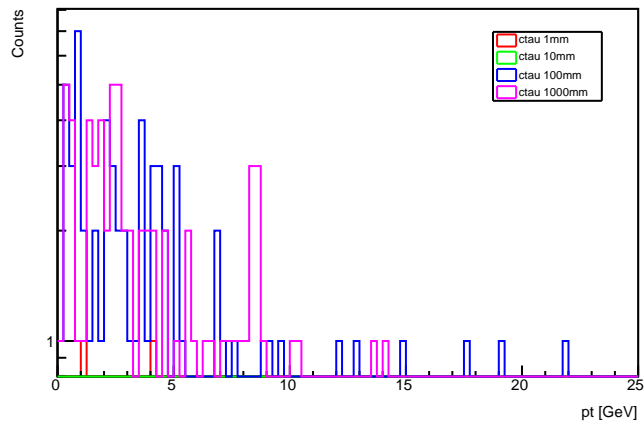
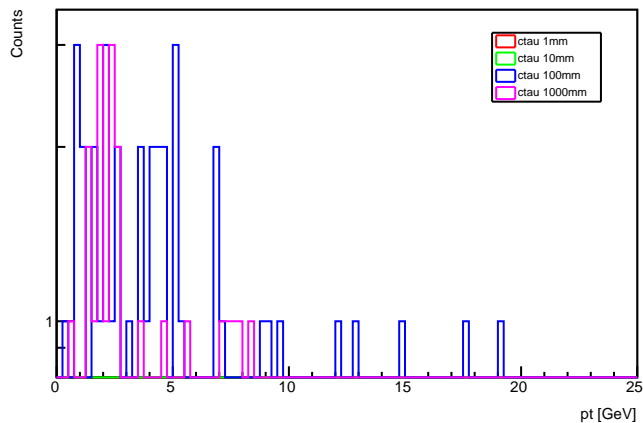
gen leading Jet phi: MET &gt; 120 GeV

gen leading Jet phi:  $j1pt > 120$ , at most 2 jets w/  $p_T > 30$  GeVgen leading Jet phi: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 

gen leading Mu pt: no cuts

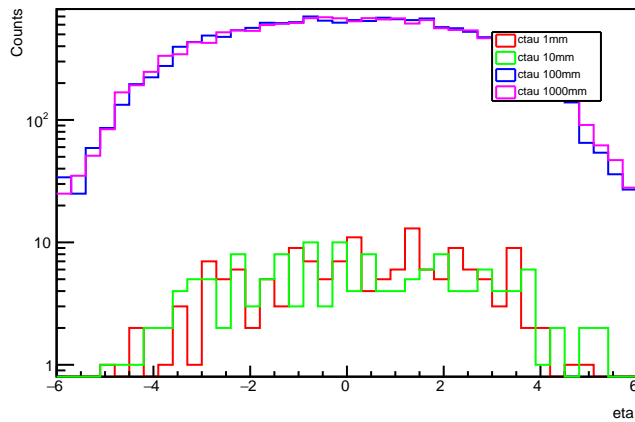
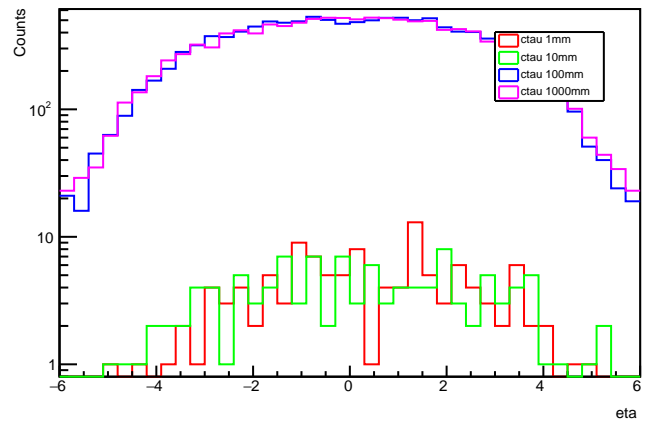
gen leading Mu pt:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

gen leading Mu pt: MET &gt; 120 GeV

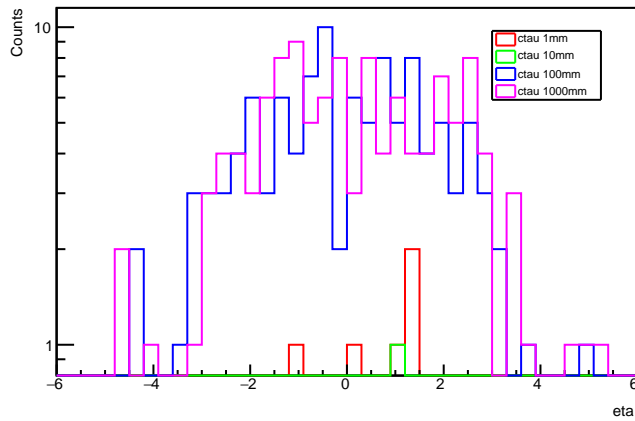
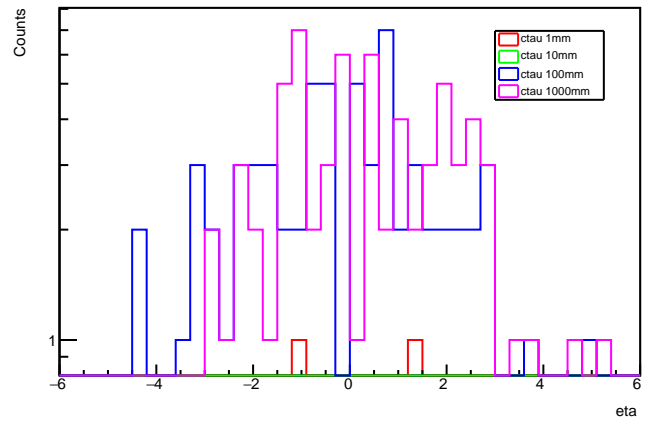
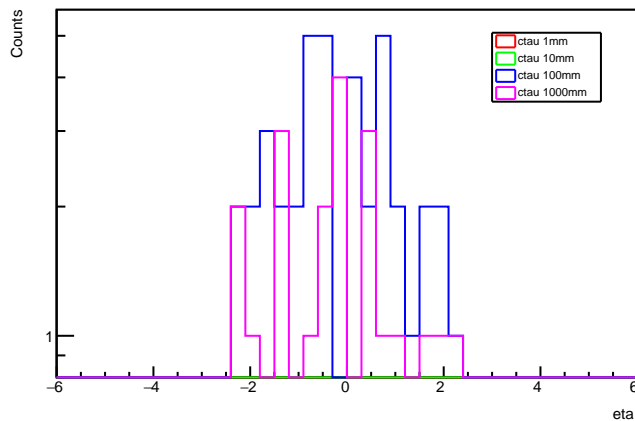
gen leading Mu pt:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_{\text{T}} > 30$  GeVgen leading Mu pt: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\text{eta}| < 2.4$ 



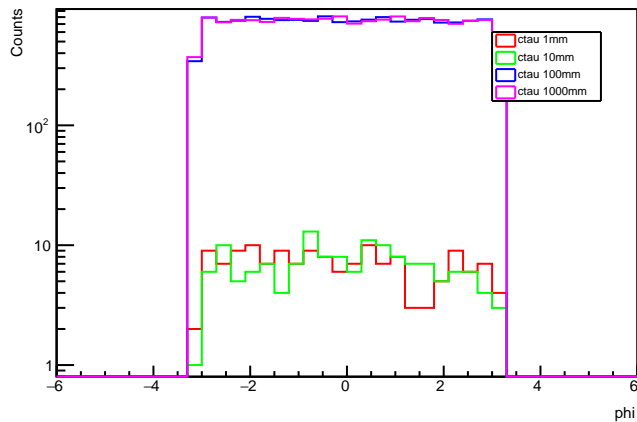
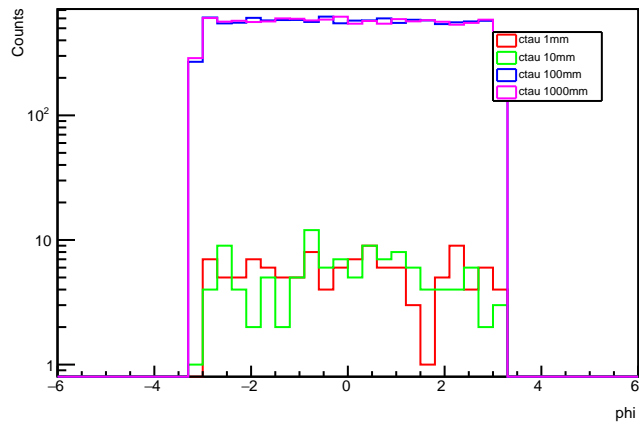
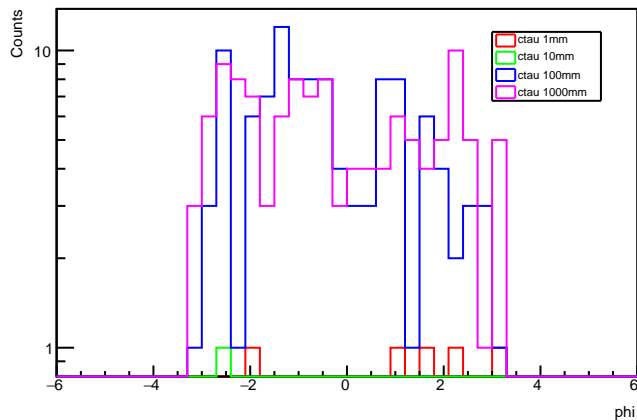
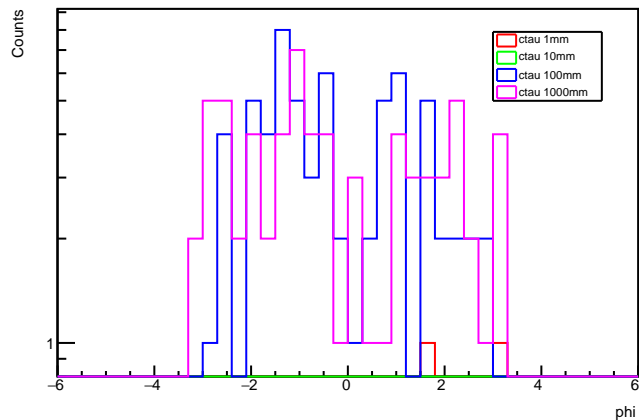
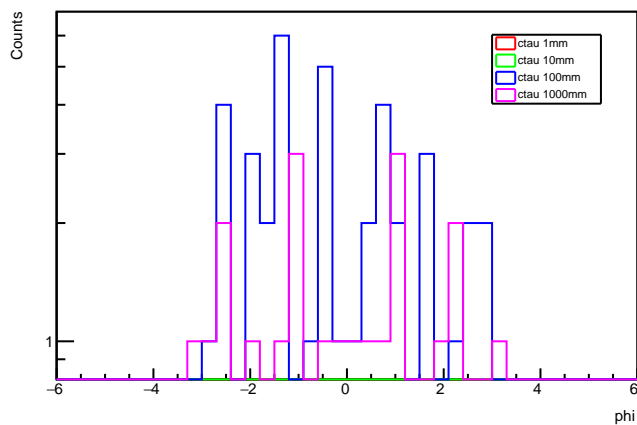
gen leading Mu eta: no cuts

gen leading Mu eta:  $n_{\text{jet}} \geq 1, j1pt > 30$  GeV

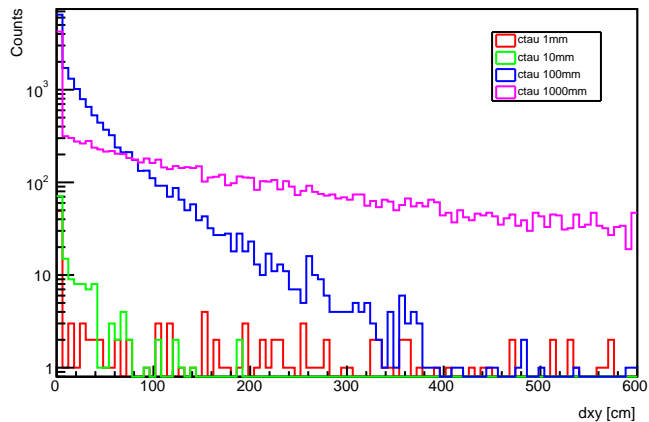
gen leading Mu eta: MET &gt; 120 GeV

gen leading Mu eta:  $j1pt > 120$ , at most 2 jets w/  $p_T > 30$  GeVgen leading Mu eta: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 

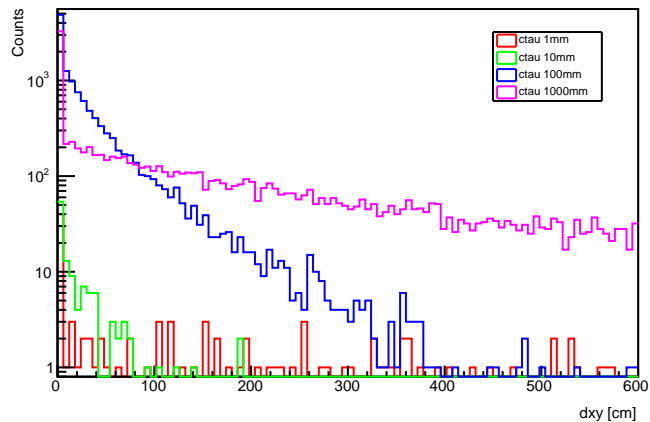
gen leading Mu phi: no cuts

gen leading Mu phi:  $n_{\text{jet}} \geq 1, j_{1\text{pt}} > 30 \text{ GeV}$ gen leading Mu phi:  $\text{MET} > 120 \text{ GeV}$ gen leading Mu phi:  $j_{1\text{pt}} > 120, \text{ at most 2 jets w/ } p_t > 30 \text{ GeV}$ gen leading Mu phi: at least 2 mu w/  $v_{xy} < 740 \text{ cm}, |v_z| < 960 \text{ cm}$  &  $|\eta_a| < 2.4$ 

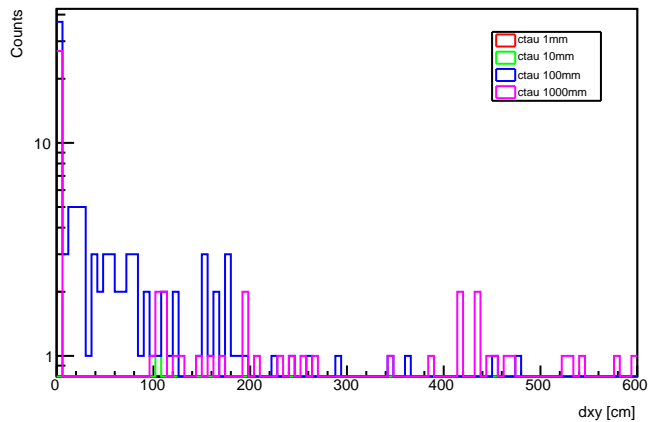
gen leading Mu vxy: no cuts



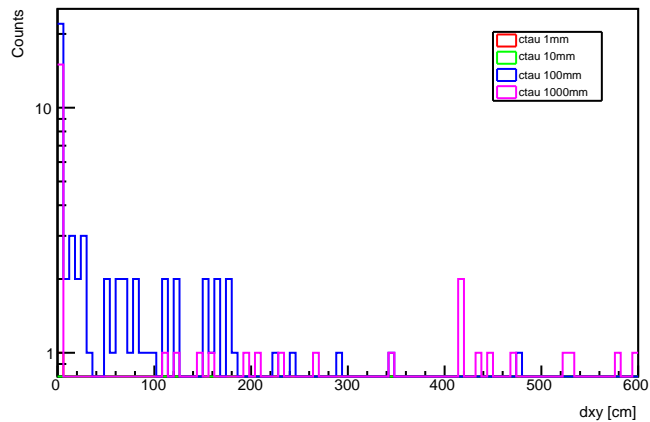
gen leading Mu vxy: n\_jet &gt;=1, j1pt &gt; 30 GeV



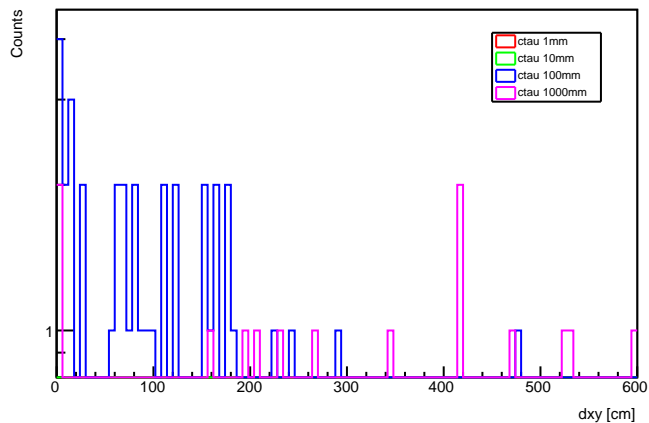
gen leading Mu vxy: MET &gt; 120 GeV



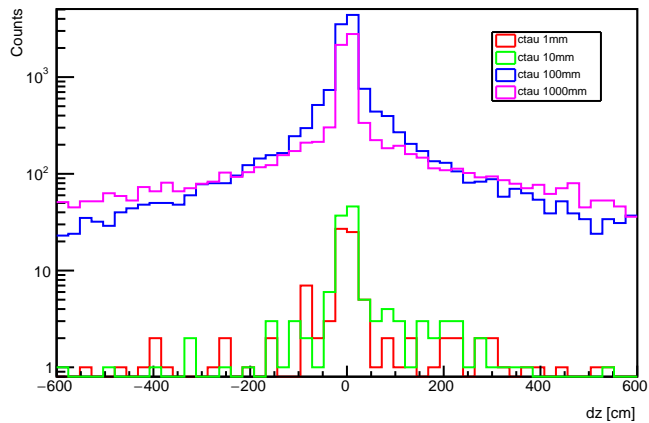
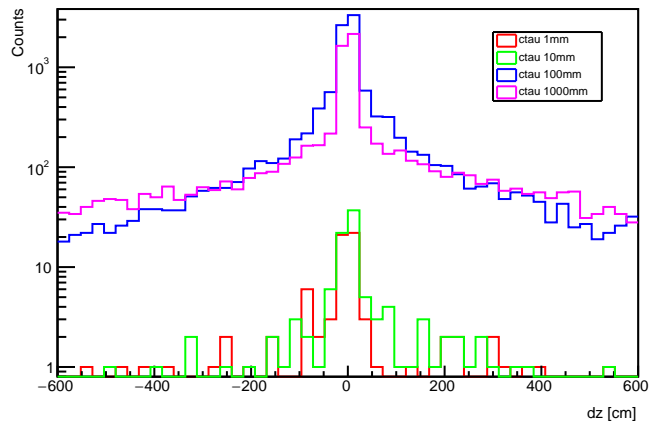
gen leading Mu vxy: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



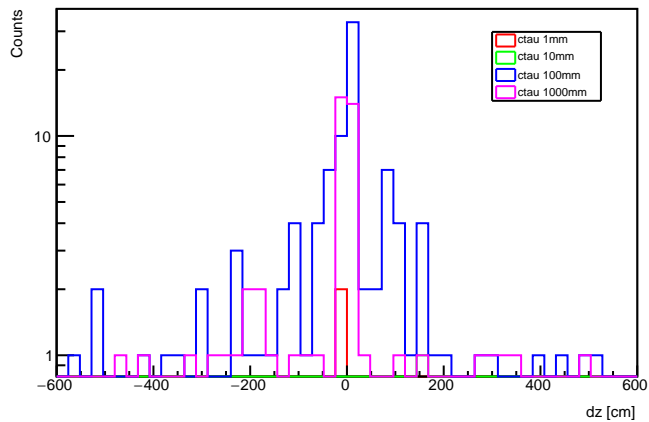
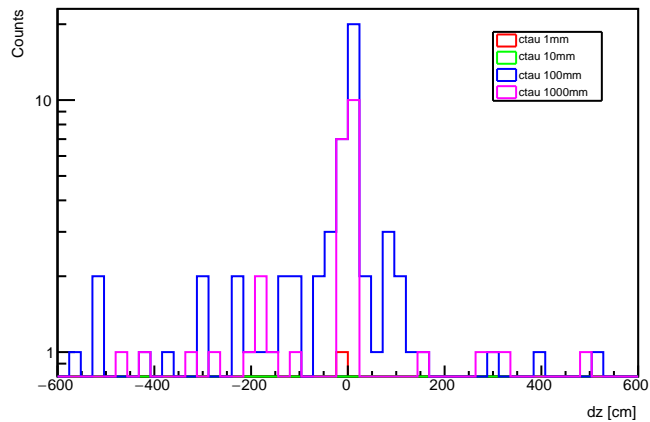
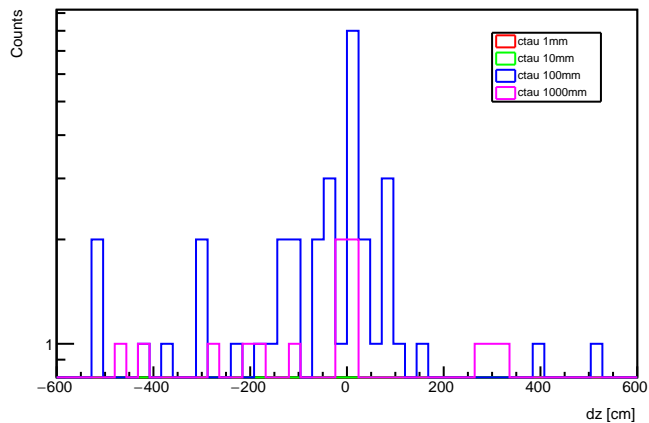
gen leading Mu vxy: at least 2 mu w/ vxy &lt; 740 cm, |vz| &lt; 960 cm &amp; |eta| &lt; 2.4



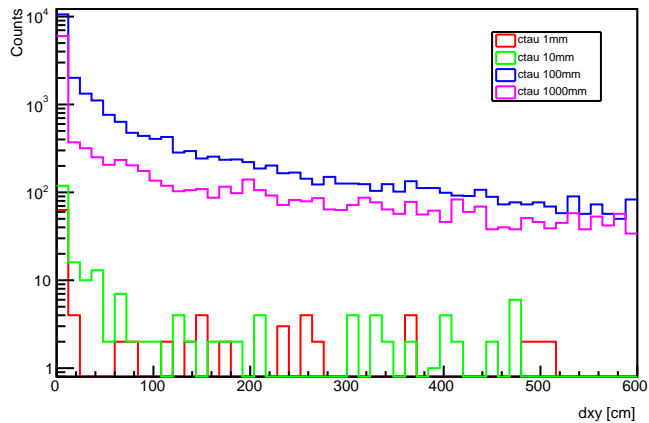
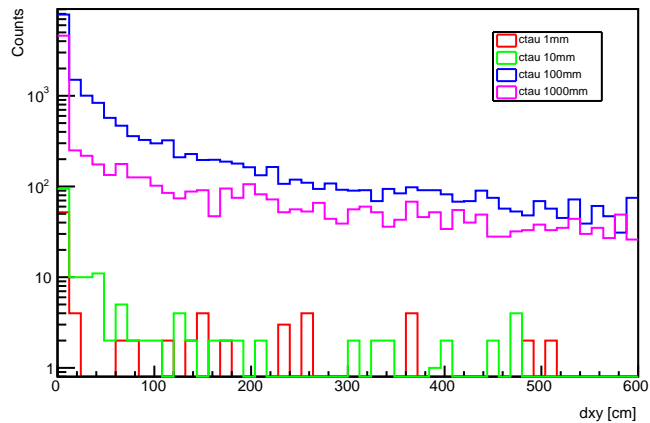
gen leading Mu vz: no cuts

gen leading Mu vz:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

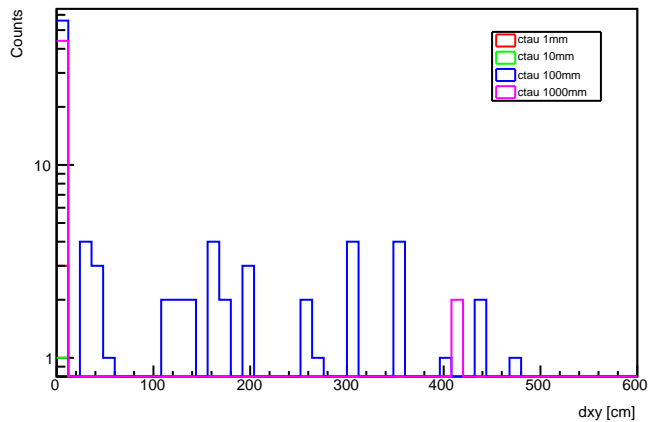
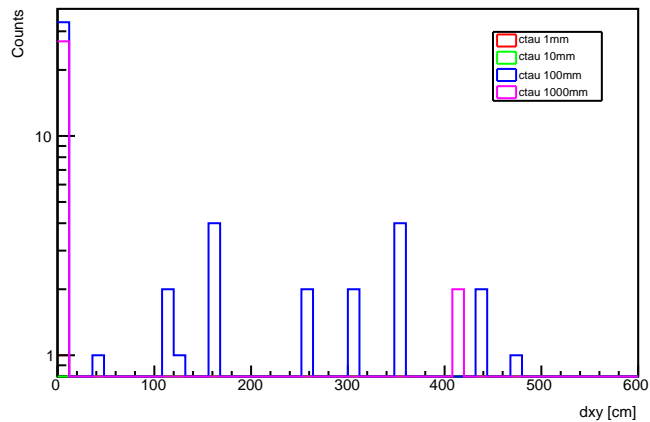
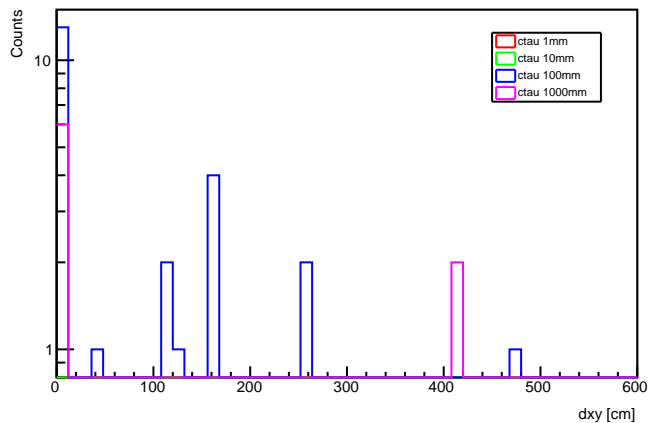
gen leading Mu vz: MET &gt; 120 GeV

gen leading Mu vz:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVgen leading Mu vz: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta_{\text{jet}}| < 2.4$ 

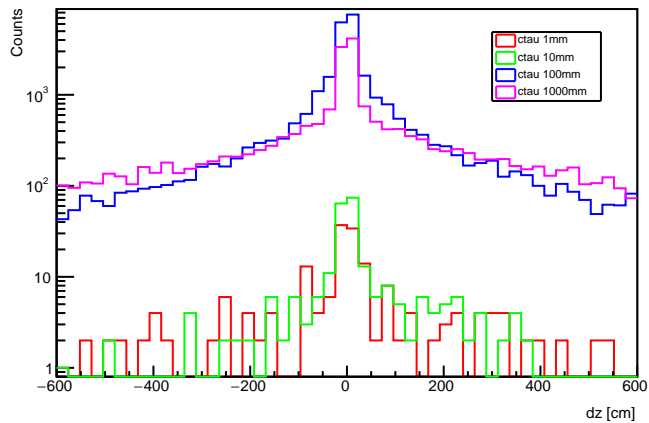
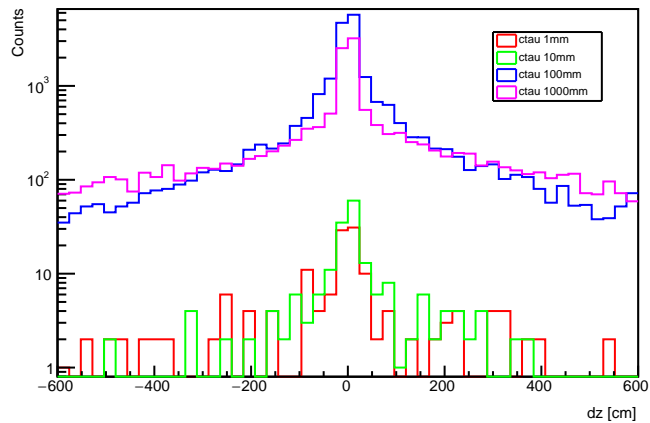
gen all Mu vxy: no cuts

gen all Mu vxy:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

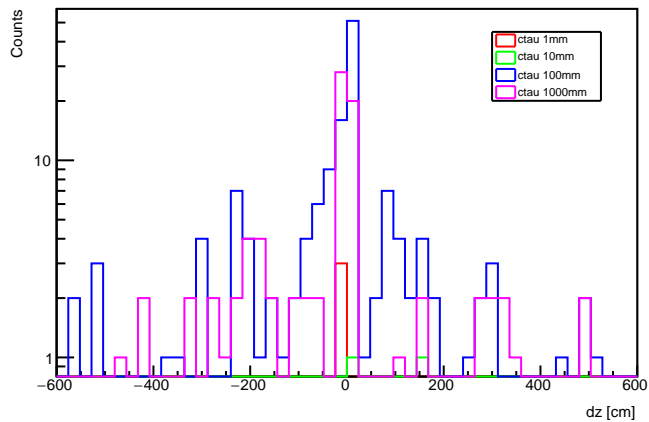
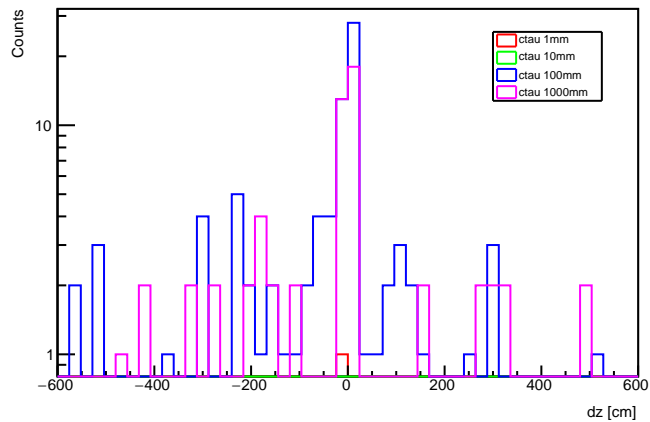
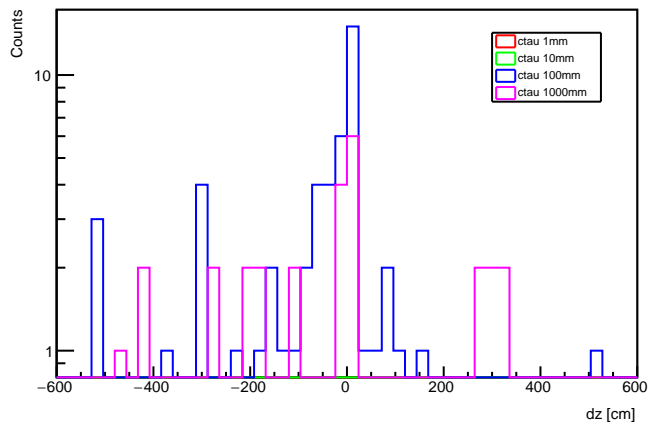
gen all Mu vxy: MET &gt; 120 GeV

gen all Mu vxy:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVgen all Mu vxy: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 

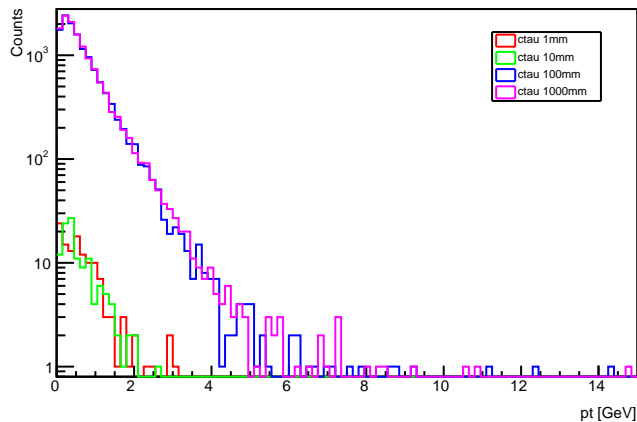
gen all Mu vz: no cuts

gen all Mu vz:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

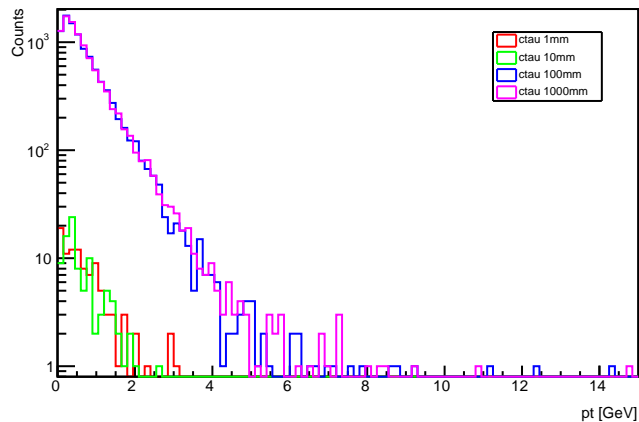
gen all Mu vz: MET &gt; 120 GeV

gen all Mu vz:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVgen all Mu vz: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta_{\text{jet}}| < 2.4$ 

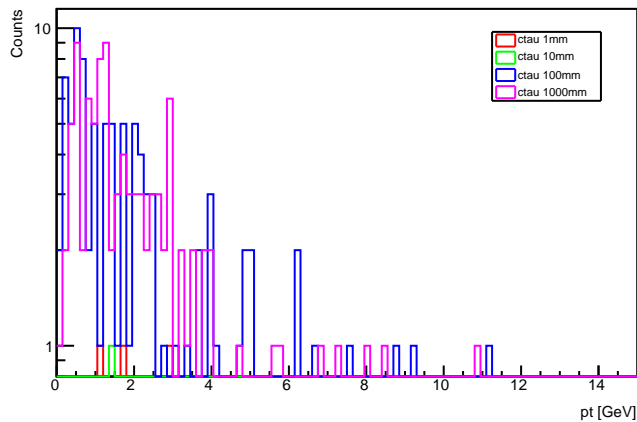
gen subleading Mu pt: no cuts



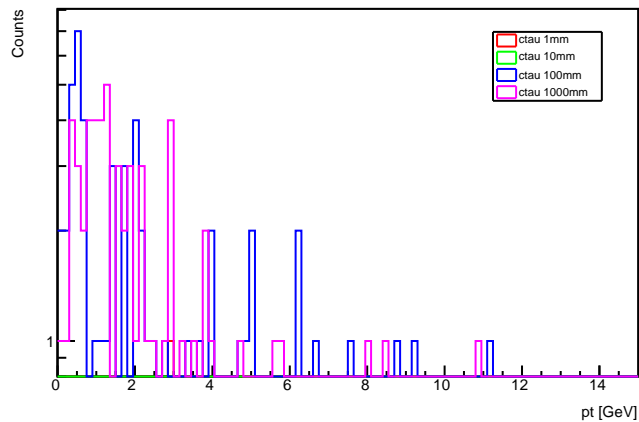
gen subleading Mu pt: n\_jet &gt;=1, j1pt &gt; 30 GeV



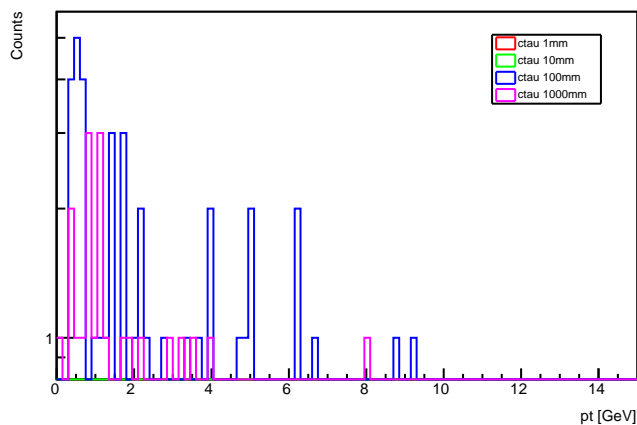
gen subleading Mu pt: MET &gt; 120 GeV



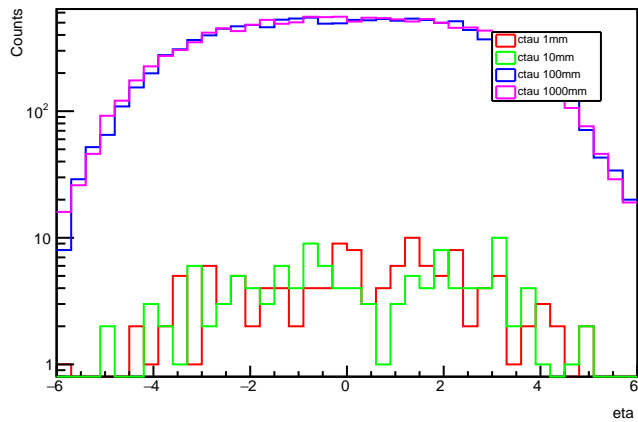
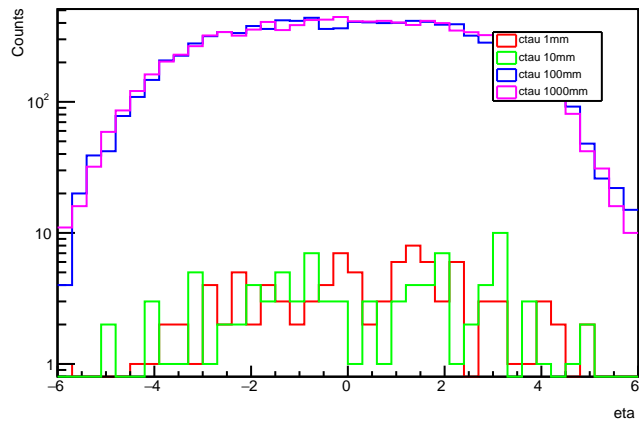
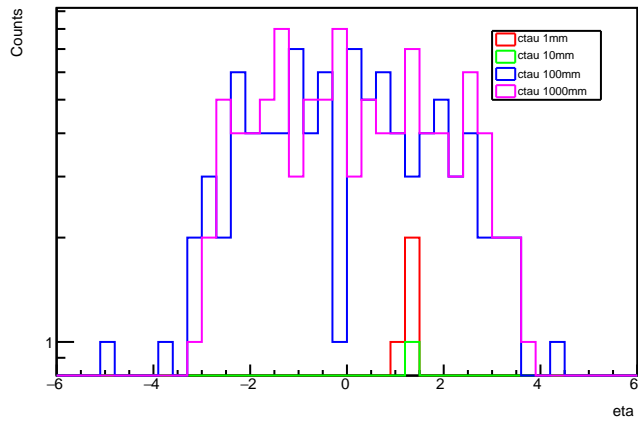
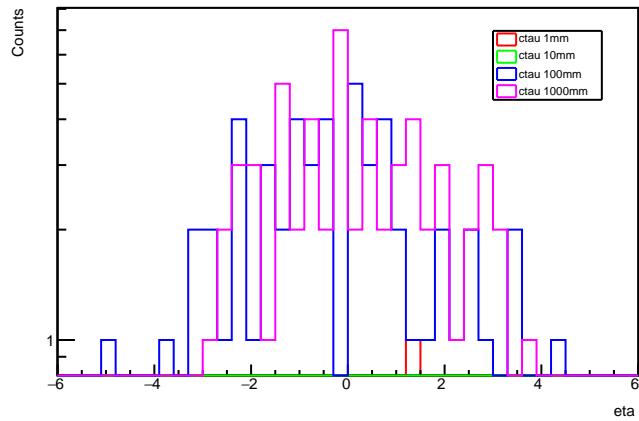
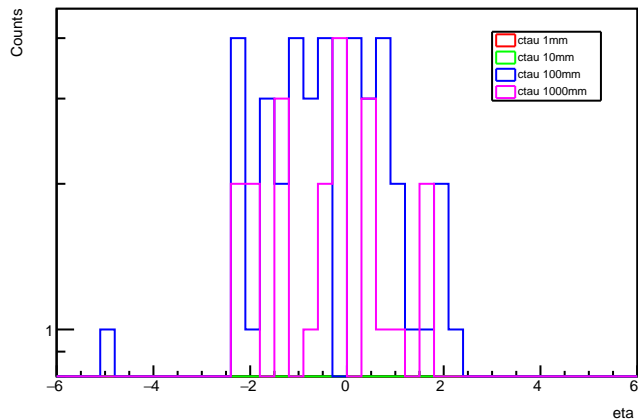
gen subleading Mu pt: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



gen subleading Mu pt: at least 2 mu w/ vx &lt; 740 cm, |vz| &lt; 960 cm &amp; |eta| &lt; 2.4

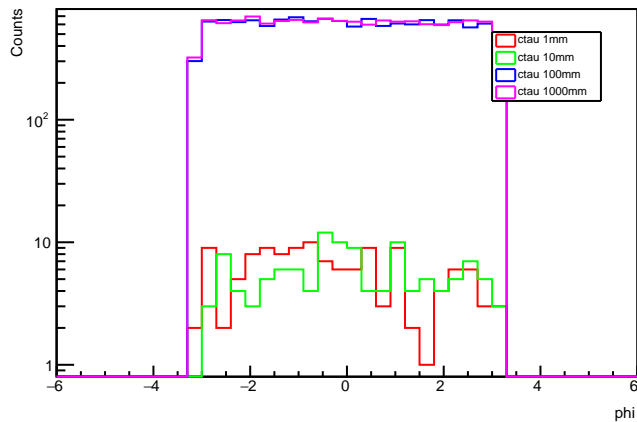
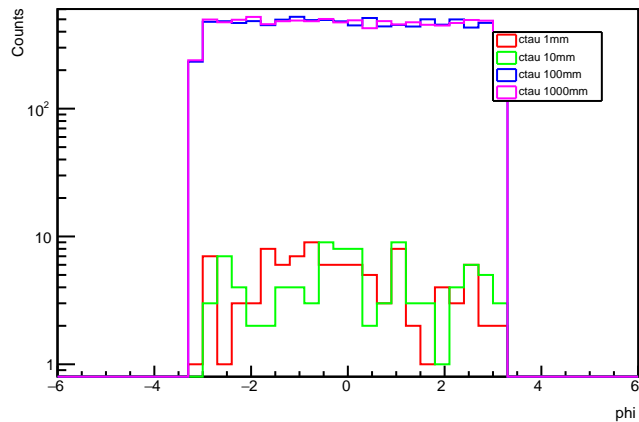


gen subleading Mu eta: no cuts

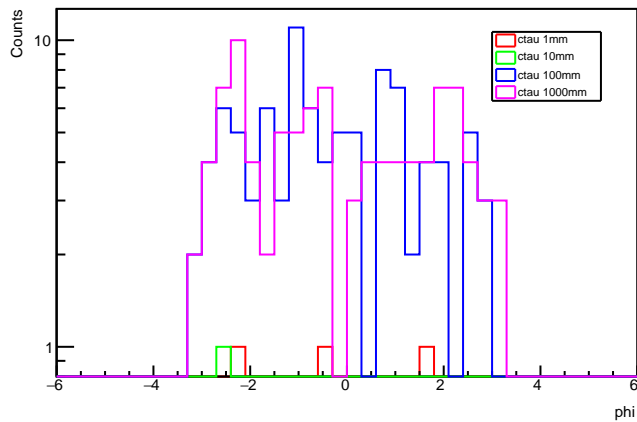
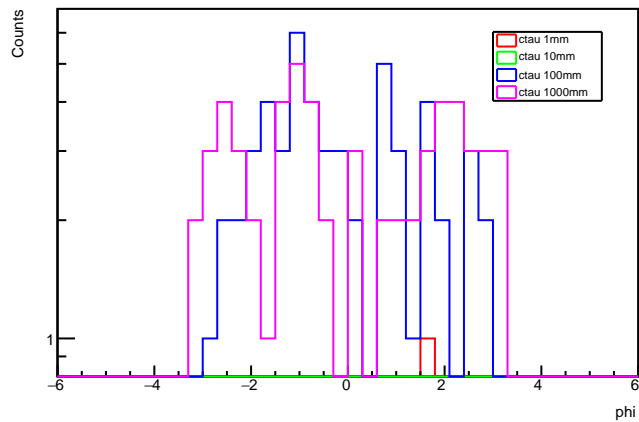
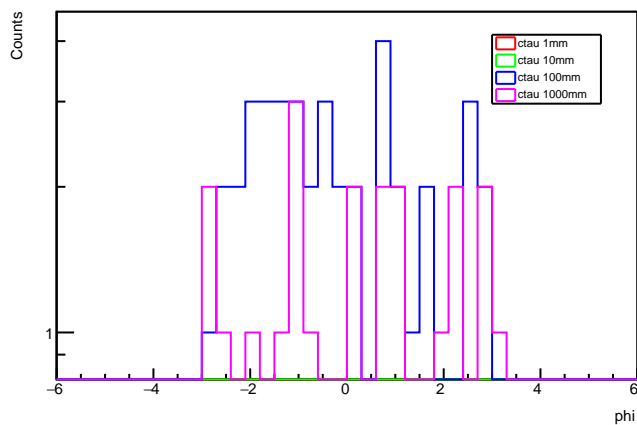
gen subleading Mu eta:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeVgen subleading Mu eta:  $\text{MET} > 120$  GeVgen subleading Mu eta:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVgen subleading Mu eta: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\text{eta}| < 2.4$ 



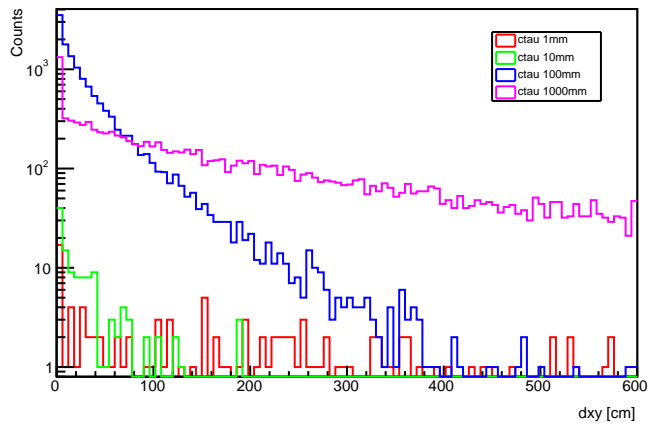
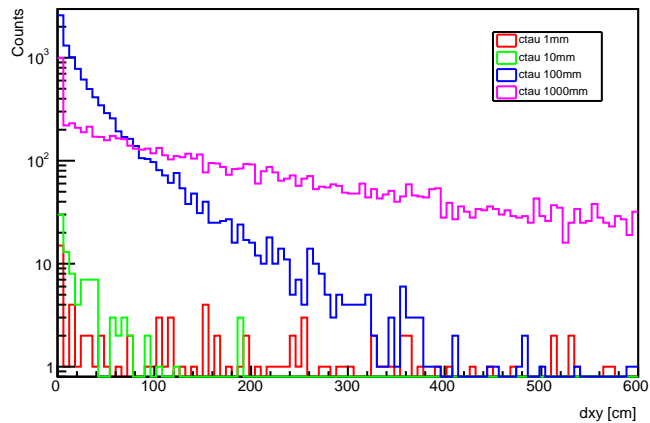
gen subleading Mu phi: no cuts

gen subleading Mu phi:  $n_{\text{jet}} \geq 1$ ,  $j1_{\text{pt}} > 30$  GeV

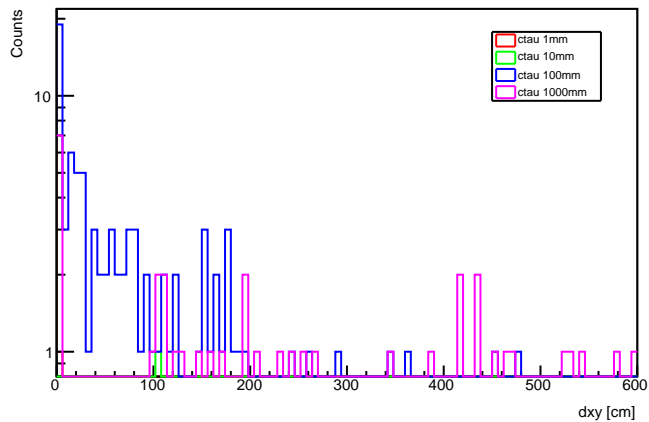
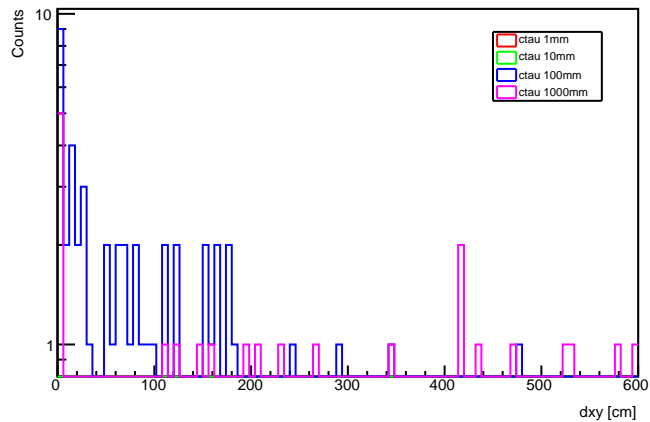
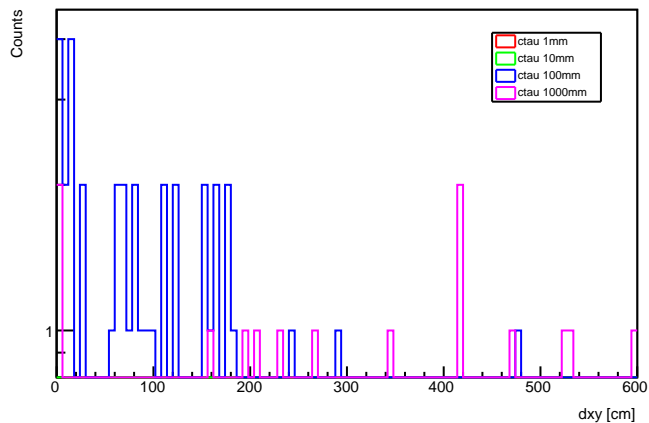
gen subleading Mu phi: MET &gt; 120 GeV

gen subleading Mu phi:  $j1_{\text{pt}} > 120$ , at most 2 jets w/  $p_{\text{T}} > 30$  GeVgen subleading Mu phi: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta_{\text{jet}}| < 2.4$ 

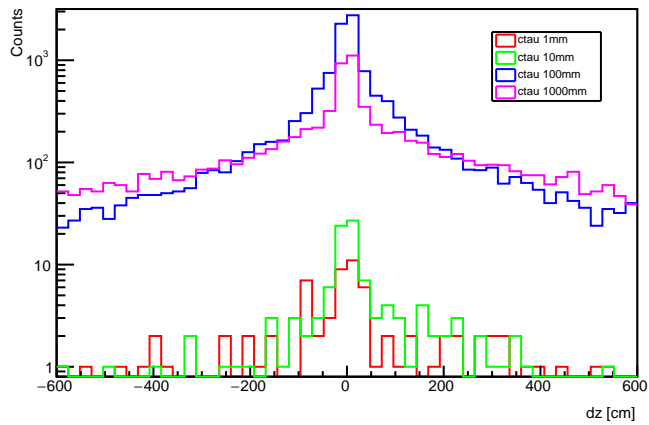
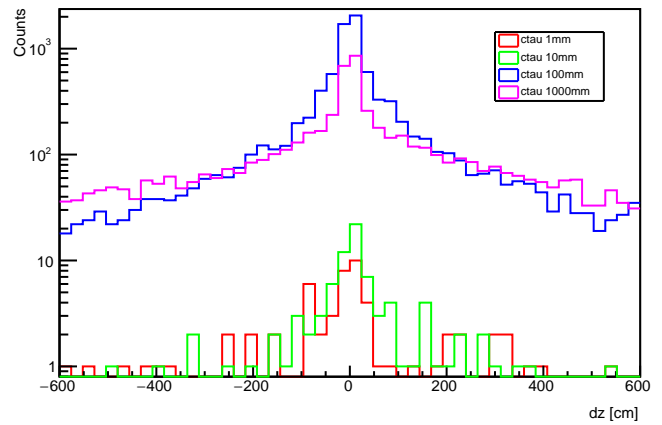
gen subleading Mu vxy: no cuts

gen subleading Mu vxy:  $n_{\text{jet}} \geq 1$ ,  $j1pt > 30$  GeV

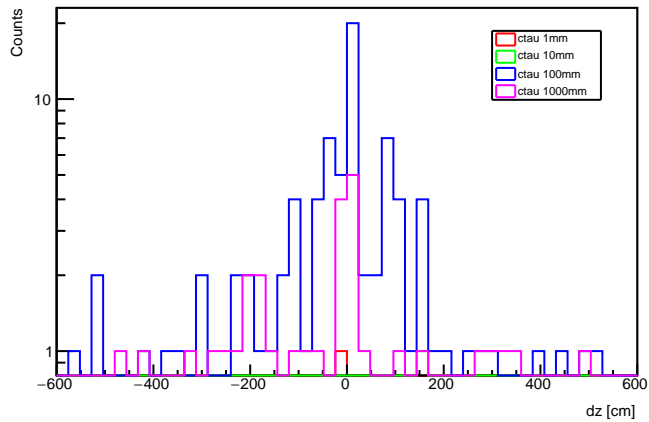
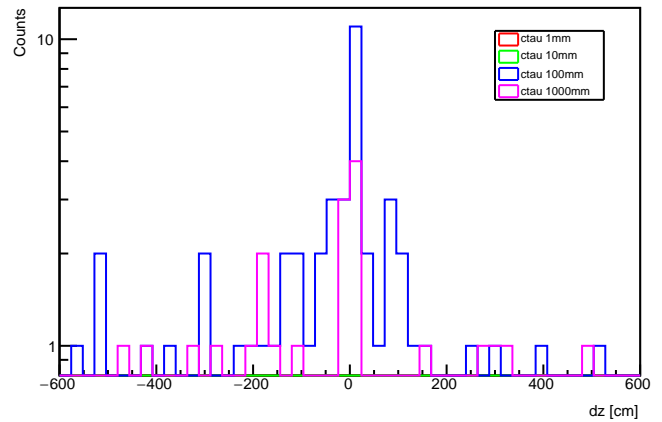
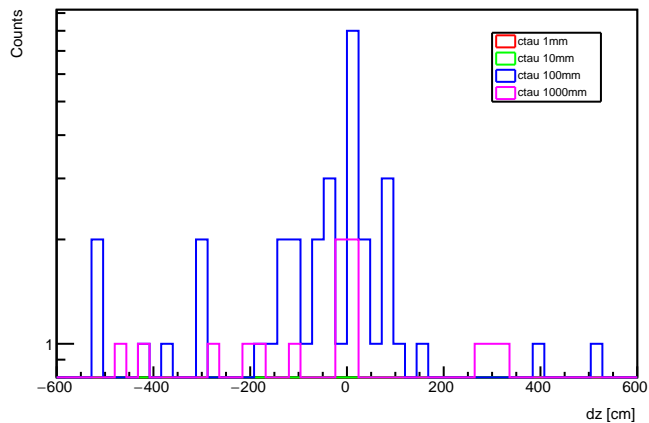
gen subleading Mu vxy: MET &gt; 120 GeV

gen subleading Mu vxy:  $j1pt > 120$ , at most 2 jets w/  $pt > 30$  GeVgen subleading Mu vxy: at least 2 mu w/  $vxy < 740$  cm,  $|vz| < 960$  cm &  $|\eta| < 2.4$ 

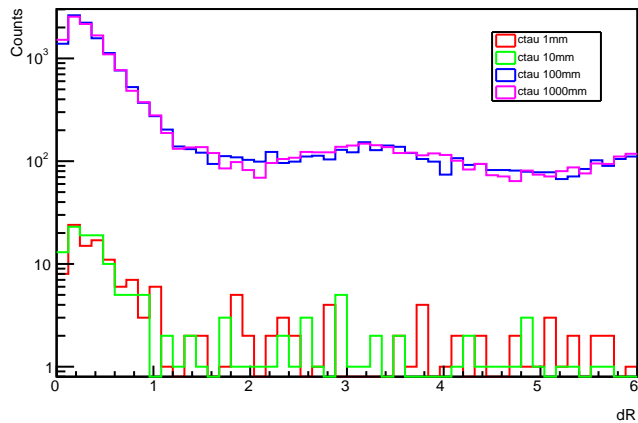
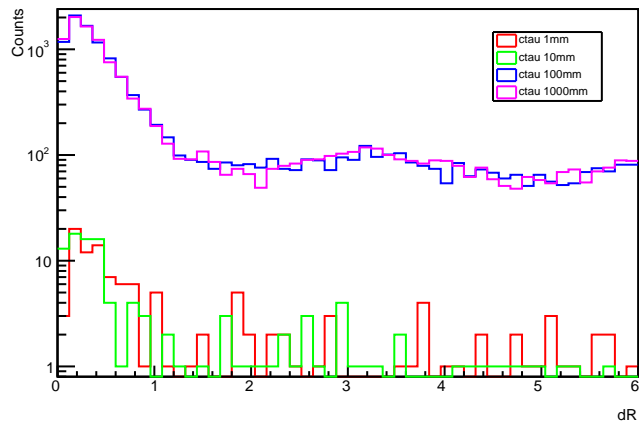
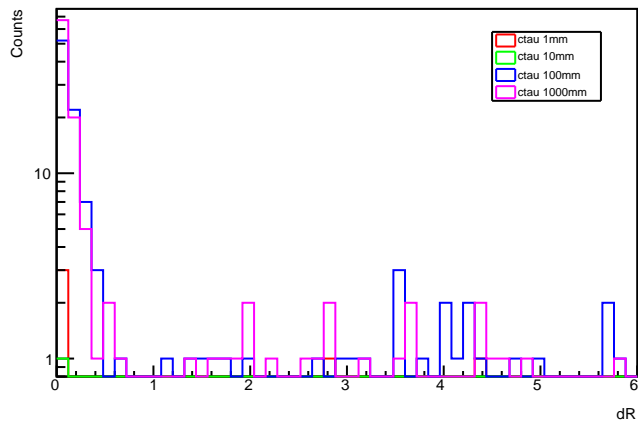
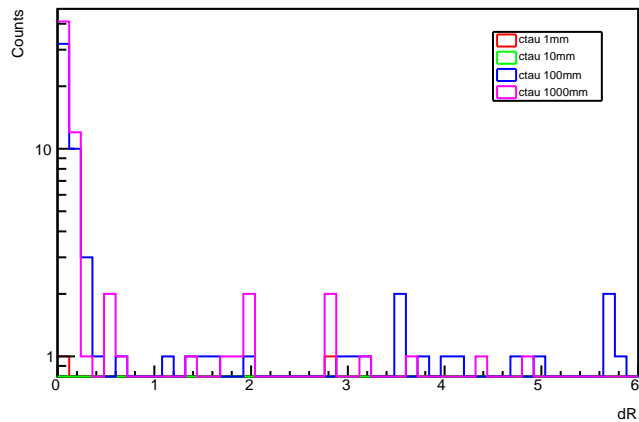
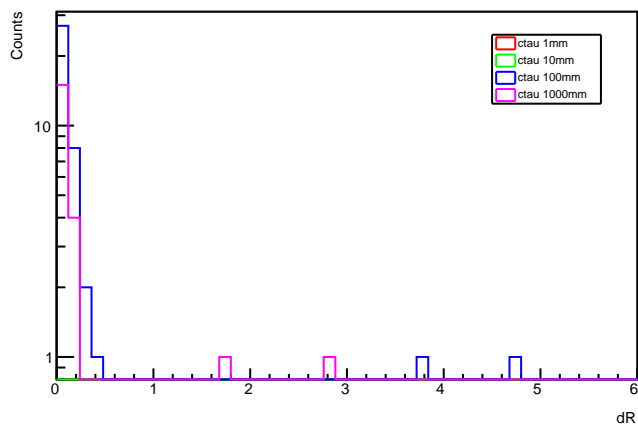
gen subleading Mu vz: no cuts

gen subleading Mu vz:  $n_{\text{jet}} \geq 1, j_{1\text{pt}} > 30 \text{ GeV}$ 

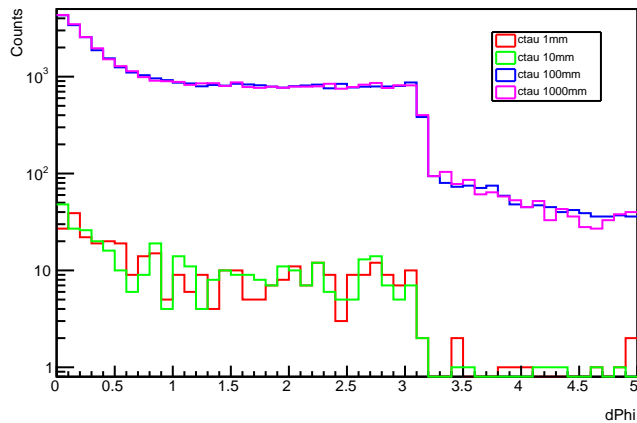
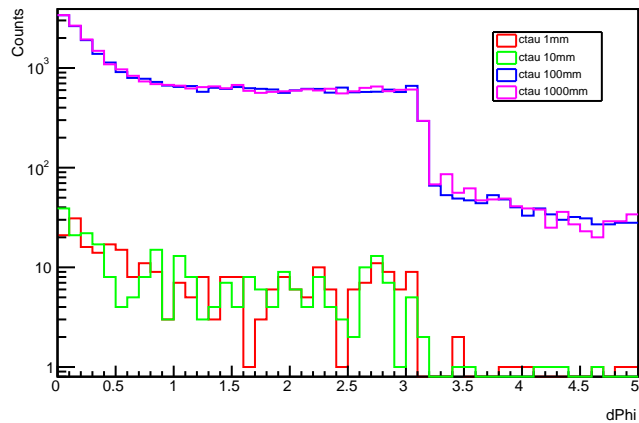
gen subleading Mu vz: MET &gt; 120 GeV

gen subleading Mu vz:  $j_{1\text{pt}} > 120, \text{ at most 2 jets w/ } p_t > 30 \text{ GeV}$ gen subleading Mu vz: at least 2 mu w/  $v_{xy} < 740 \text{ cm}, |v_z| < 960 \text{ cm} \text{ \& } |j_{\text{eta}}| < 2.4$ 

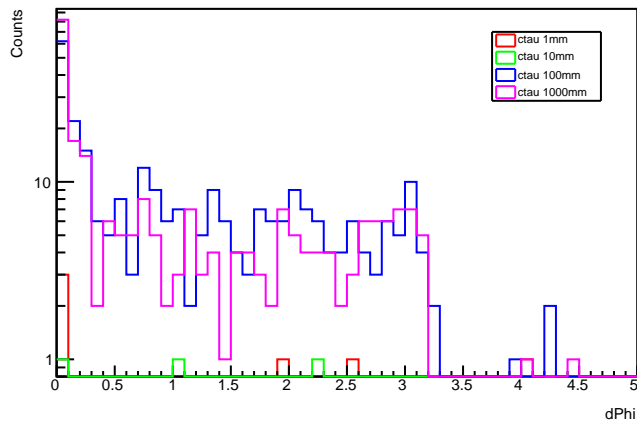
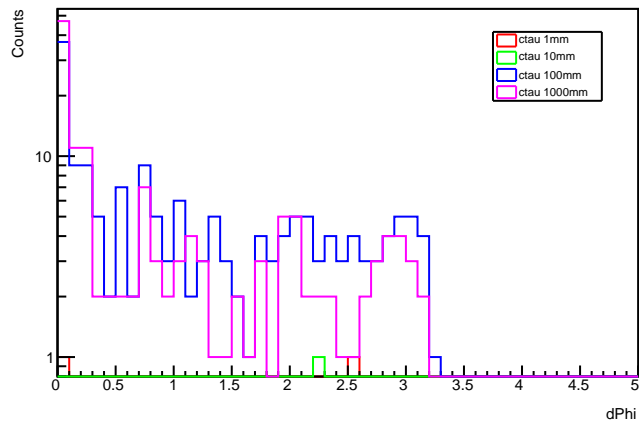
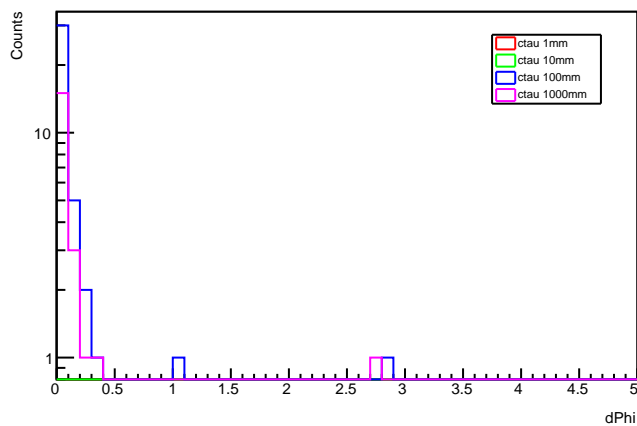
dR: gen leading mu and subleading mu: no cuts

dR: gen leading mu and subleading mu:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30 \text{ GeV}$ dR: gen leading mu and subleading mu:  $\text{MET} > 120 \text{ GeV}$ dR: gen leading mu and subleading mu:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30 \text{ GeV}$ dR: gen leading mu and subleading mu: at least 2 mu w/  $v_{xy} < 740 \text{ cm}$ ,  $|v_z| < 960 \text{ cm}$  &  $|\text{eta}| < 2.4$ 

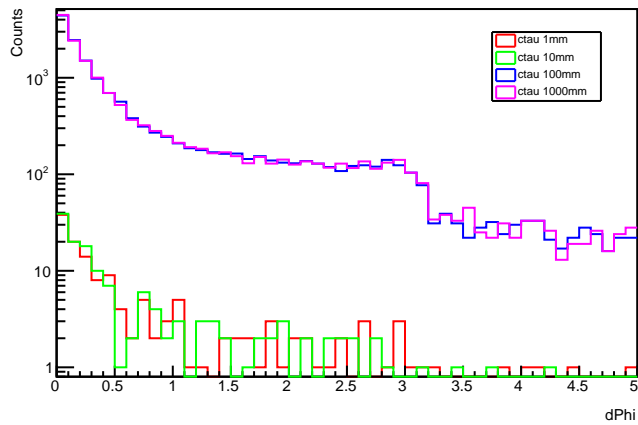
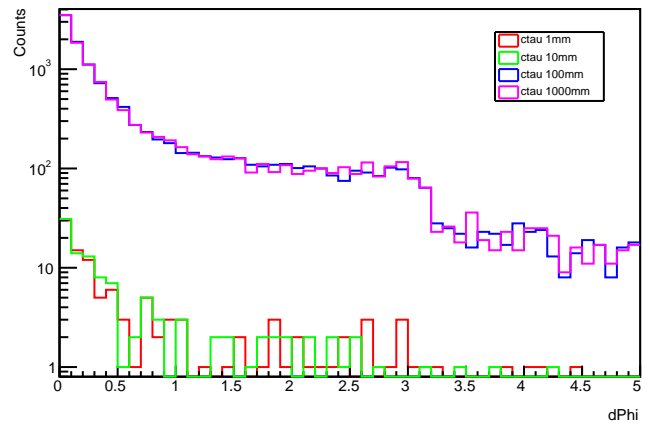
dPhi: gen MET and leading mu: no cuts

dPhi: gen MET and leading mu:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

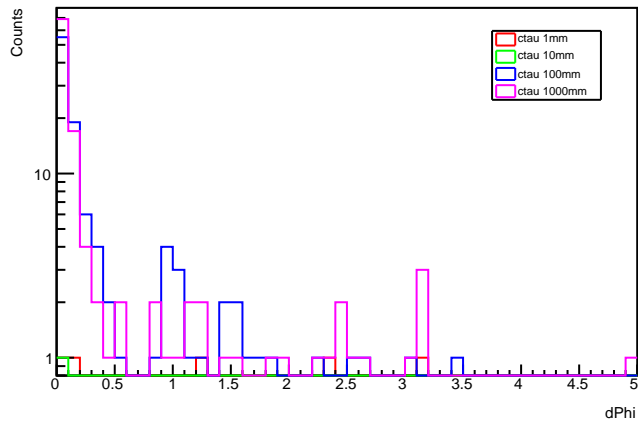
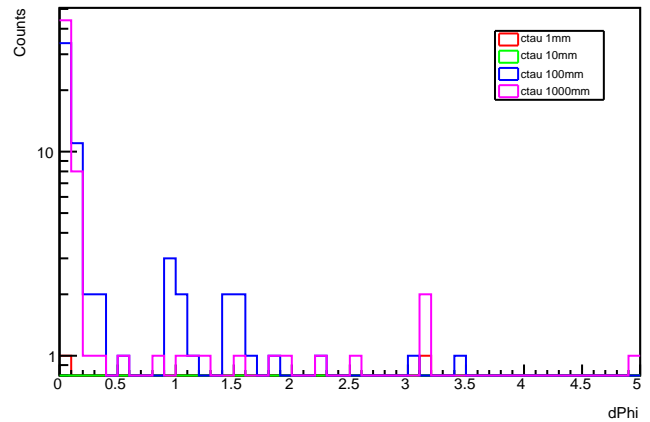
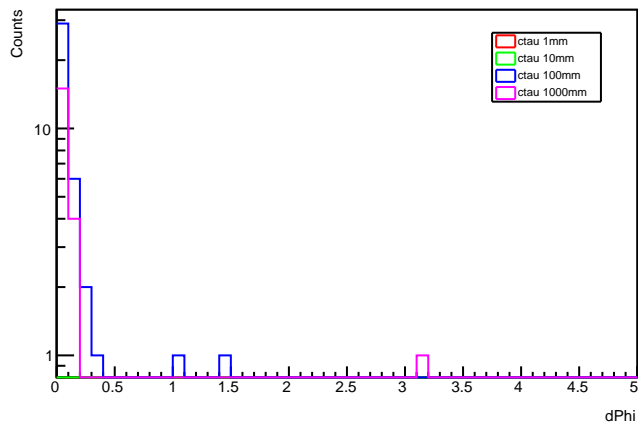
dPhi: gen MET and leading mu: MET &gt; 120 GeV

dPhi: gen MET and leading mu:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVdPhi: gen MET and leading mu: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 

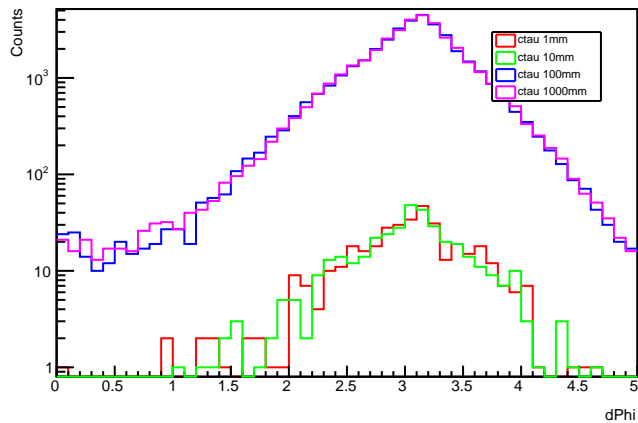
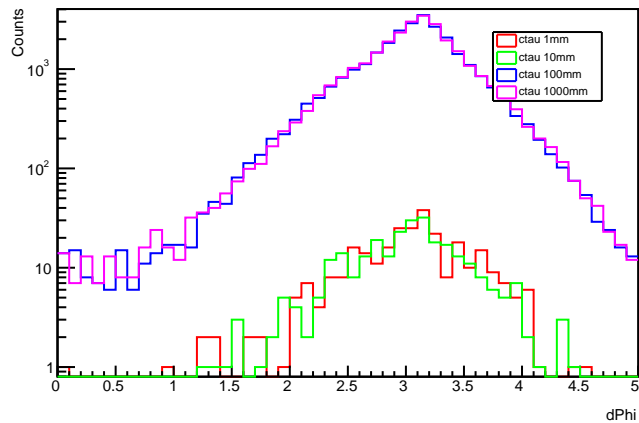
dPhi: gen leading mu and subleading mu: no cuts

dPhi: gen leading mu and subleading mu:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

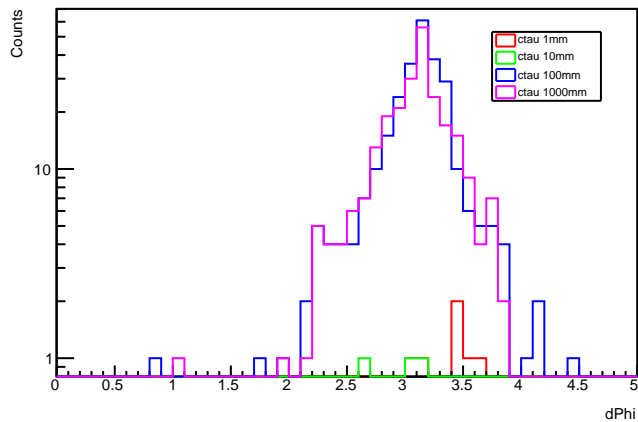
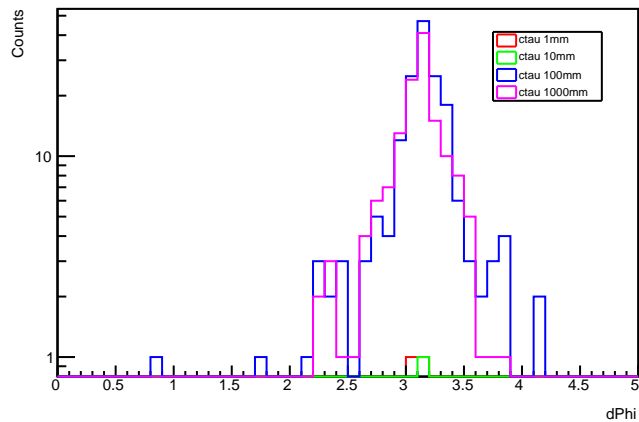
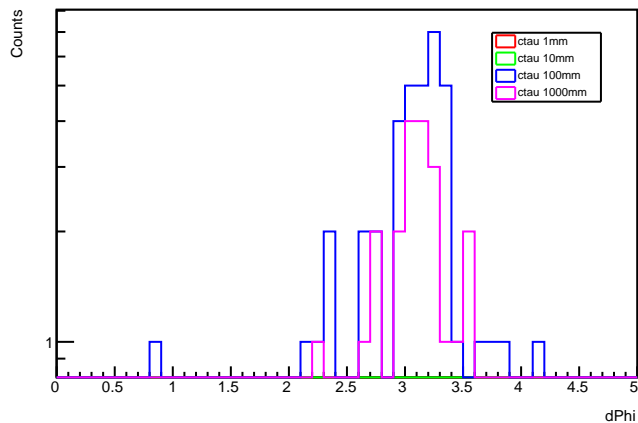
dPhi: gen leading mu and subleading mu: MET &gt; 120 GeV

dPhi: gen leading mu and subleading mu:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_{\text{T}} > 30$  GeVdPhi: gen leading mu and subleading mu: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 

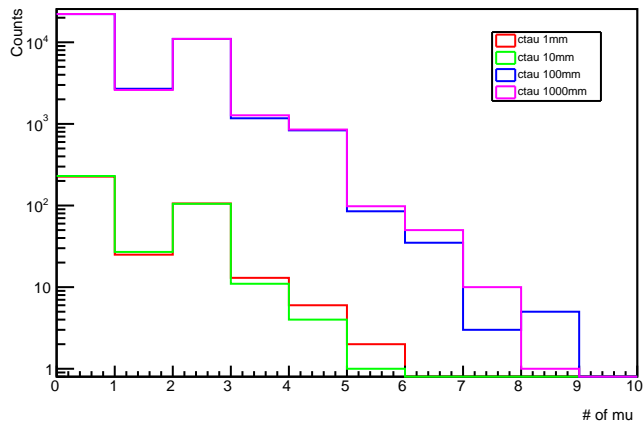
dPhi: gen MET and leading jet: no cuts

dPhi: gen MET and leading jet:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

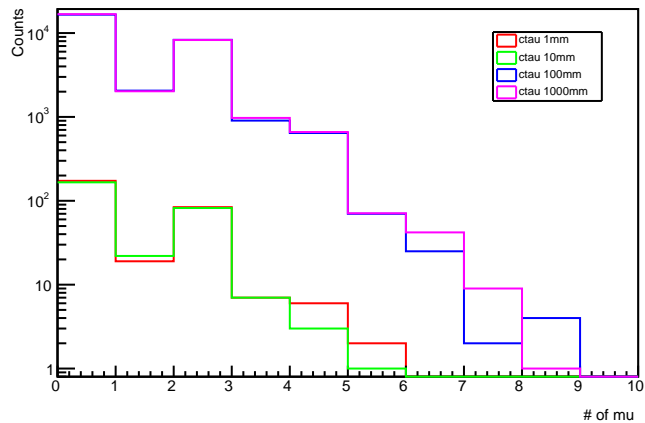
dPhi: gen MET and leading jet: MET &gt; 120 GeV

dPhi: gen MET and leading jet:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVdPhi: gen MET and leading jet: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta_{\text{jet}}| < 2.4$ 

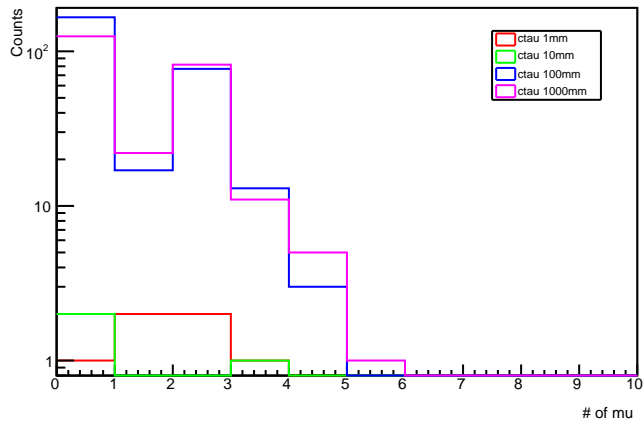
gen number of mu: no cuts



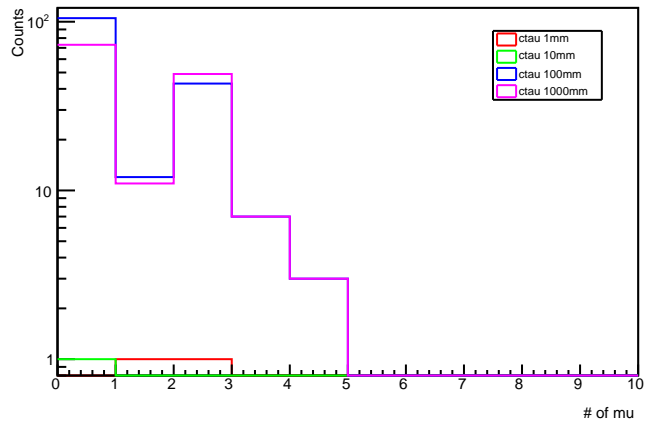
gen number of mu: n\_jet &gt;=1, j1pt &gt; 30 GeV



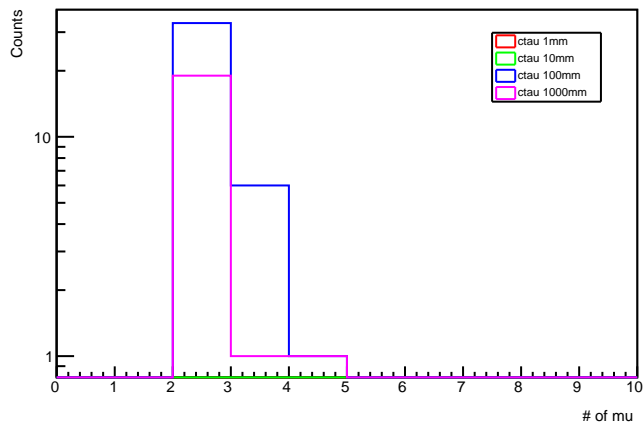
gen number of mu: MET &gt; 120 GeV



gen number of mu: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV

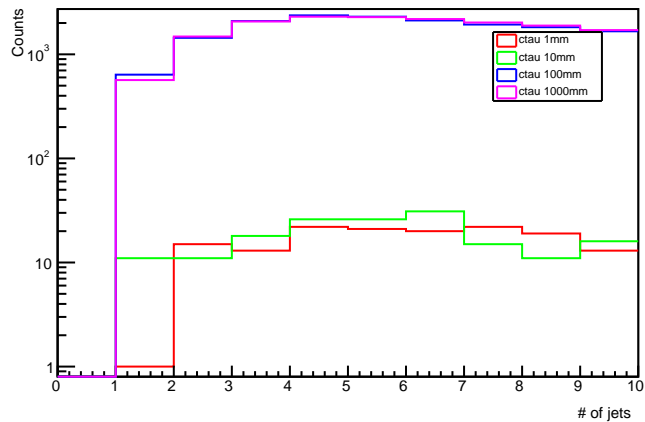
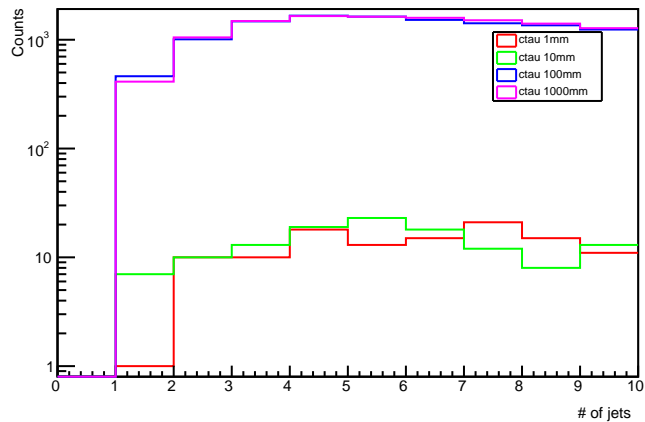


gen number of mu: at least 2 mu w/ vxy&lt; 740 cm, |vz|&lt;960cm &amp; |eta|&lt;2.4

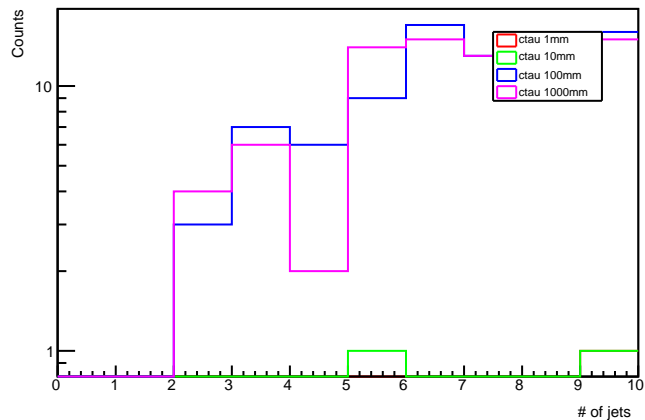
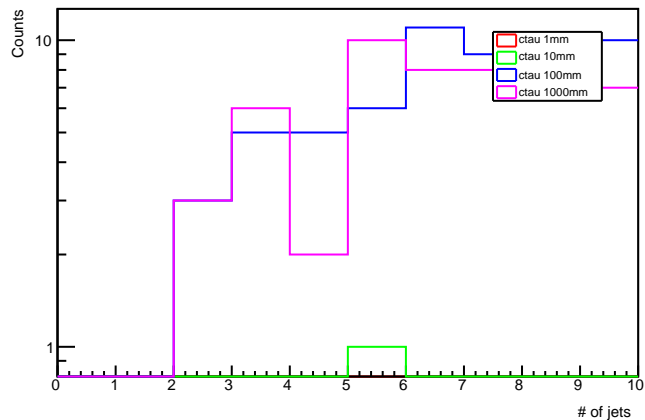
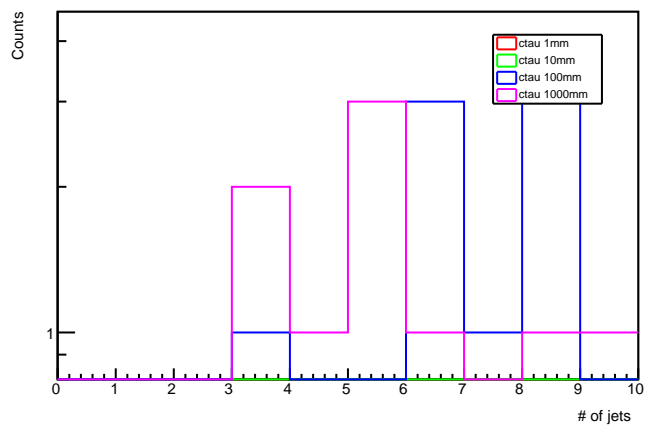




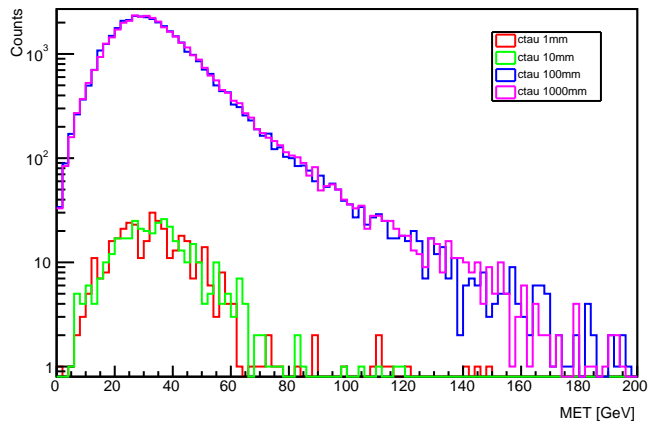
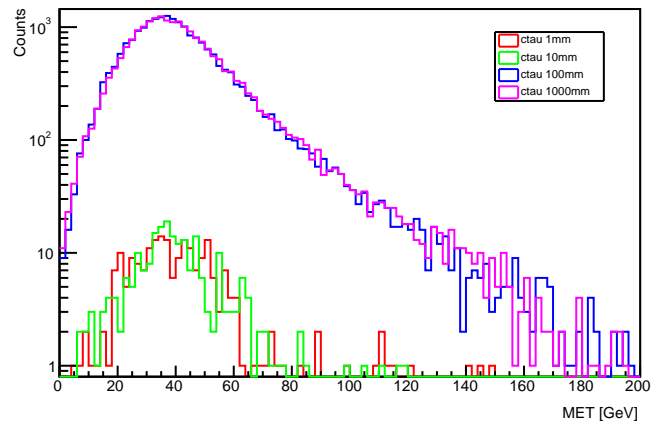
gen number of jets: no cuts

gen number of jets:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30 \text{ GeV}$ 

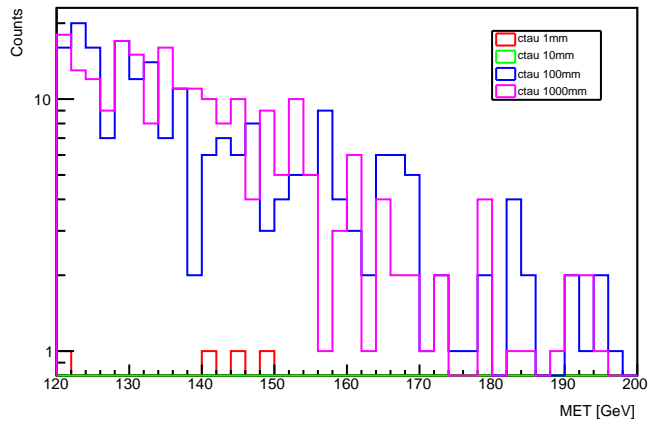
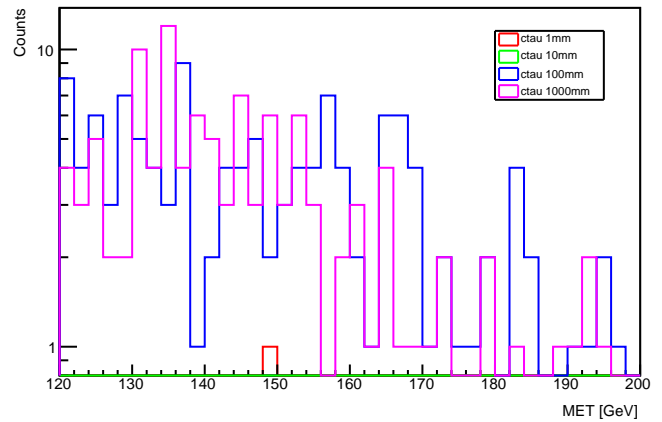
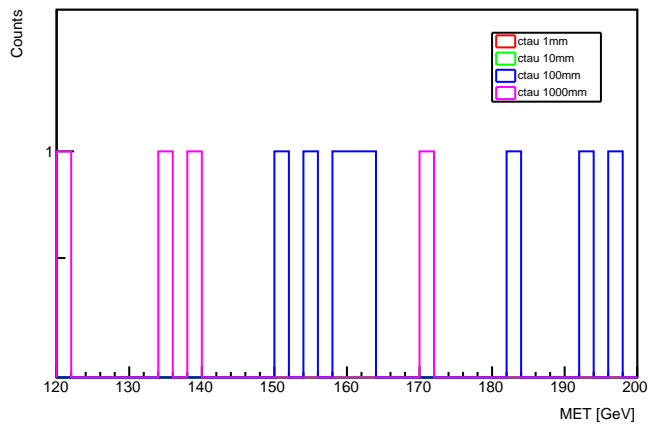
gen number of jets: MET &gt; 120 GeV

gen number of jets:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30 \text{ GeV}$ gen number of jets: at least 2 mu w/  $v_{xy} < 740 \text{ cm}$ ,  $|v_z| < 960 \text{ cm}$  &  $|\eta_a| < 2.4$ 

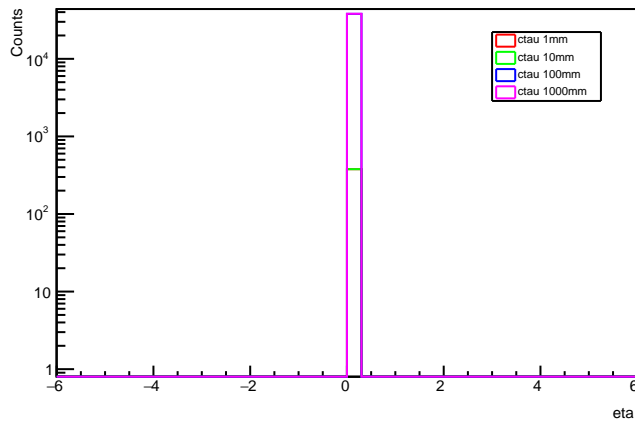
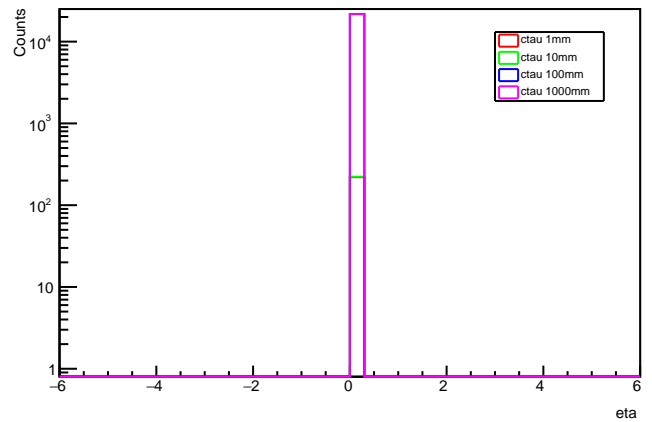
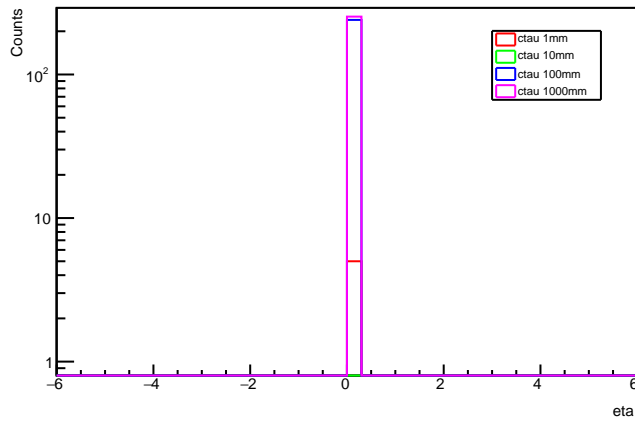
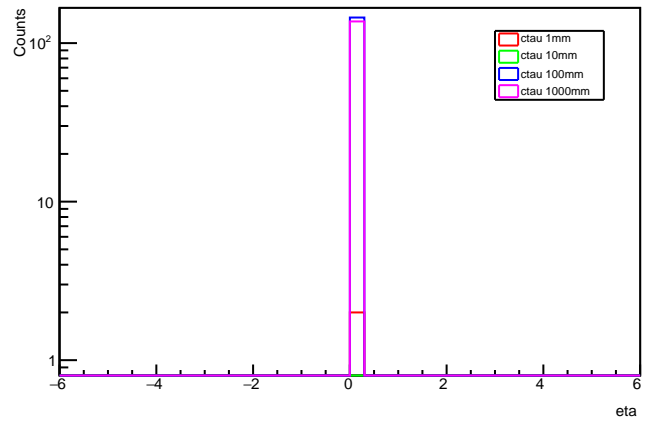
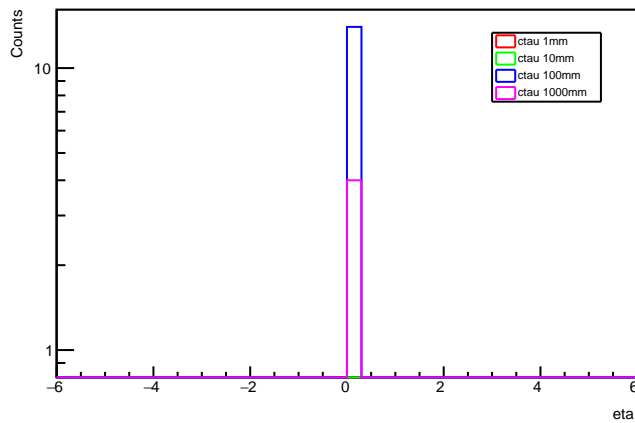
reco leading MET: no cuts

reco leading MET:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

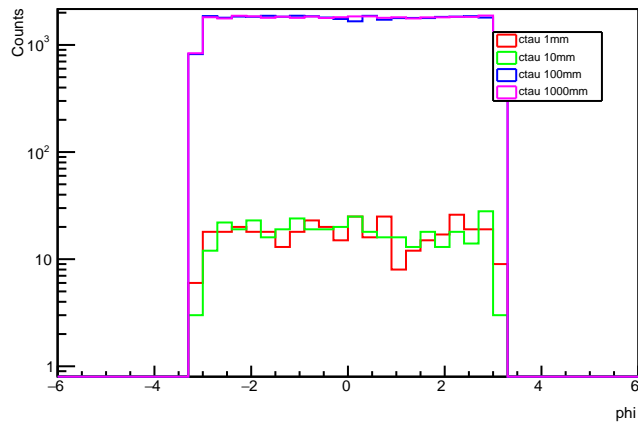
reco leading MET: MET &gt; 120 GeV

reco leading MET:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_T > 30$  GeVreco leading MET: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 

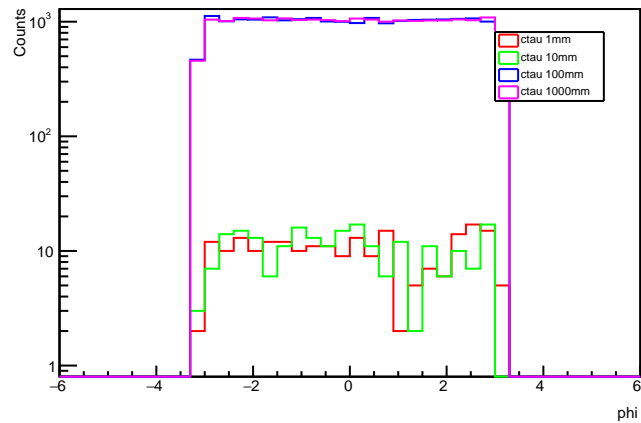
reco leading Met eta: no cuts

reco leading Met eta:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeVreco leading Met eta:  $\text{MET} > 120$  GeVreco leading Met eta:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVreco leading Met eta: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 

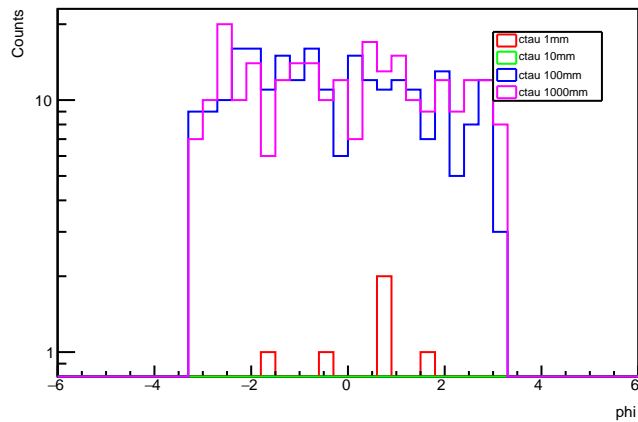
reco leading Met phi: no cuts



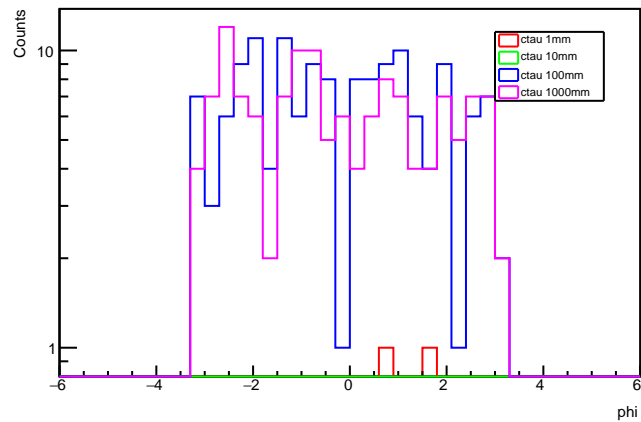
reco leading Met phi: n\_jet &gt;=1, j1pt &gt; 30 GeV



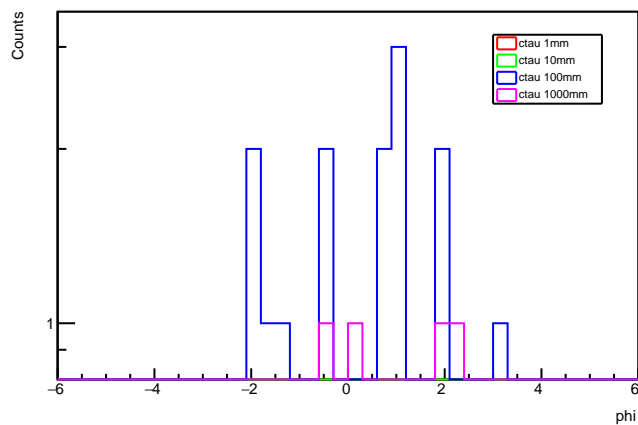
reco leading Met phi: MET &gt; 120 GeV



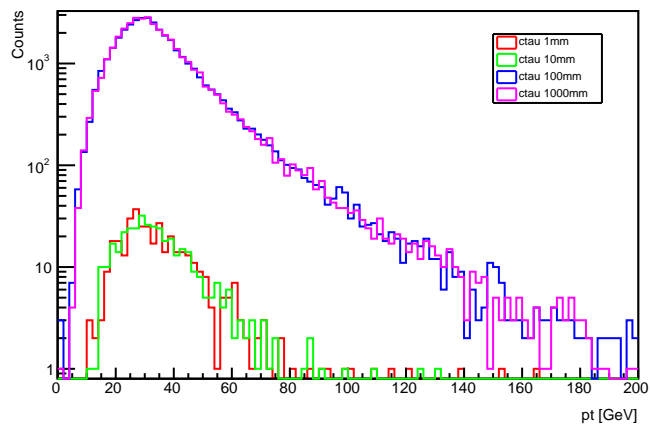
reco leading Met phi: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



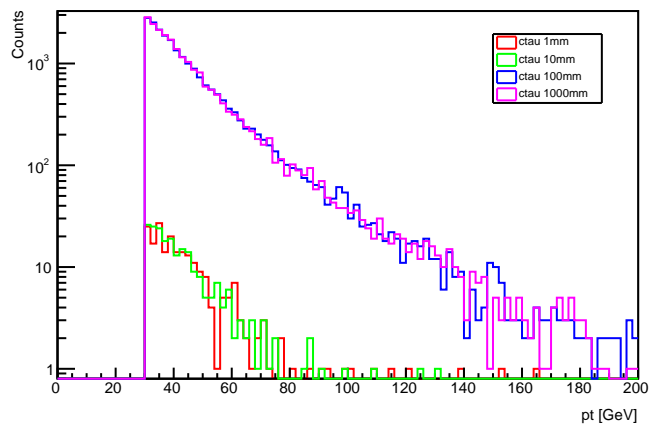
reco leading Met phi: at least 2 mu w/ vx &lt; 740 cm, |vz| &lt; 960 cm &amp; |eta| &lt; 2.4



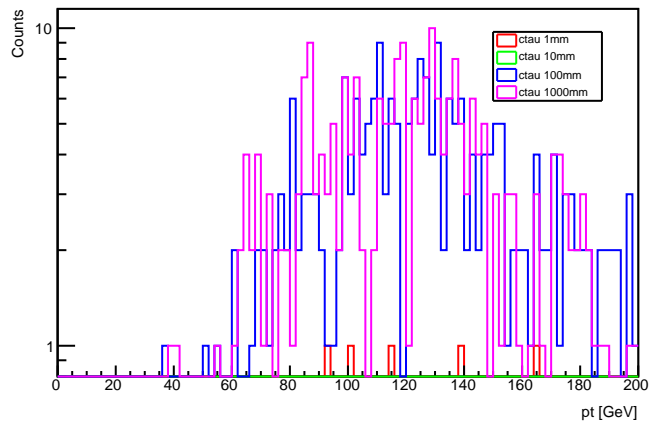
reco leading Jet pt: no cuts



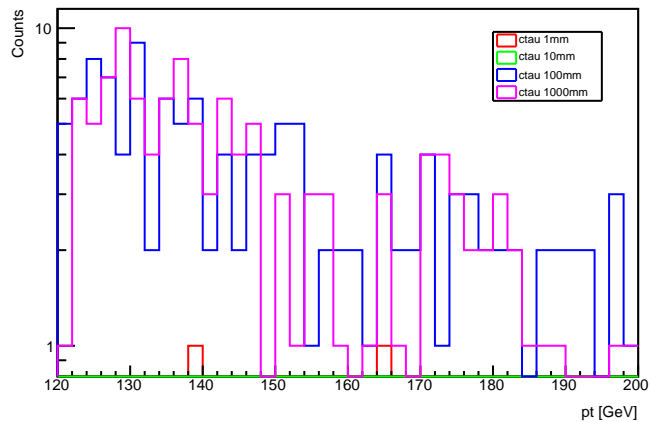
reco leading Jet pt: n\_jet &gt;= 1, j1pt &gt; 30 GeV



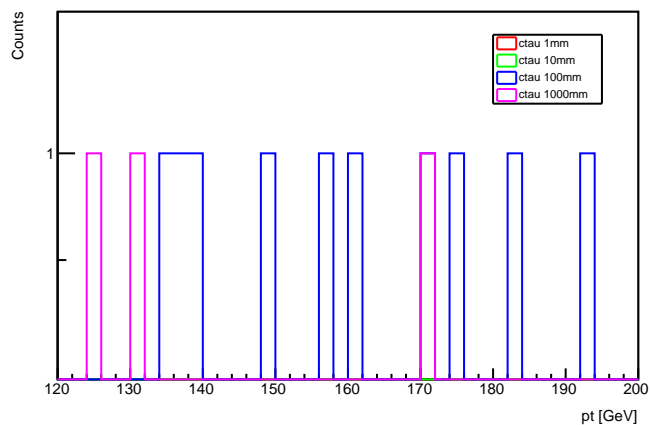
reco leading Jet pt: MET &gt; 120 GeV



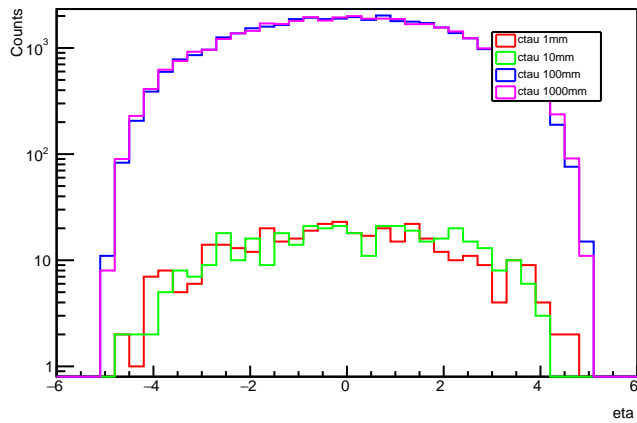
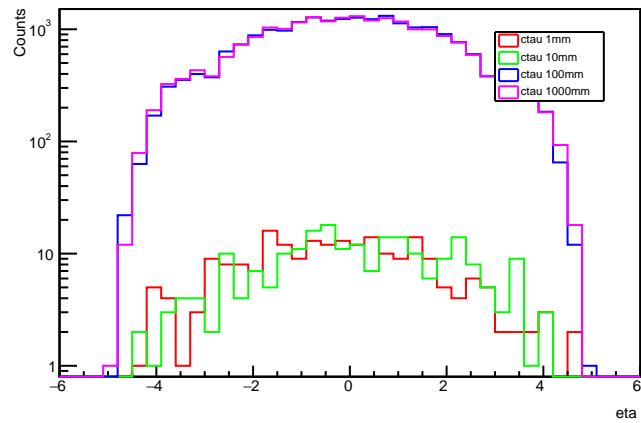
reco leading Jet pt: j1pt &gt; 120, at most 2 jets w/ pt &gt; 30 GeV



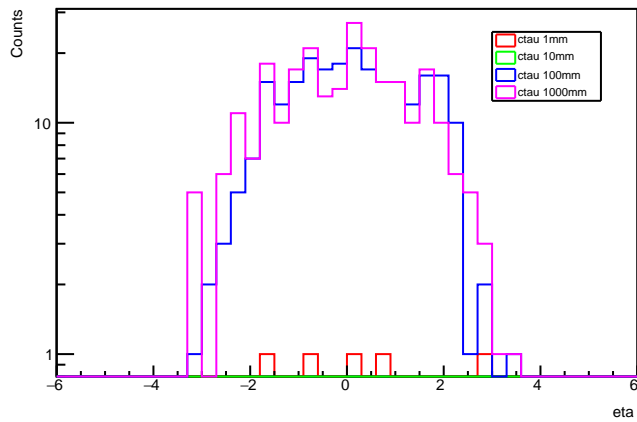
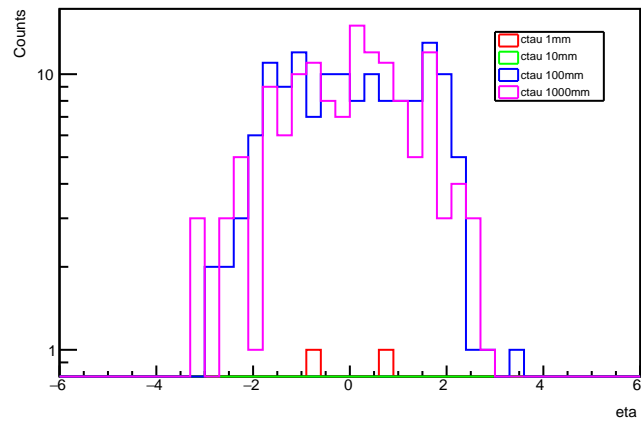
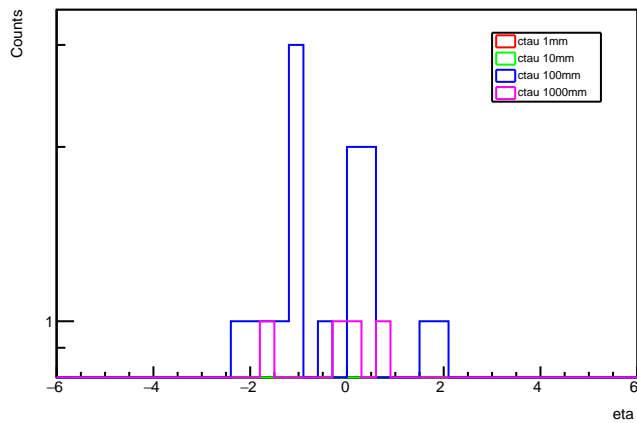
reco leading Jet pt: at least 2 mu w/ vxy &lt; 740 cm, |vz| &lt; 960 cm &amp; |eta| &lt; 2.4



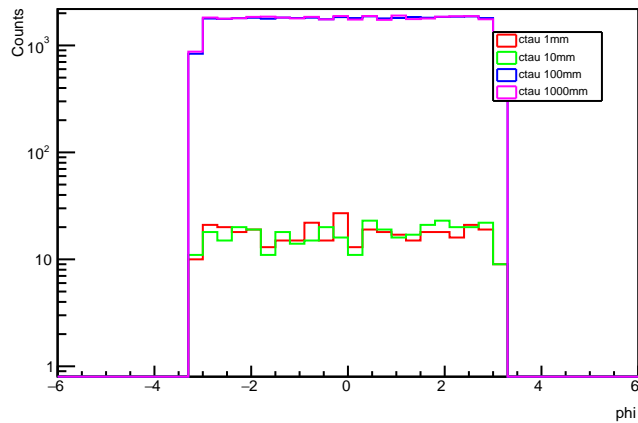
reco leading Jet eta: no cuts

reco leading Jet eta:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

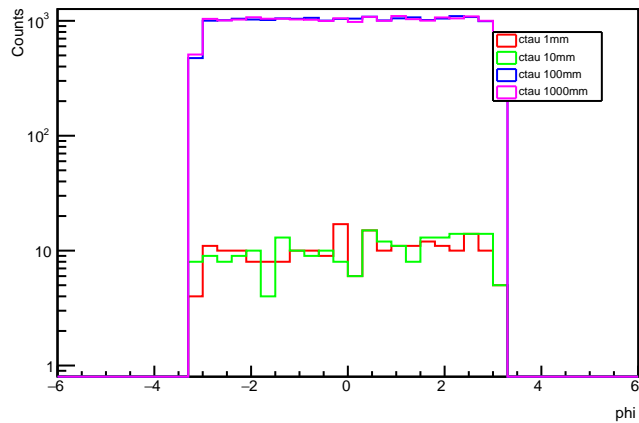
reco leading Jet eta: MET &gt; 120 GeV

reco leading Jet eta:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVreco leading Jet eta: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 

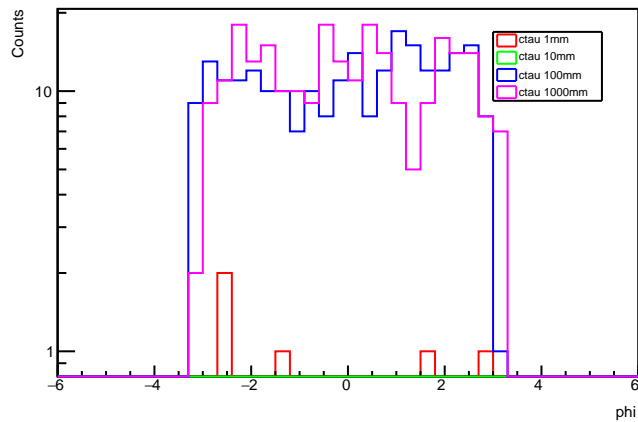
reco leading Jet phi: no cuts



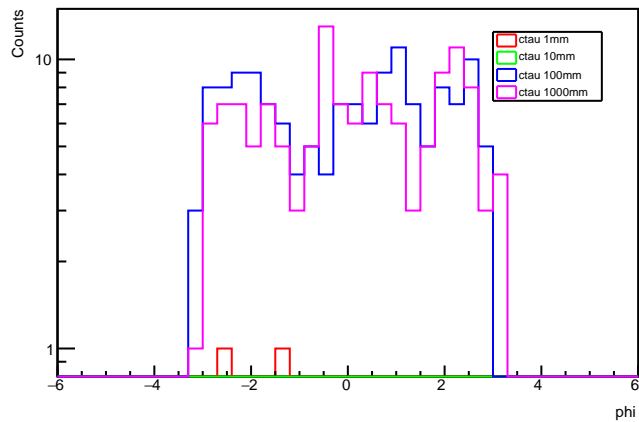
reco leading Jet phi: n\_jet &gt;= 1, j1pt &gt; 30 GeV



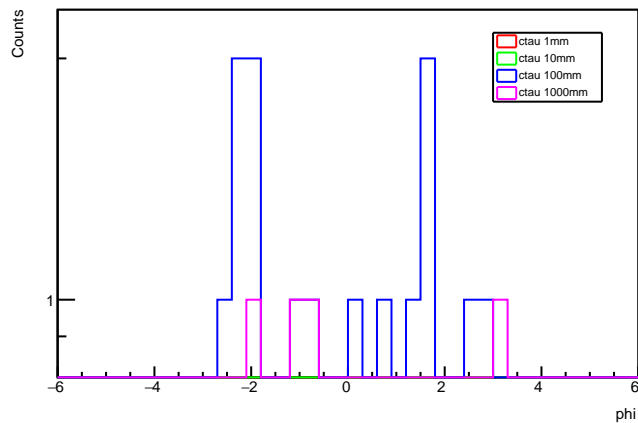
reco leading Jet phi: MET &gt; 120 GeV



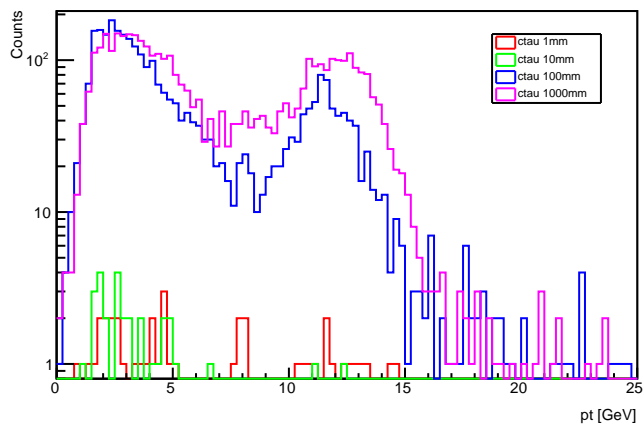
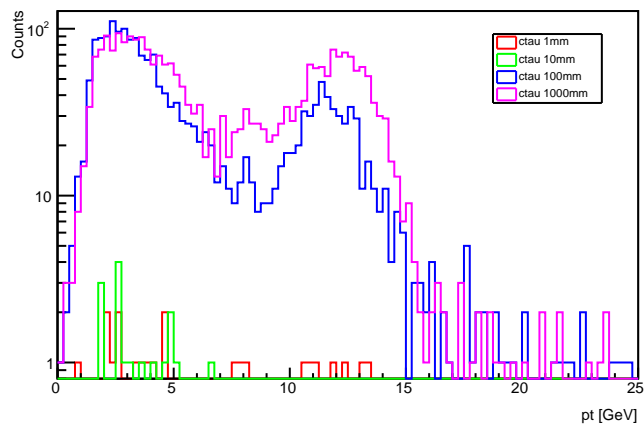
reco leading Jet phi: j1pt &gt; 120, at most 2 jets w/ pt &gt; 30 GeV



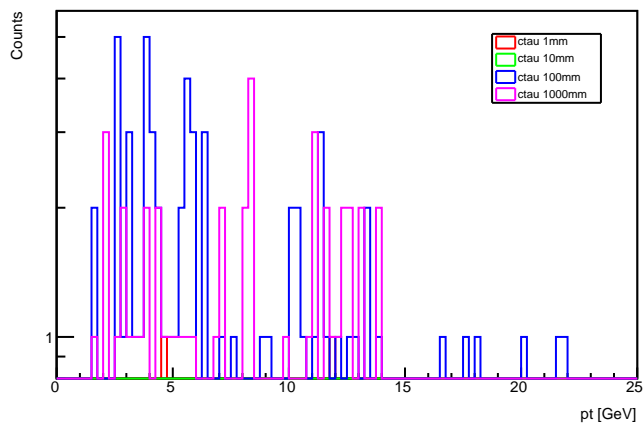
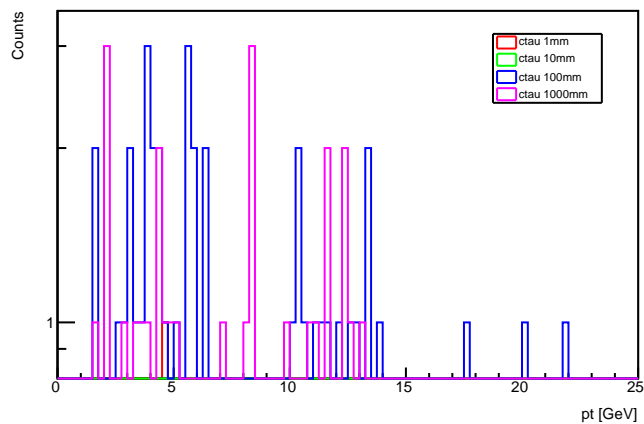
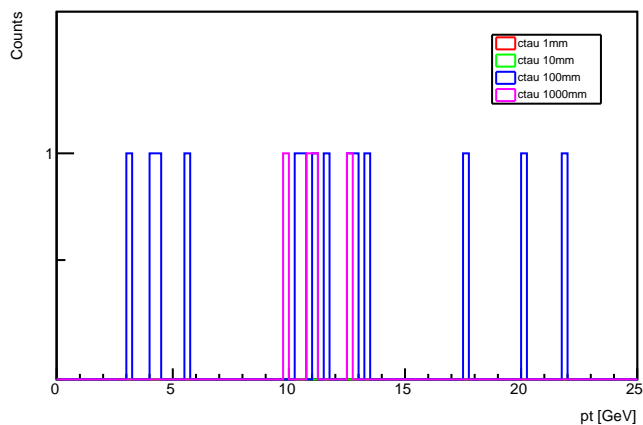
reco leading Jet phi: at least 2 mu w/ vx &lt; 740 cm, |vz| &lt; 960 cm &amp; |eta| &lt; 2.4



reco leading Mu pt: no cuts

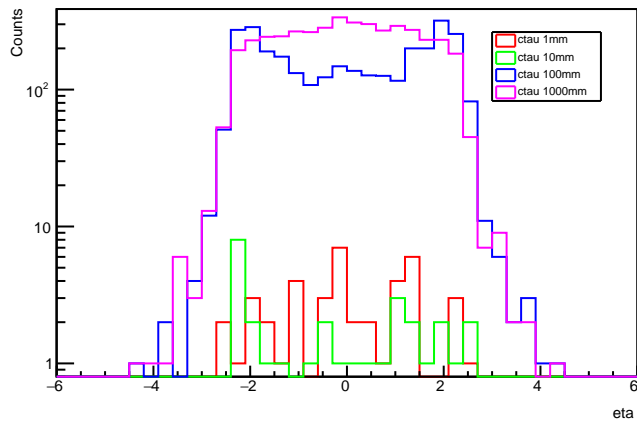
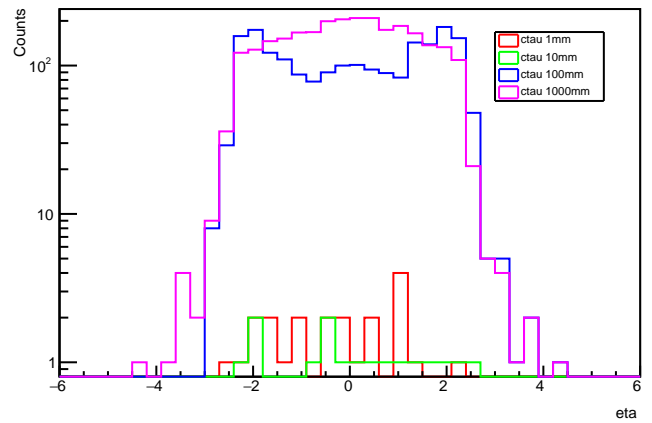
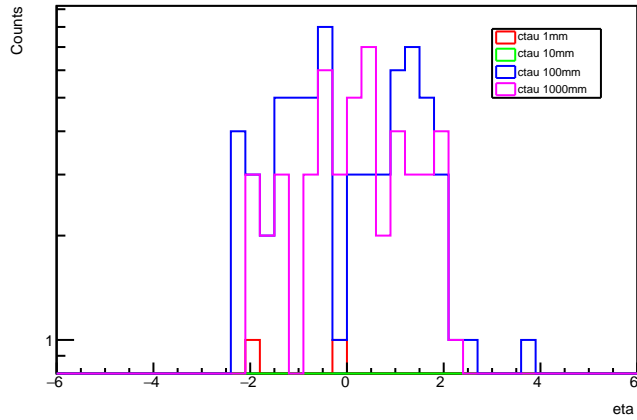
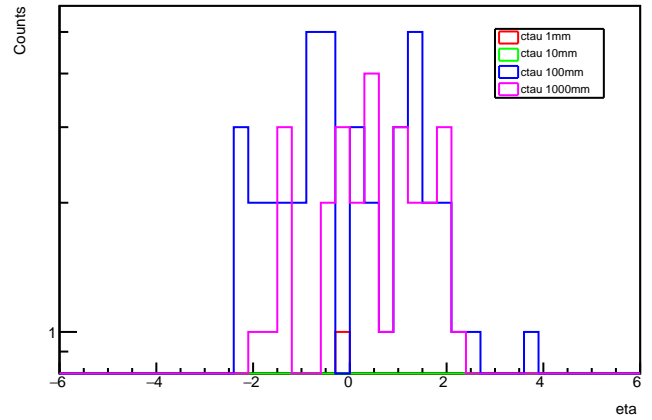
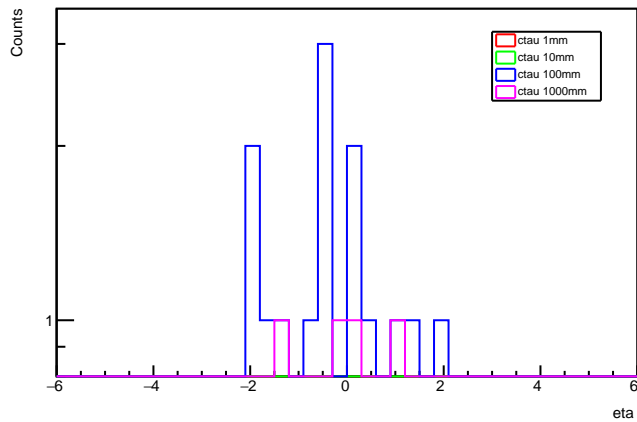
reco leading Mu pt:  $n_{\text{jet}} \geq 1$ ,  $j1pt > 30$  GeV

reco leading Mu pt: MET &gt; 120 GeV

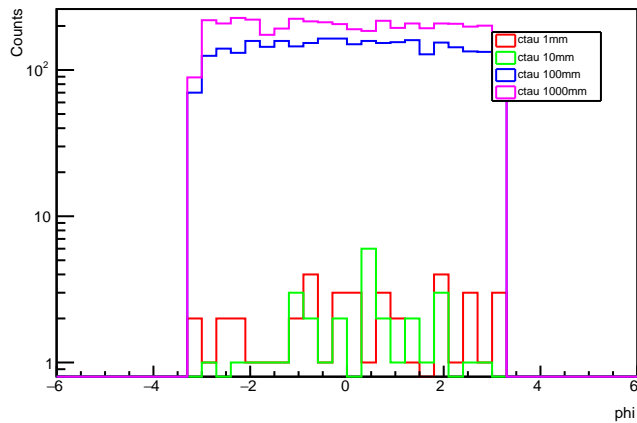
reco leading Mu pt:  $j1pt > 120$ , at most 2 jets w/  $pt > 30$  GeVreco leading Mu pt: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 



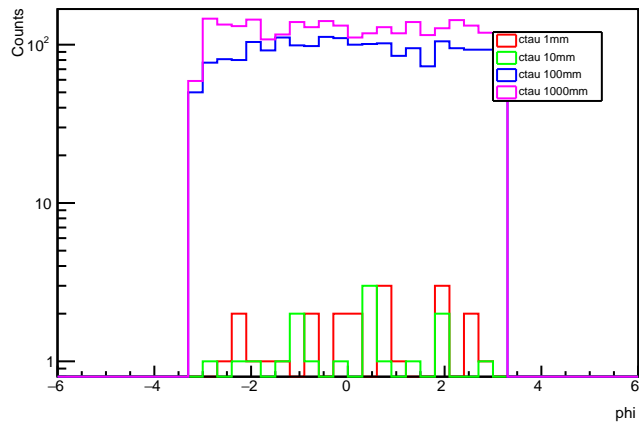
reco leading Mu eta: no cuts

reco leading Mu eta:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30\text{ GeV}$ reco leading Mu eta:  $\text{MET} > 120\text{ GeV}$ reco leading Mu eta:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30\text{ GeV}$ reco leading Mu eta: at least 2 mu w/  $v_{xy} < 740\text{ cm}$ ,  $|v_z| < 960\text{ cm}$  &  $|\eta| < 2.4$ 

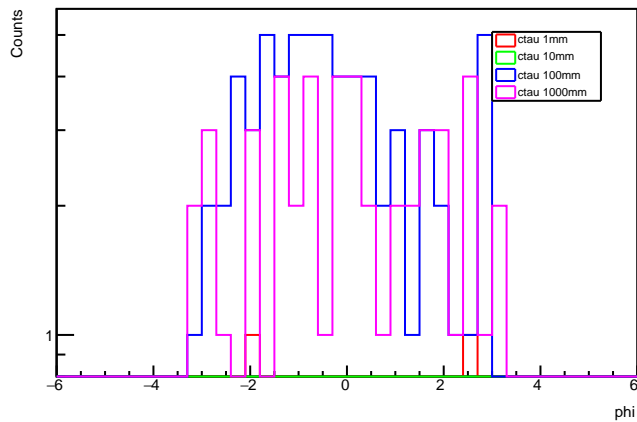
reco leading Mu phi: no cuts



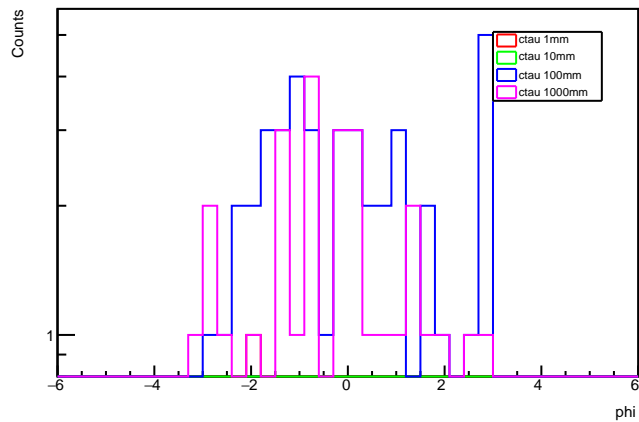
reco leading Mu phi: n\_jet &gt;=1, j1pt &gt; 30 GeV



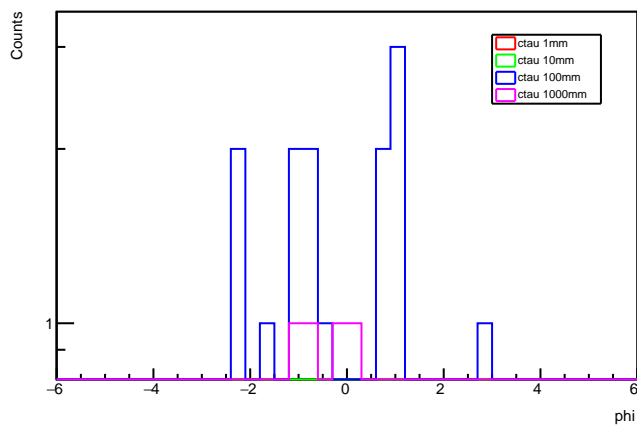
reco leading Mu phi: MET &gt; 120 GeV



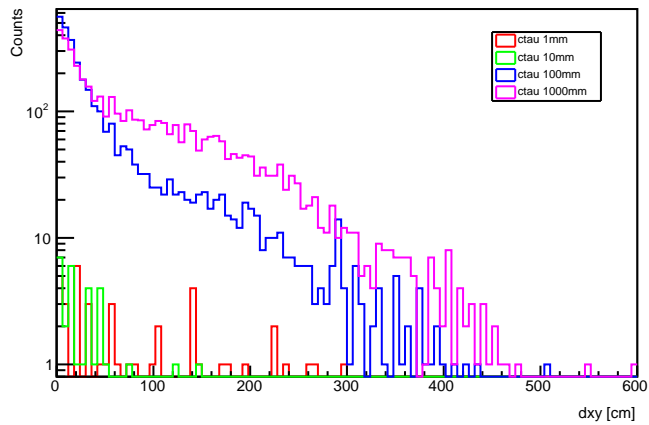
reco leading Mu phi: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



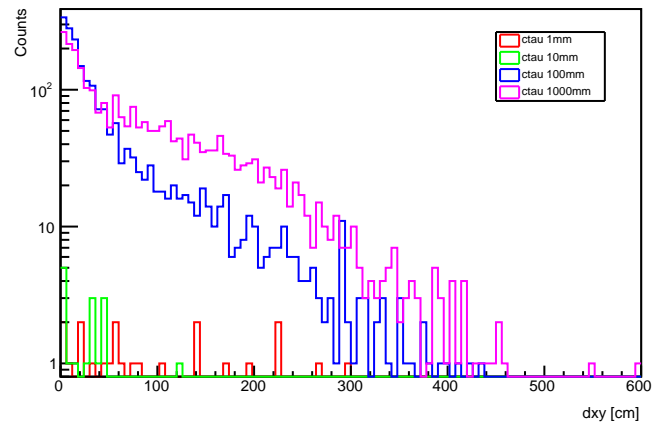
reco leading Mu phi: at least 2 mu w/ vxy &lt; 740 cm, |vz| &lt; 960 cm &amp; |eta| &lt; 2.4



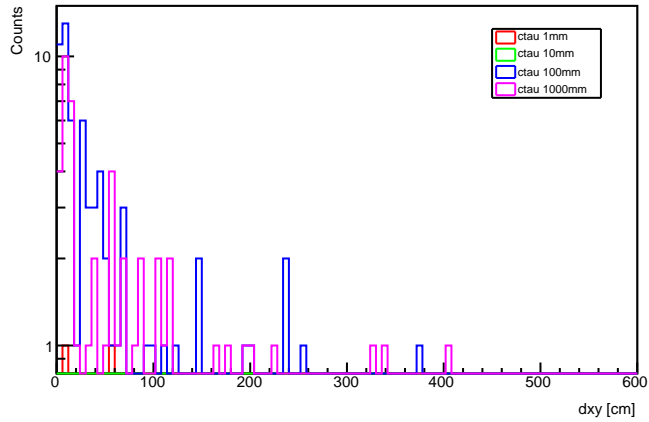
reco leading Mu vxy: no cuts



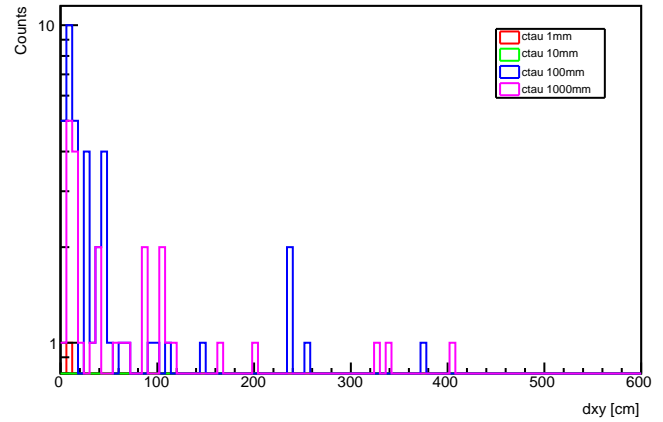
reco leading Mu vxy: n\_jet &gt;=1, j1pt &gt; 30 GeV



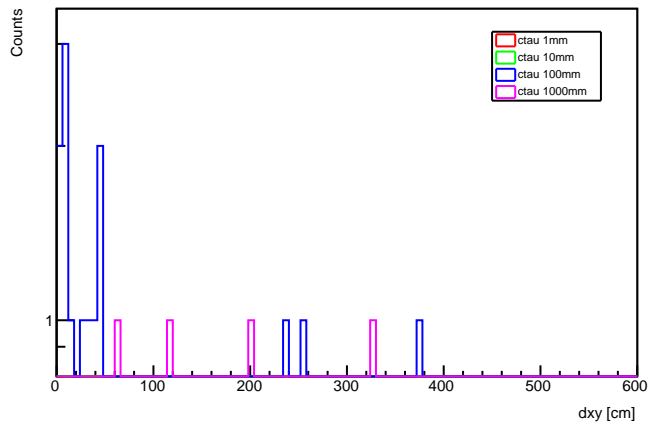
reco leading Mu vxy: MET &gt; 120 GeV



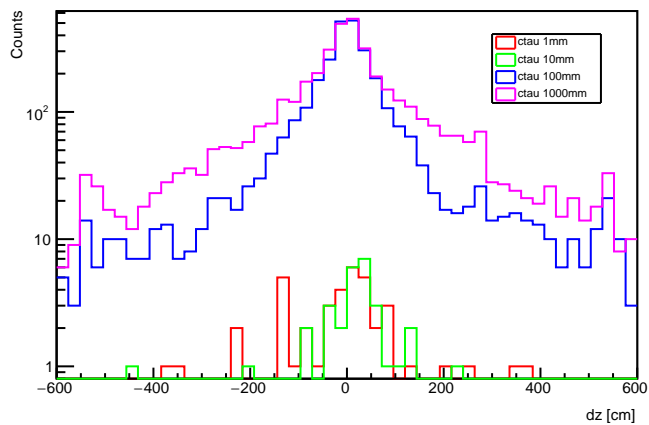
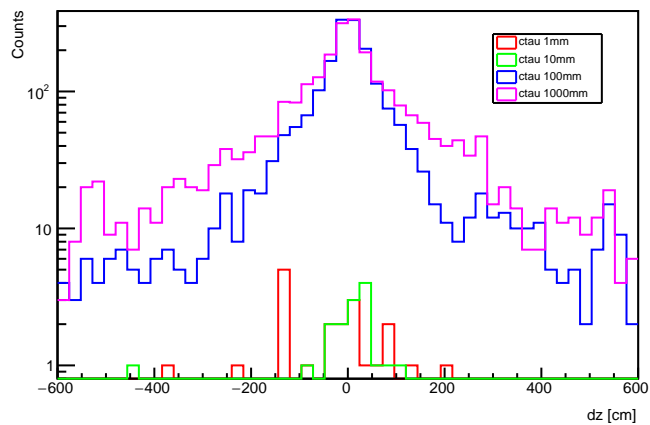
reco leading Mu vxy: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



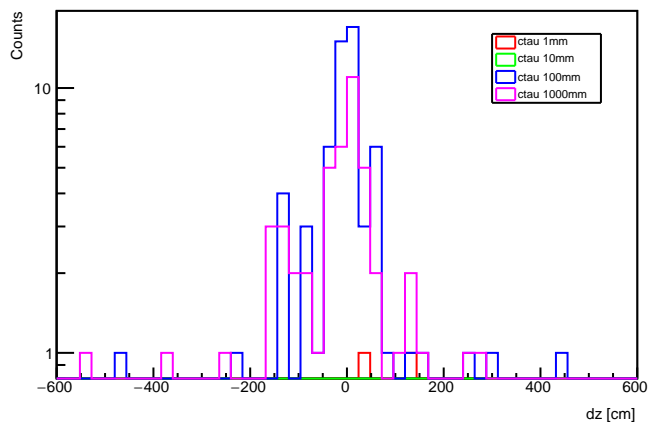
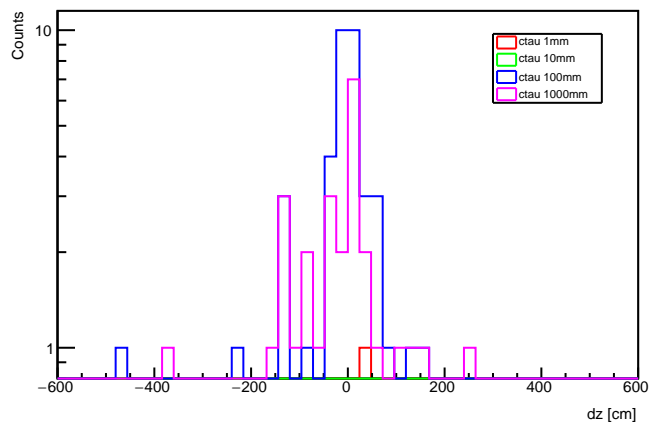
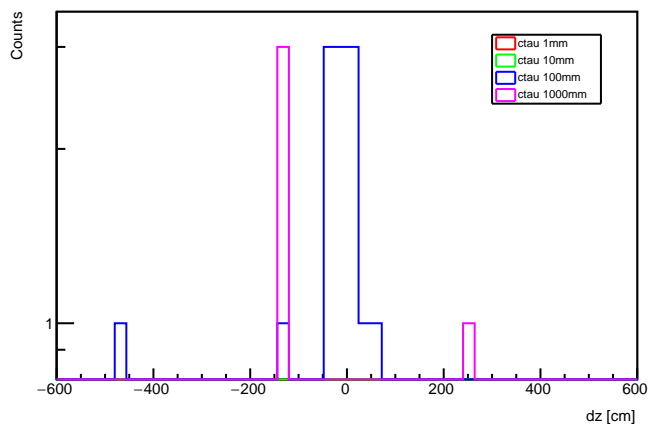
reco leading Mu vxy: at least 2 mu w/ vxy &lt; 740 cm, |vz| &lt; 960 cm &amp; |eta| &lt; 2.4



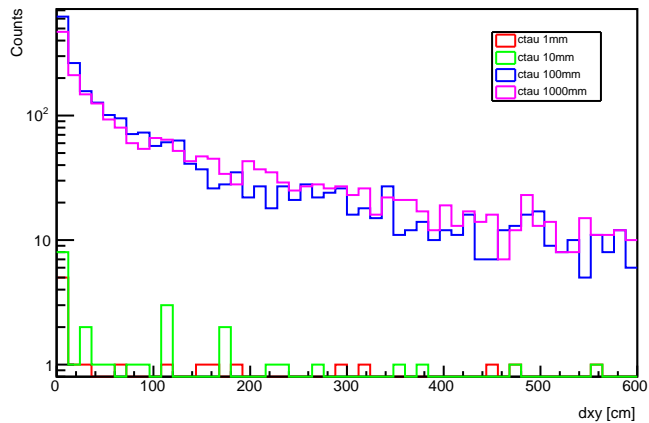
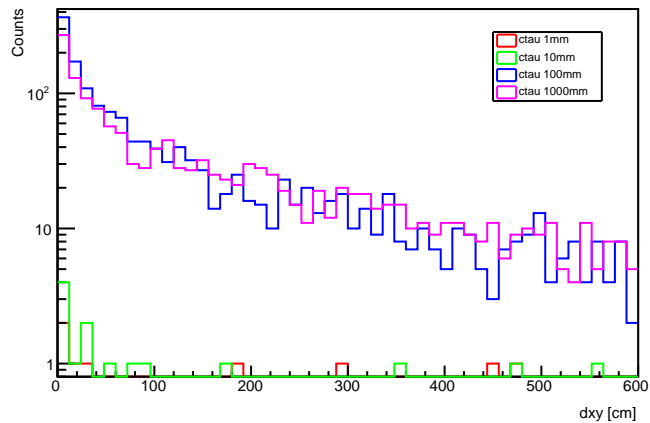
reco leading Mu vz: no cuts

reco leading Mu vz:  $n_{\text{jet}} \geq 1$ ,  $j1_{\text{pt}} > 30$  GeV

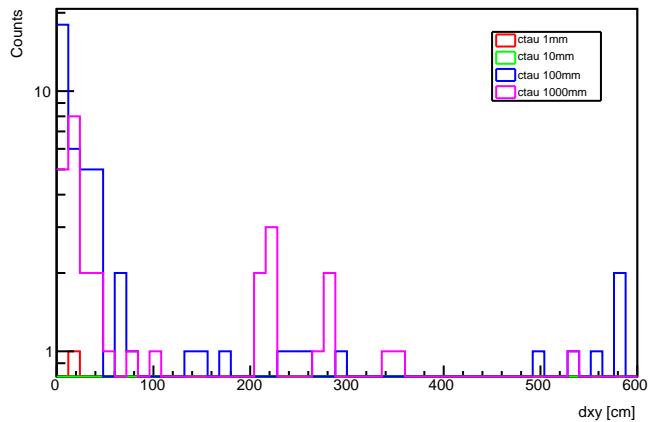
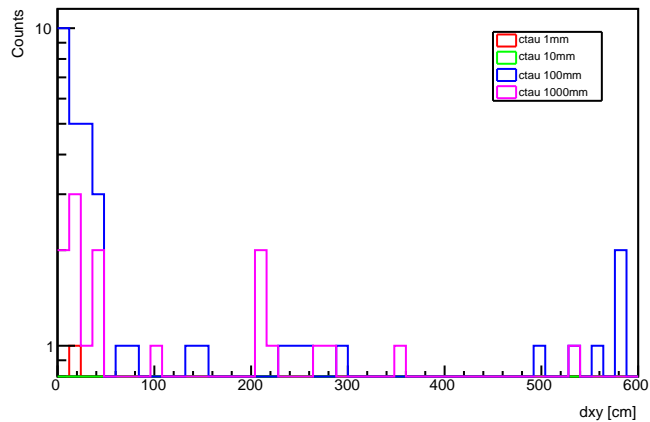
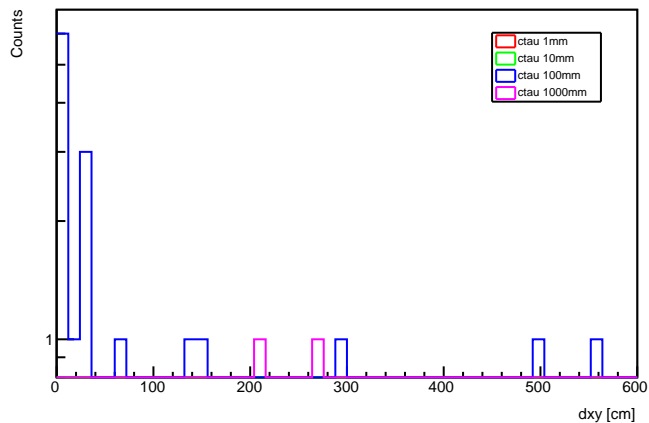
reco leading Mu vz: MET &gt; 120 GeV

reco leading Mu vz:  $j1_{\text{pt}} > 120$ , at most 2 jets w/  $p_{\text{T}} > 30$  GeVreco leading Mu vz: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 

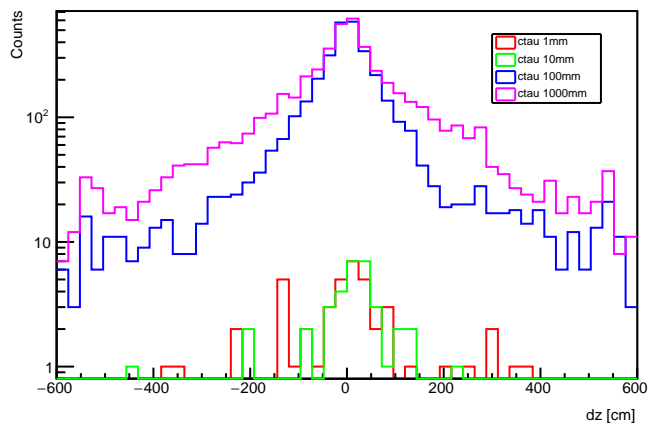
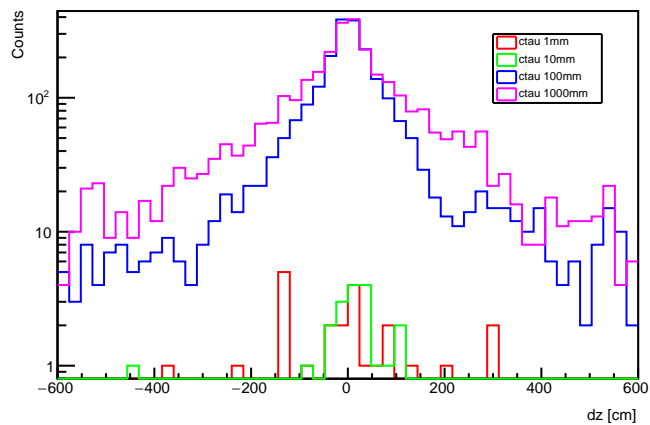
reco all Mu vxy: no cuts

reco all Mu vxy:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

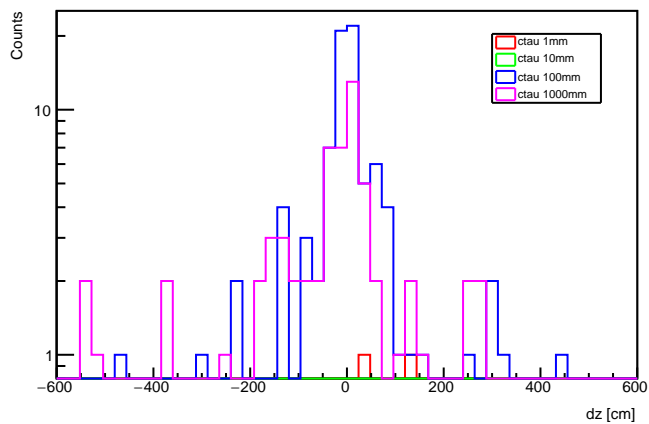
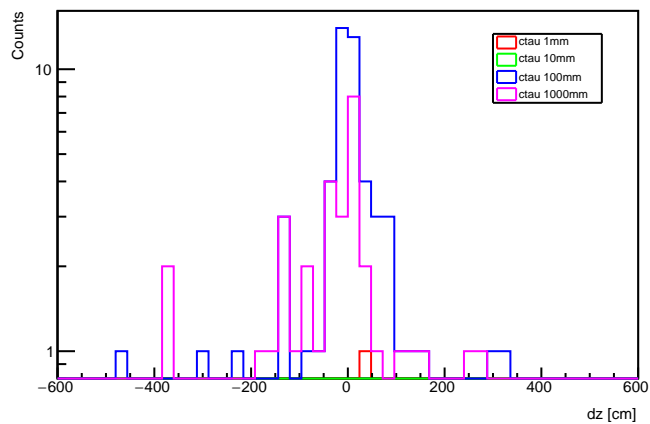
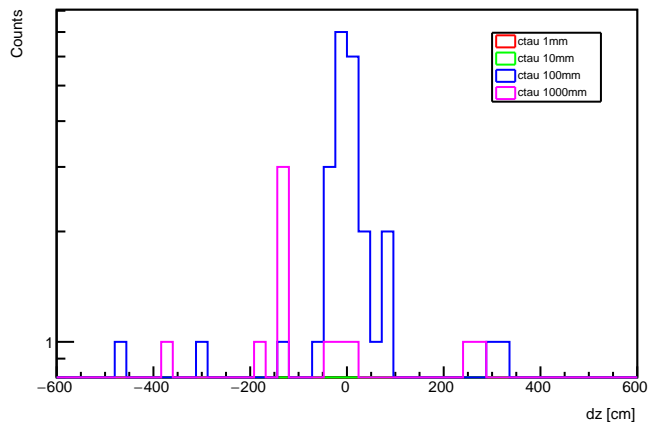
reco all Mu vxy: MET &gt; 120 GeV

reco all Mu vxy:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_{\text{T}} > 30$  GeVreco all Mu vxy: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 

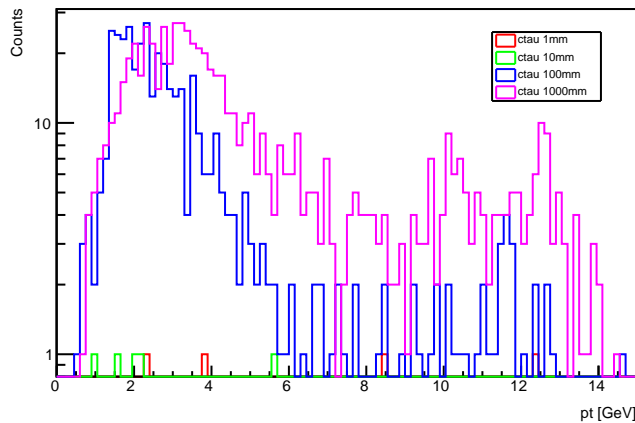
reco all Mu vz: no cuts

reco all Mu vz:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

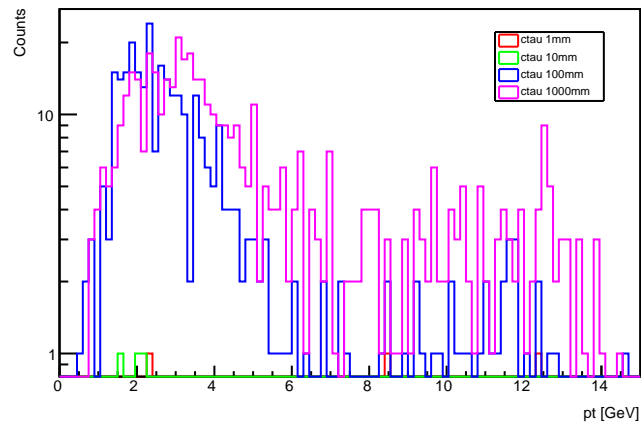
reco all Mu vz: MET &gt; 120 GeV

reco all Mu vz:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVreco all Mu vz: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 

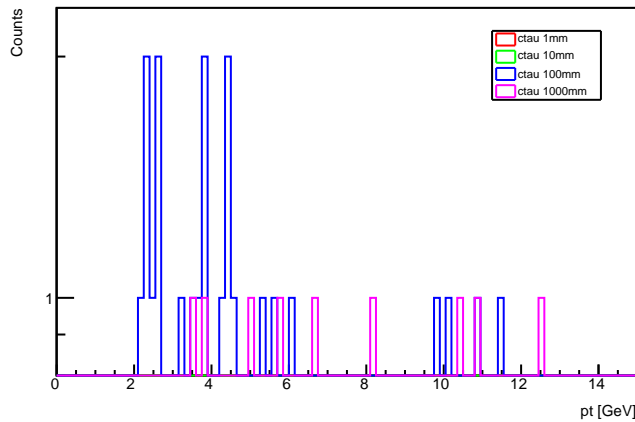
reco subleading Mu pt: no cuts



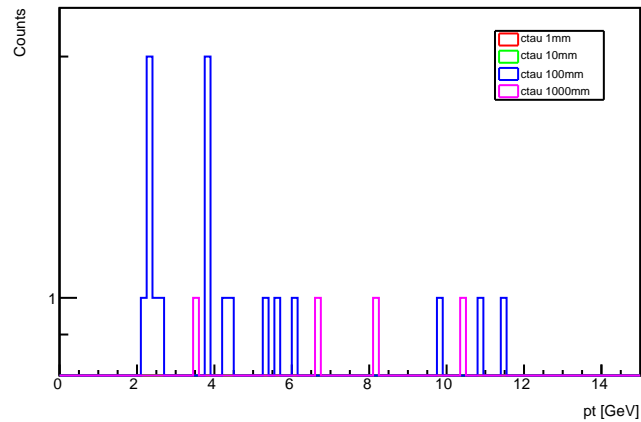
reco subleading Mu pt: n\_jet &gt;=1, j1pt &gt; 30 GeV



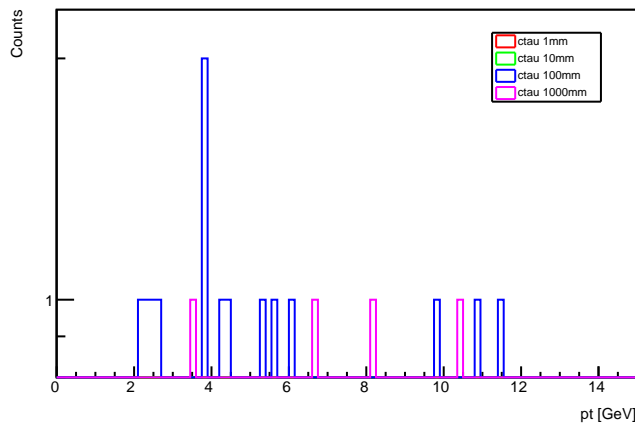
reco subleading Mu pt: MET &gt; 120 GeV



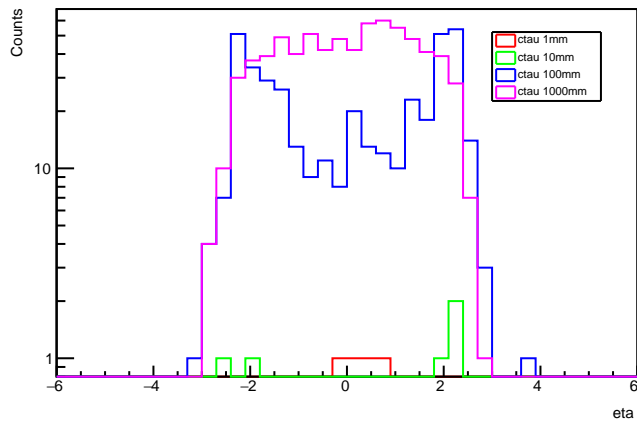
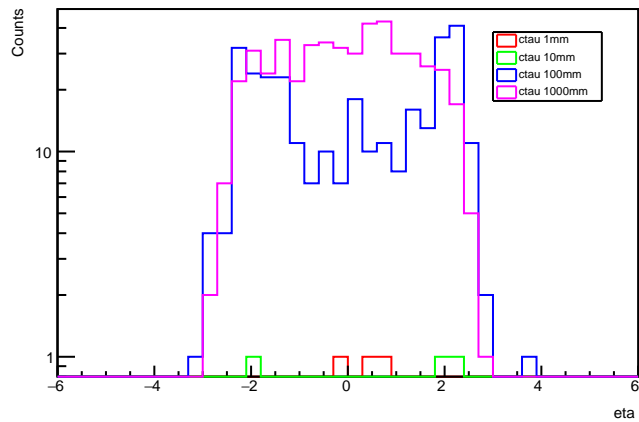
reco subleading Mu pt: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



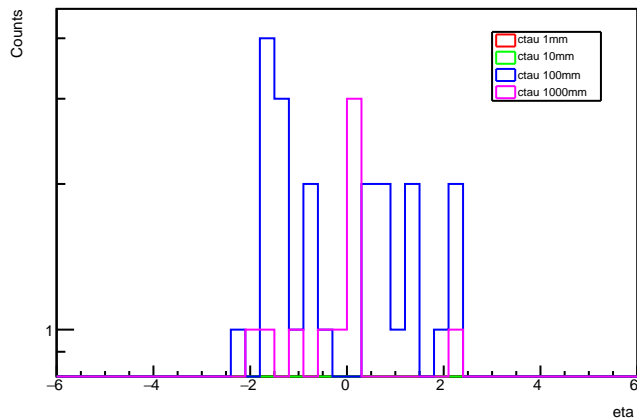
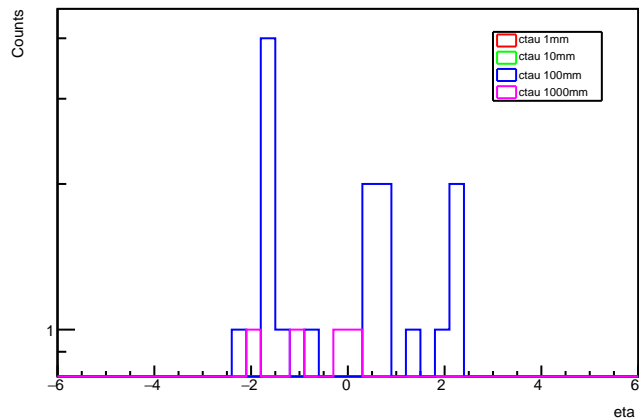
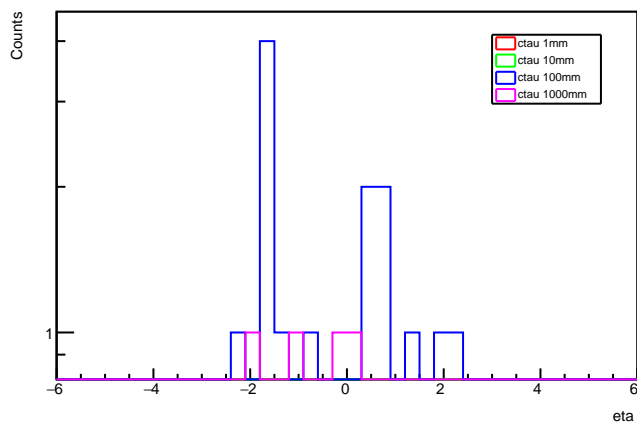
reco subleading Mu pt: at least 2 mu w/ vx &lt; 740 cm, |vz| &lt; 960 cm &amp; |eta| &lt; 2.4



reco subleading Mu eta: no cuts

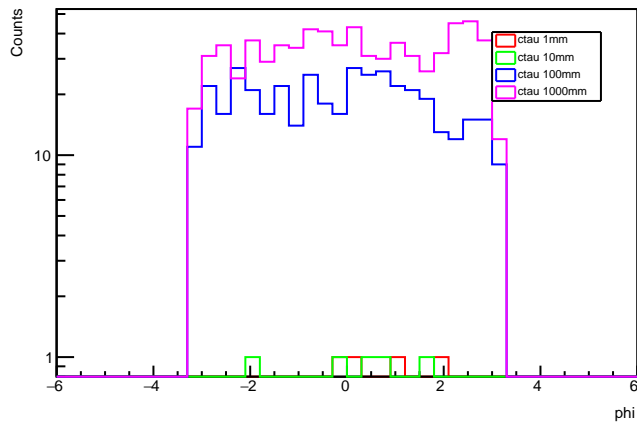
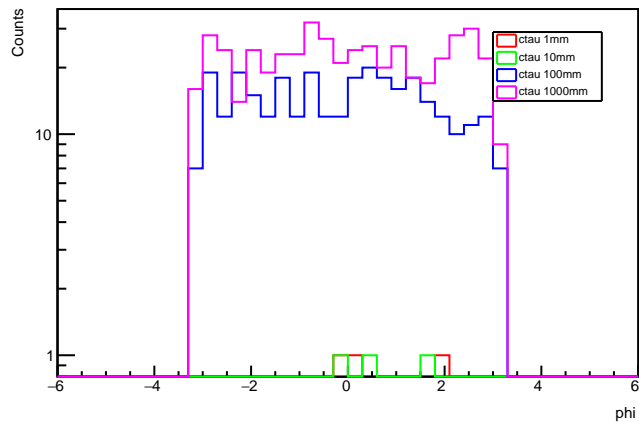
reco subleading Mu eta:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

reco subleading Mu eta: MET &gt; 120 GeV

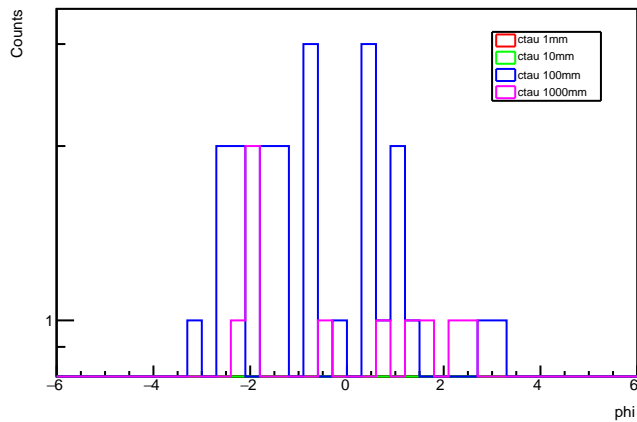
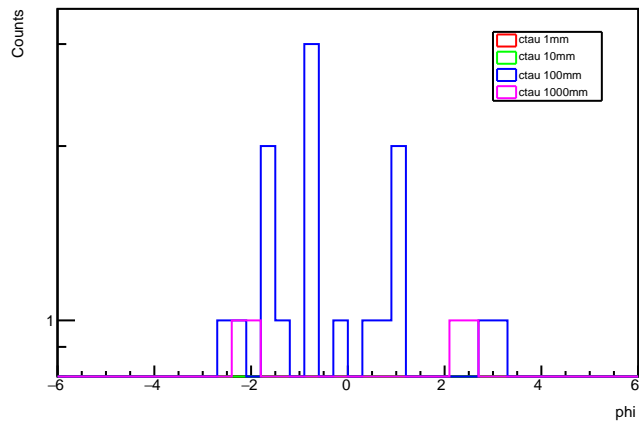
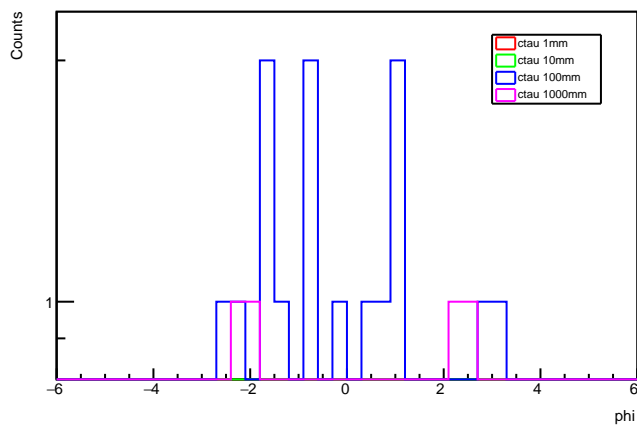
reco subleading Mu eta:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVreco subleading Mu eta: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 



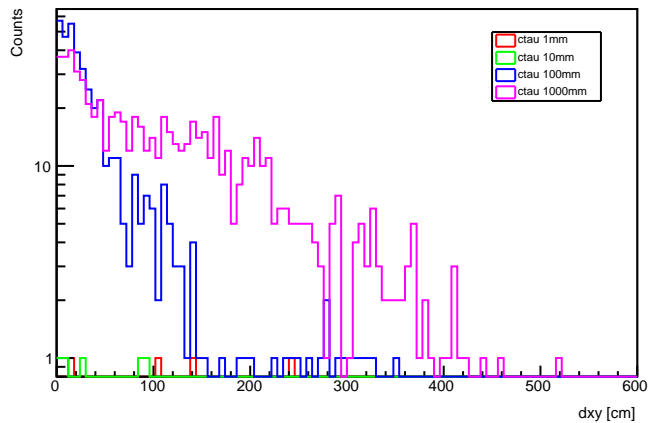
reco subleading Mu phi: no cuts

reco subleading Mu phi:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

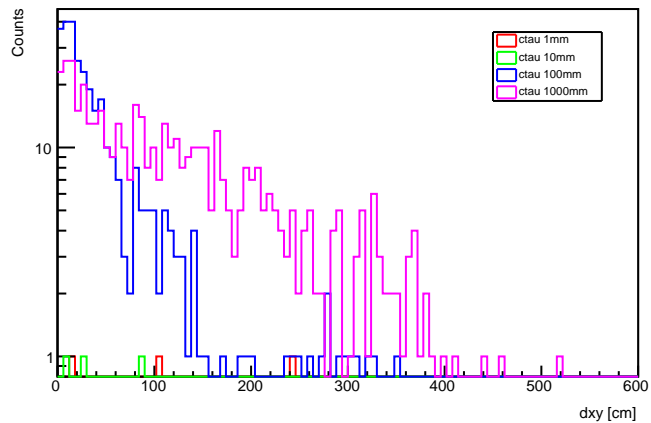
reco subleading Mu phi: MET &gt; 120 GeV

reco subleading Mu phi:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVreco subleading Mu phi: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta_{\text{jet}}| < 2.4$ 

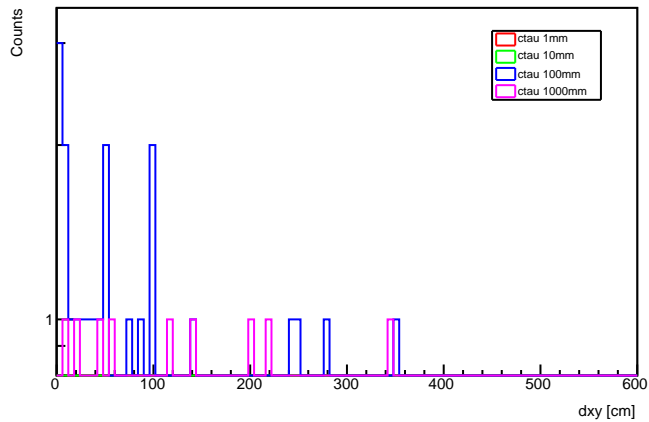
reco subleading Mu vxy: no cuts



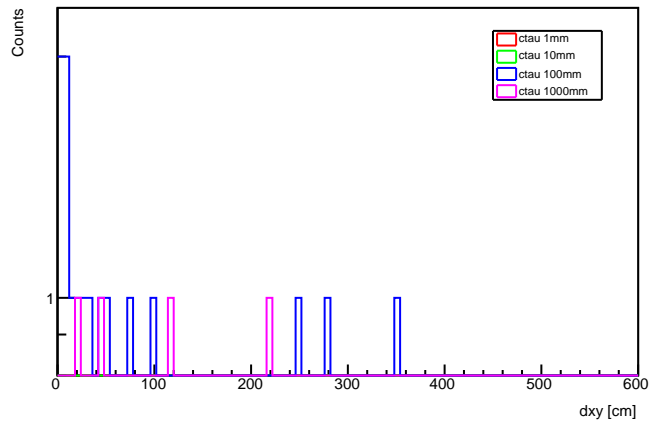
reco subleading Mu vxy:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV



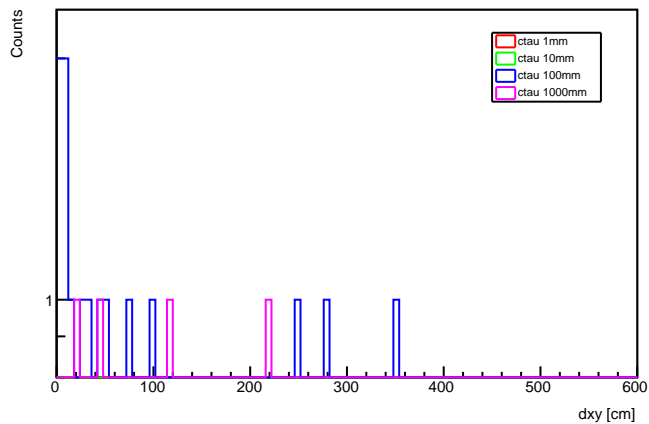
reco subleading Mu vxy: MET > 120 GeV



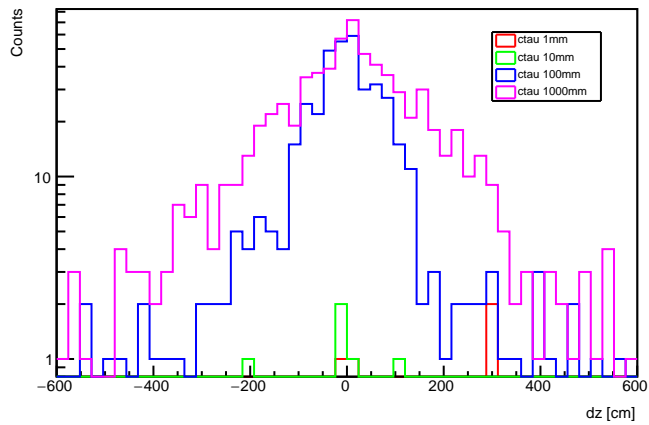
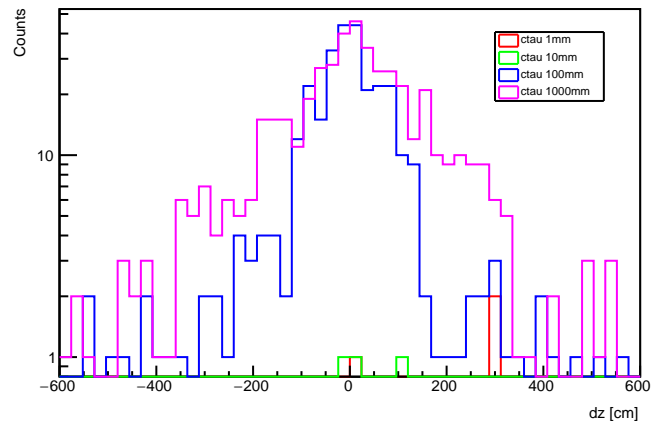
reco subleading Mu vxy:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeV



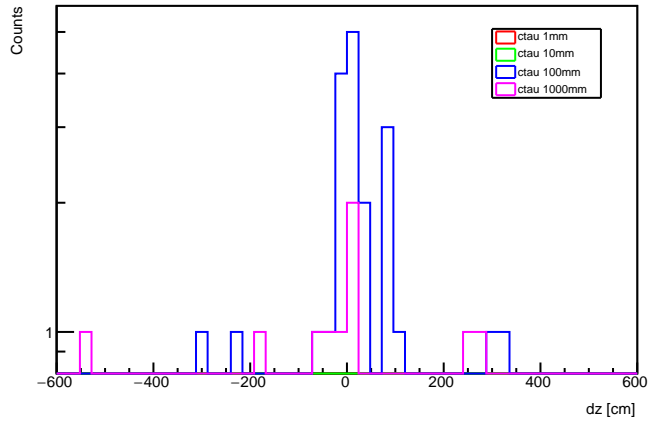
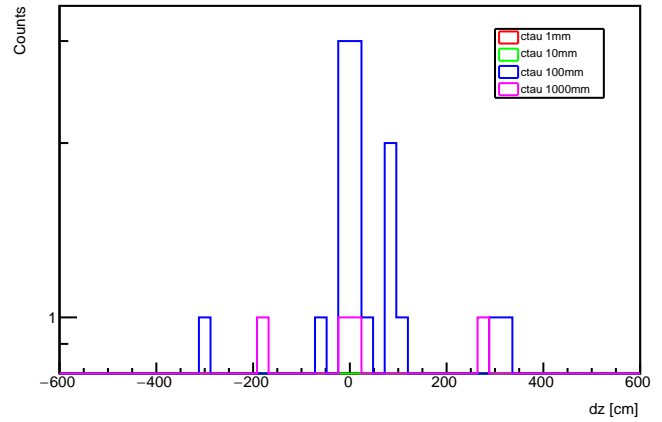
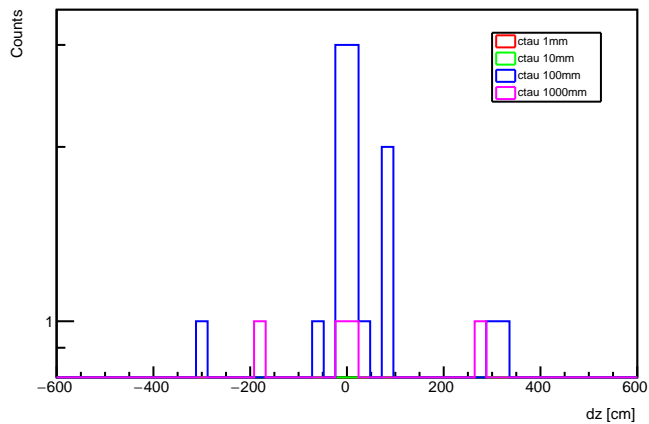
reco subleading Mu vxy: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$



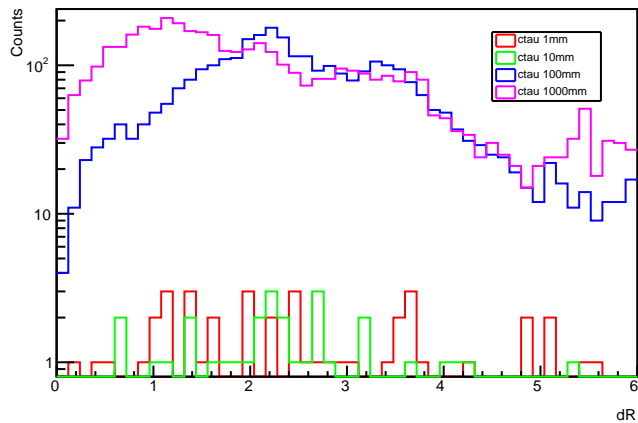
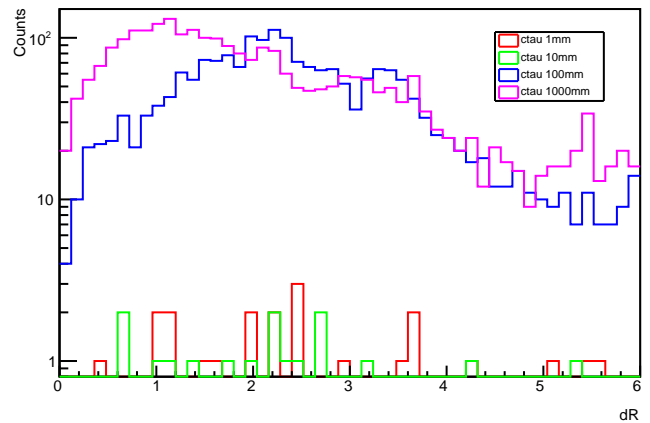
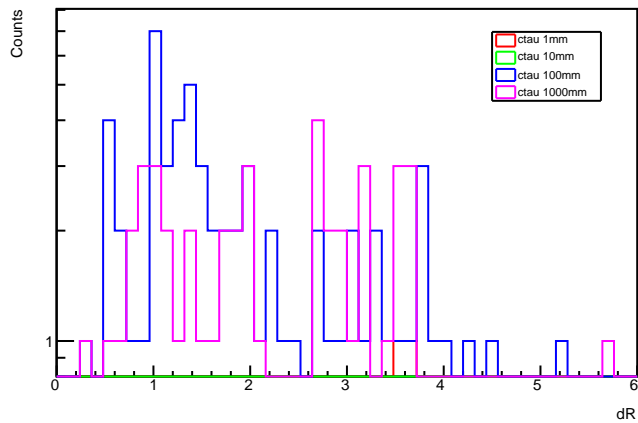
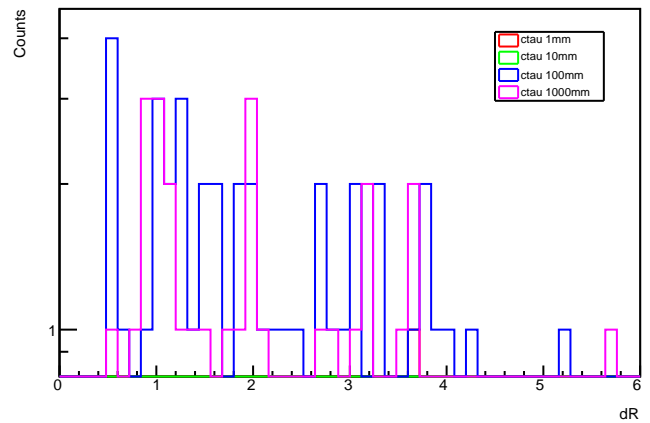
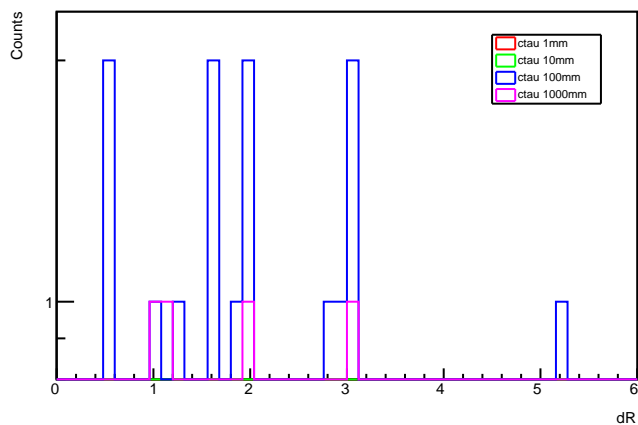
reco subleading Mu vz: no cuts

reco subleading Mu vz:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

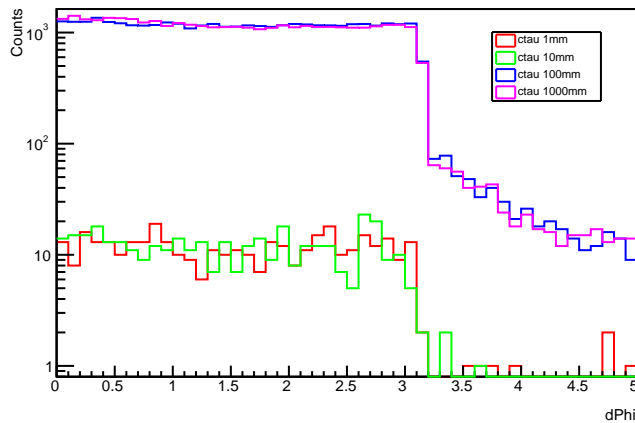
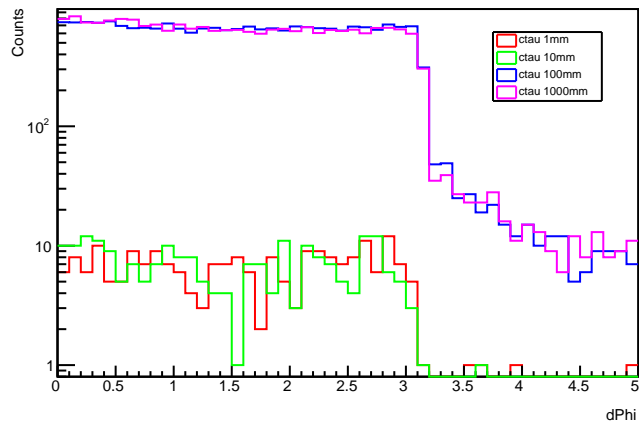
reco subleading Mu vz: MET &gt; 120 GeV

reco subleading Mu vz:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVreco subleading Mu vz: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta_a| < 2.4$ 

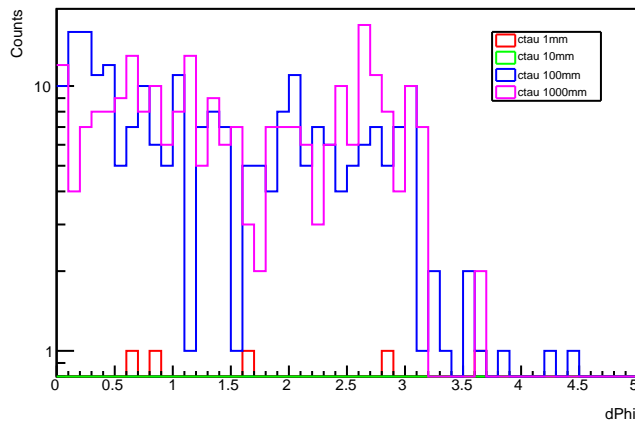
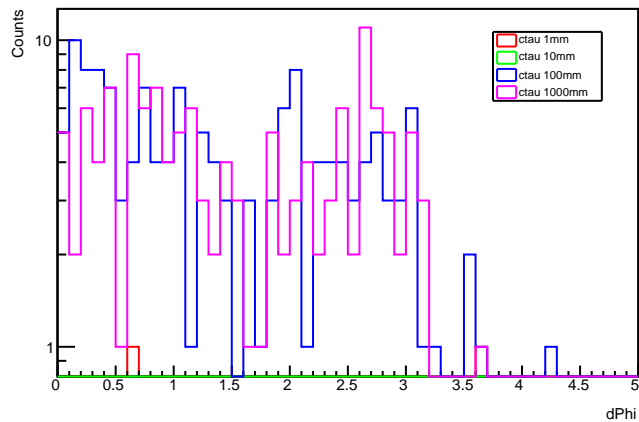
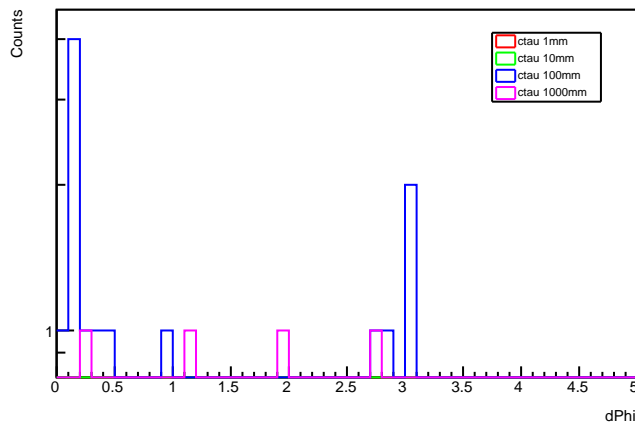
dR: reco leading mu and subleading mu: no cuts

dR: reco leading mu and subleading mu:  $n_{\text{jet}} \geq 1$ ,  $j1pt > 30 \text{ GeV}$ dR: reco leading mu and subleading mu:  $\text{MET} > 120 \text{ GeV}$ dR: reco leading mu and subleading mu:  $j1pt > 120$ , at most 2 jets w/  $pt > 30 \text{ GeV}$ dR: reco leading mu and subleading mu: at least 2 mu w/  $vxy < 740 \text{ cm}$ ,  $|vz| < 960 \text{ cm}$  &  $|\eta| < 2.4$ 

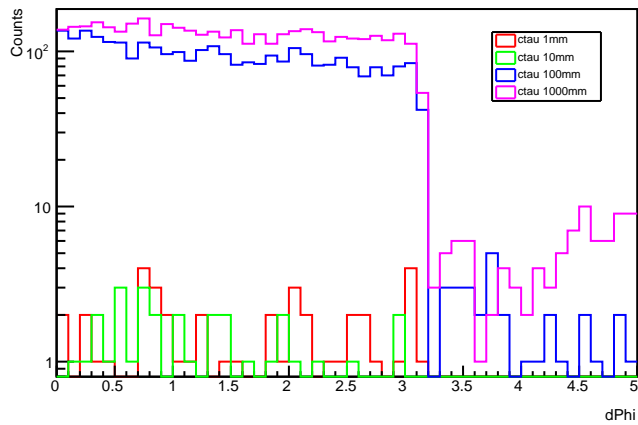
dPhi: reco MET and leading mu: no cuts

dPhi: reco MET and leading mu:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

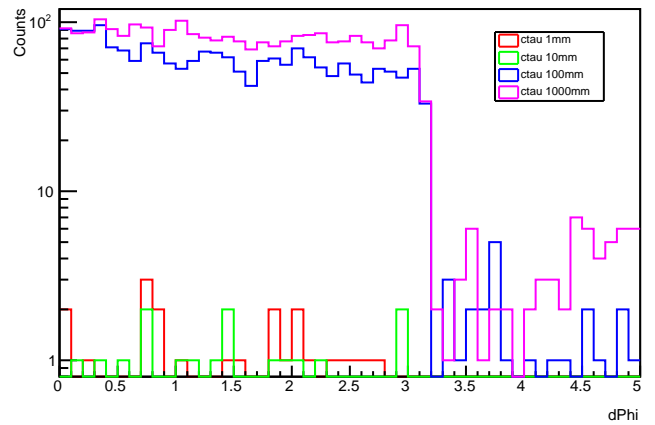
dPhi: reco MET and leading mu: MET &gt; 120 GeV

dPhi: reco MET and leading mu:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVdPhi: reco MET and leading mu: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta_{\text{jet}}| < 2.4$ 

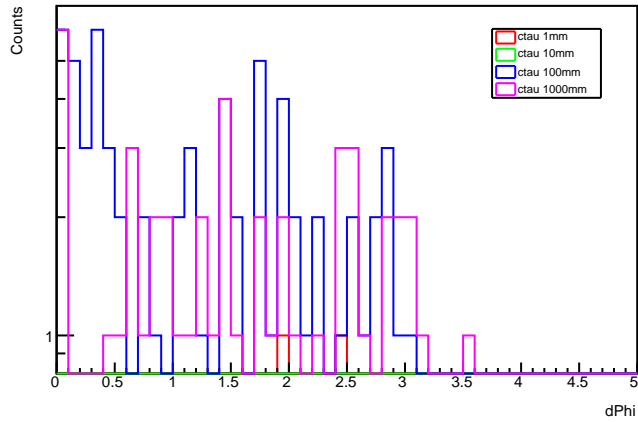
dPhi: reco leading mu and subleading mu: no cuts



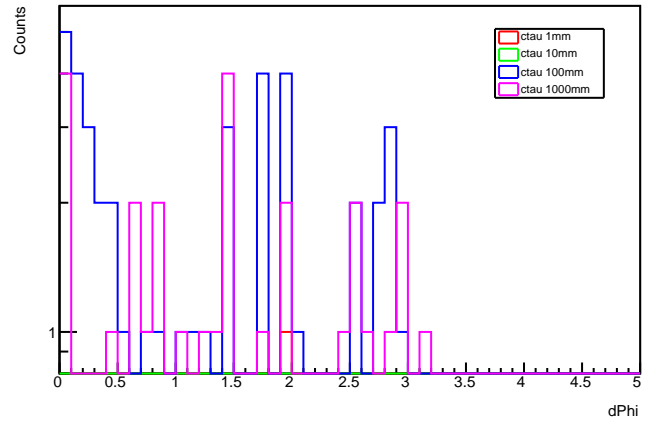
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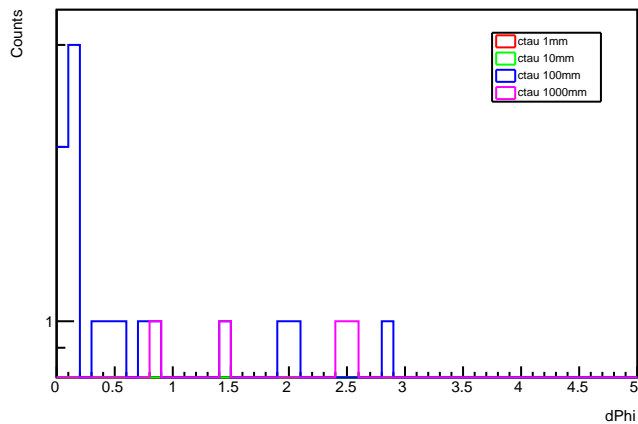
dPhi: reco leading mu and subleading mu: MET &gt; 120 GeV



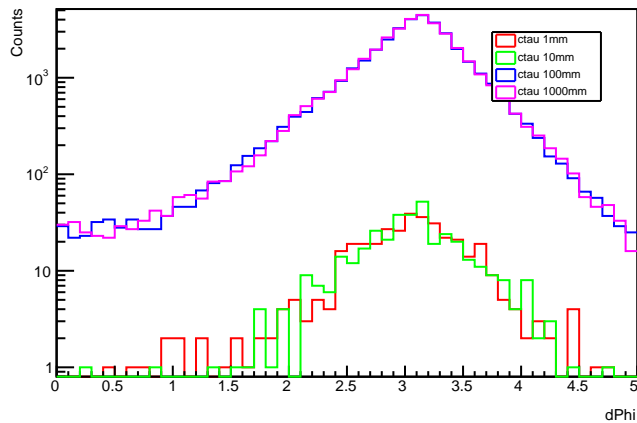
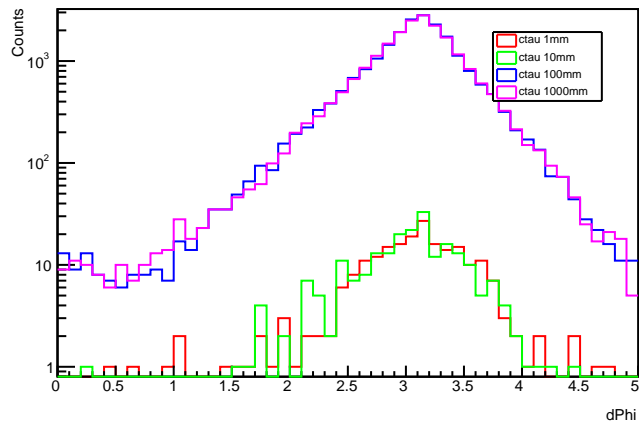
dPhi: reco leading mu and subleading mu: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



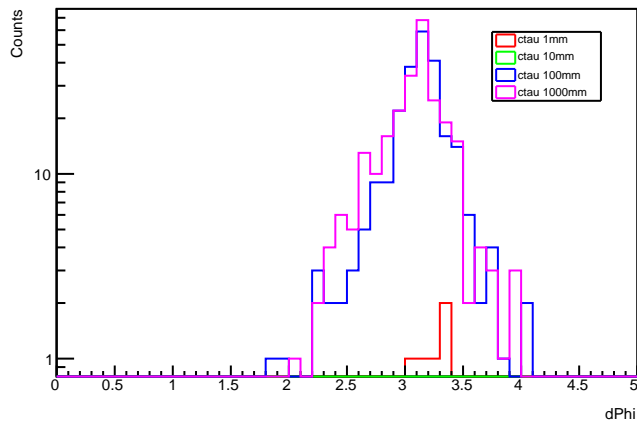
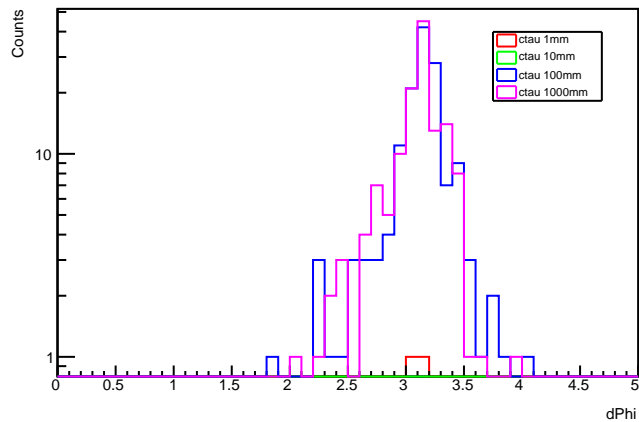
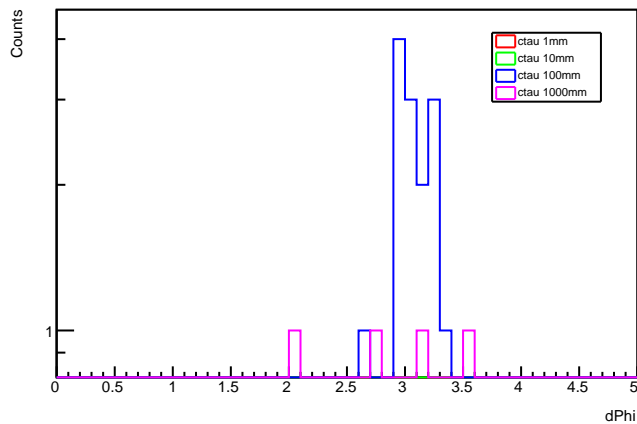
dPhi: reco leading mu and subleading mu: at least 2 mu w/ vx &lt; 740 cm, |vz| &lt; 960 cm &amp; |eta| &lt; 2.4



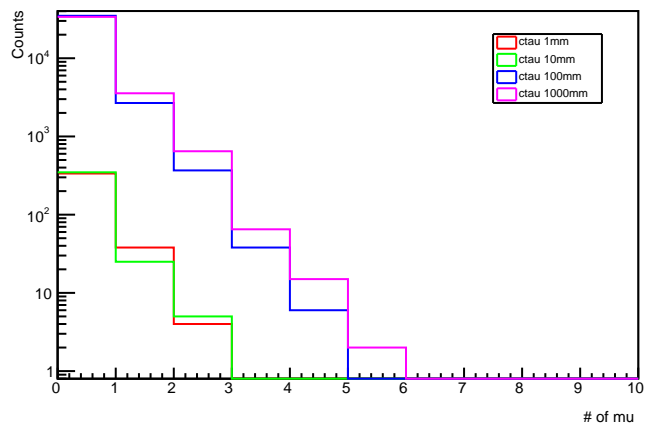
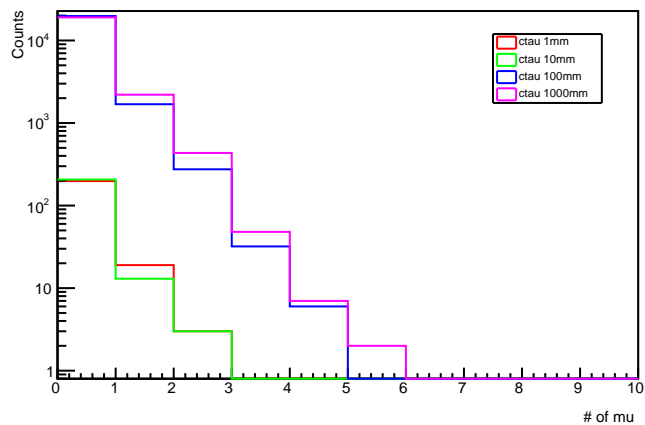
dPhi: reco MET and leading jet: no cuts

dPhi: reco MET and leading jet:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

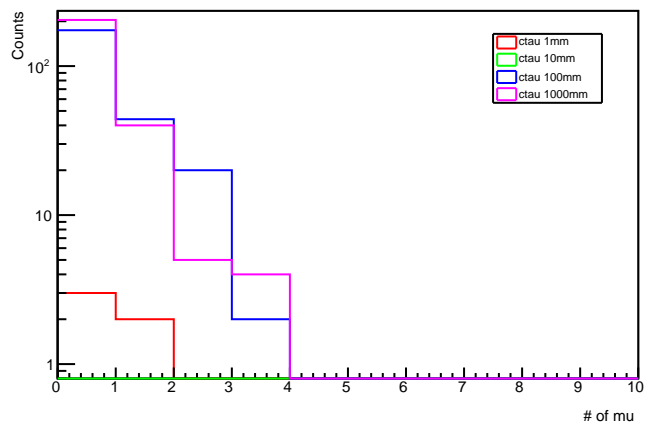
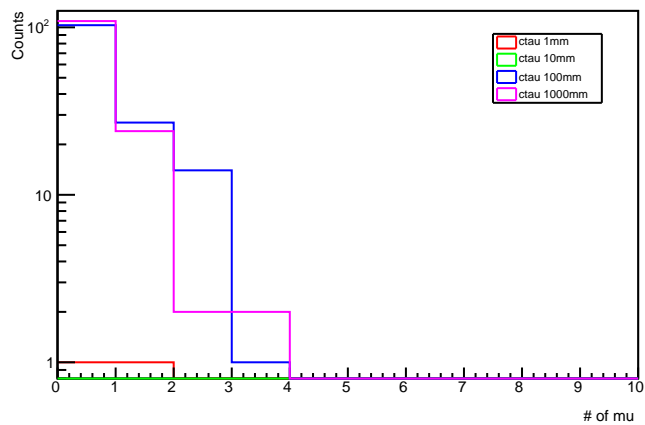
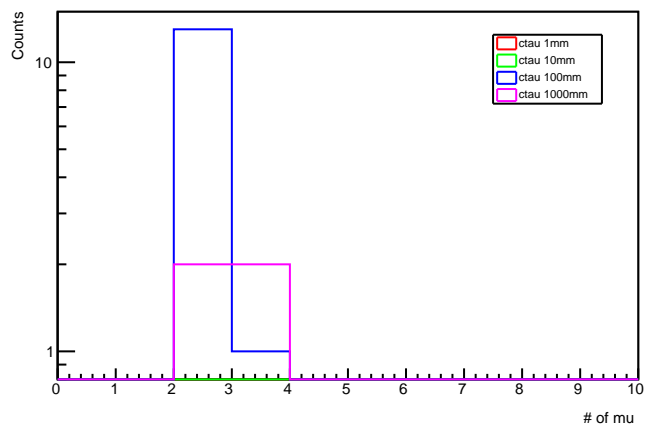
dPhi: reco MET and leading jet: MET &gt; 120 GeV

dPhi: reco MET and leading jet:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVdPhi: reco MET and leading jet: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 

reco number of mu: no cuts

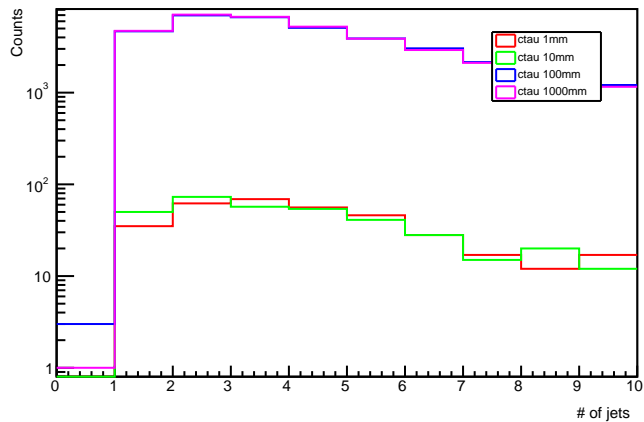
reco number of mu:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

reco number of mu: MET &gt; 120 GeV

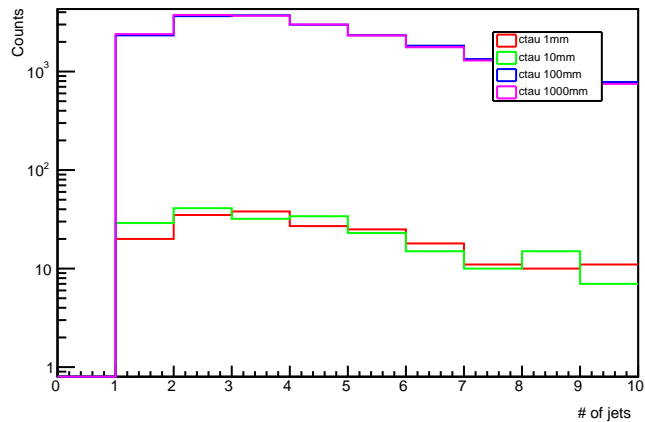
reco number of mu:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVreco number of mu: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$ 



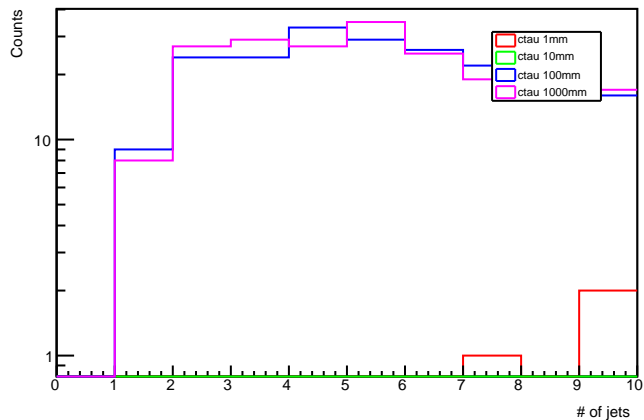
reco number of jets: no cuts



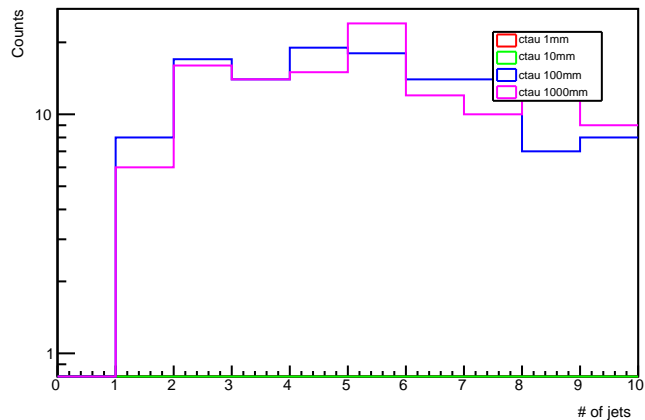
reco number of jets:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30 \text{ GeV}$



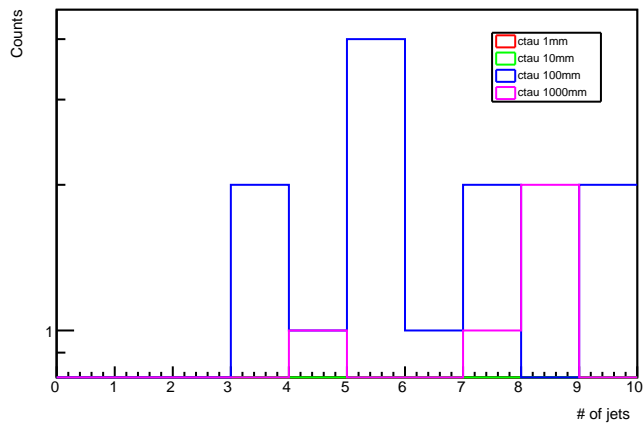
reco number of jets:  $\text{MET} > 120 \text{ GeV}$



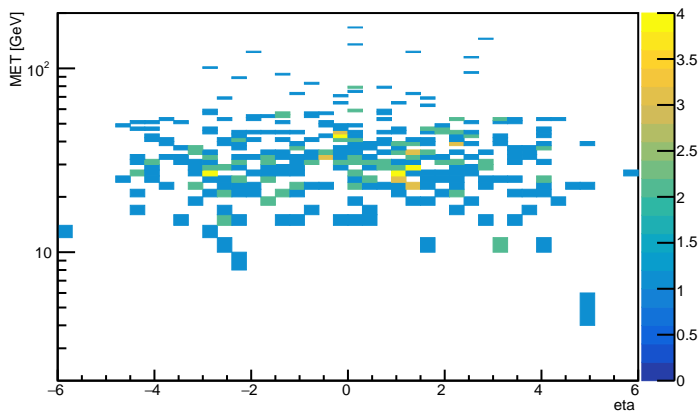
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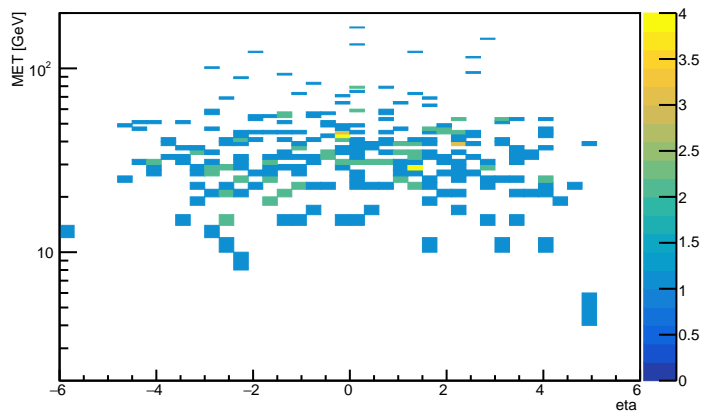
reco number of jets: at least 2 mu w/  $v_{xy} < 740 \text{ cm}$ ,  $|v_z| < 960 \text{ cm}$  &  $|\eta| < 2.4$



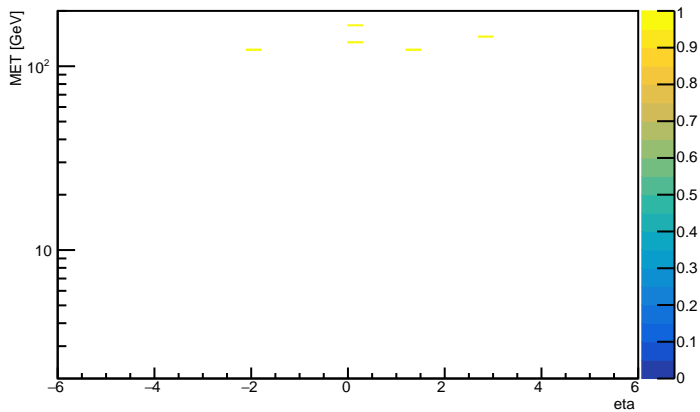
ctau 1mm gen leading Met eta vs pt: no cuts



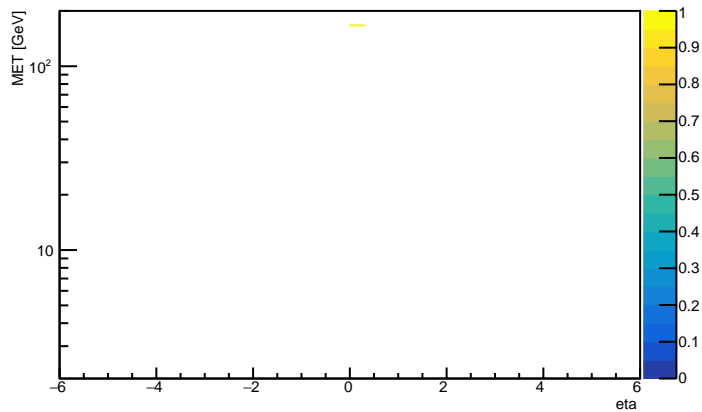
ctau 1mm gen leading Met eta vs pt:  $n_{\text{jet}} \geq 1, j_{1\text{pt}} > 30 \text{ GeV}$



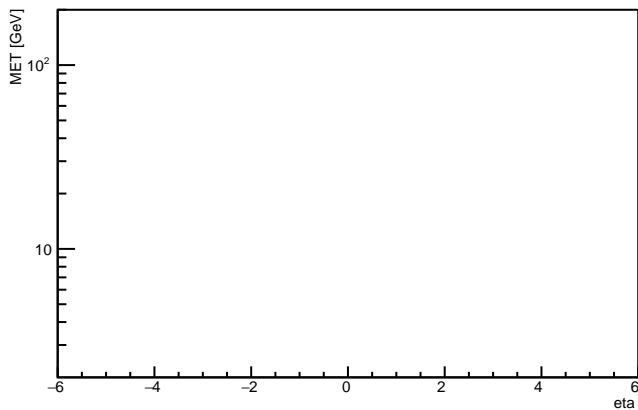
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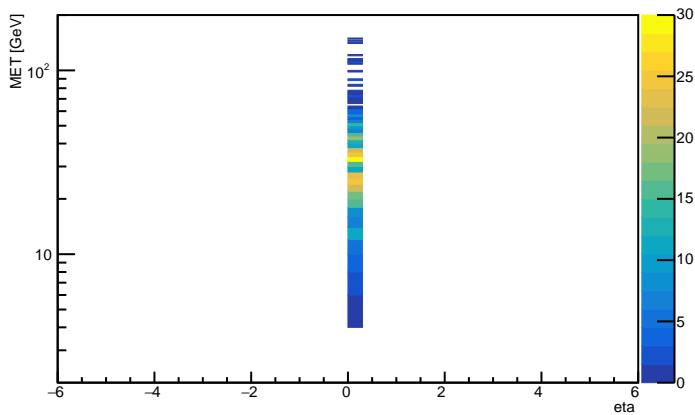
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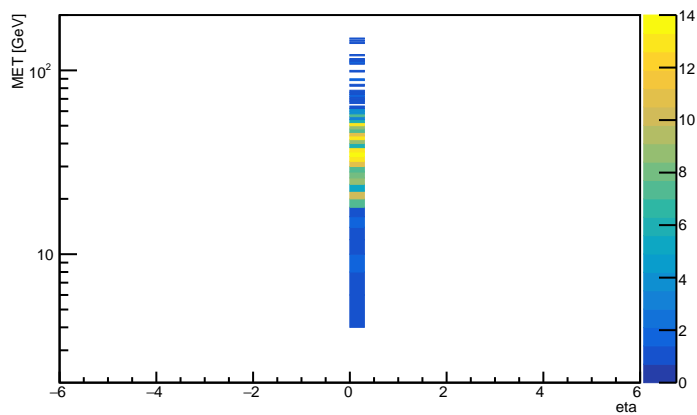
ctau 1mm gen leading Met eta vs pt: at least 2 mu w/  $v_{xy} < 740 \text{ cm}, |v_z| < 960 \text{ cm} \ \& \ |\eta_{\text{jet}}| < 2.4$



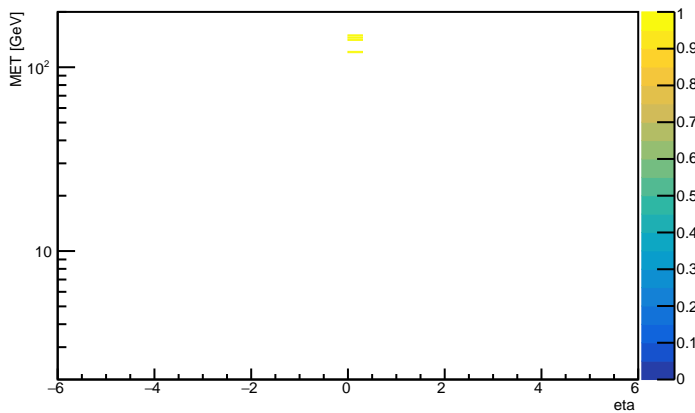
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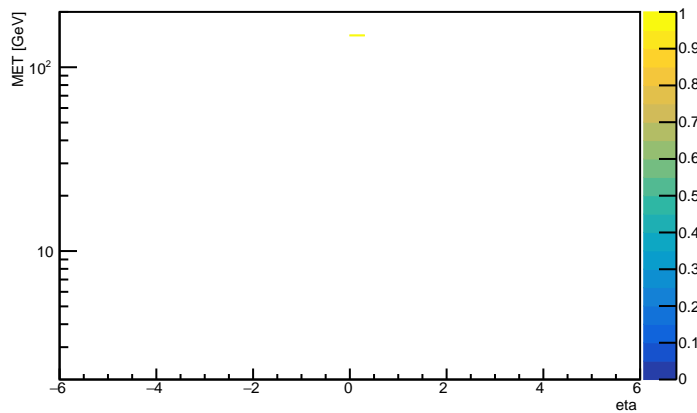
ctau 1mm reco leading Met eta vs pt:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV



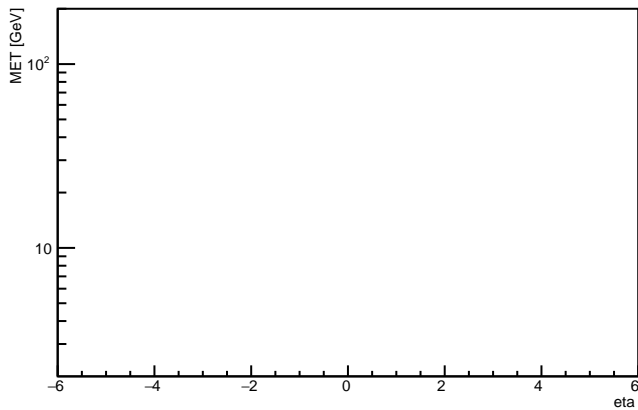
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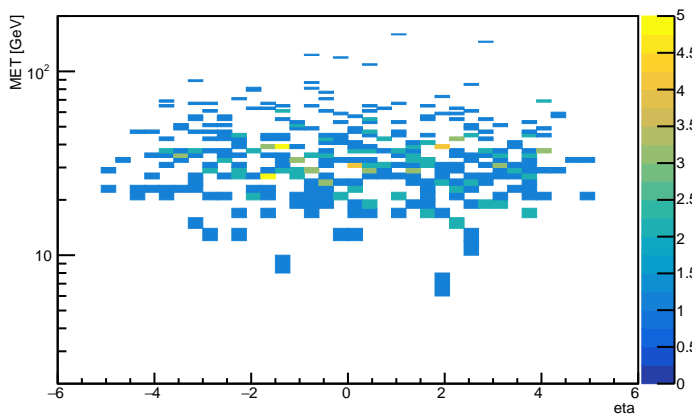
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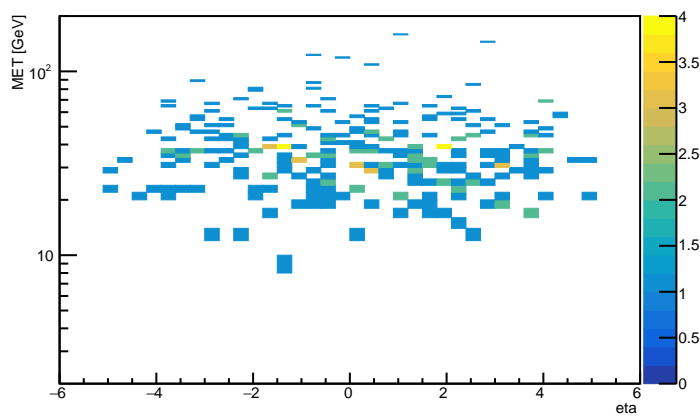
ctau 1mm reco leading Met eta vs pt: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\text{eta}| < 2.4$



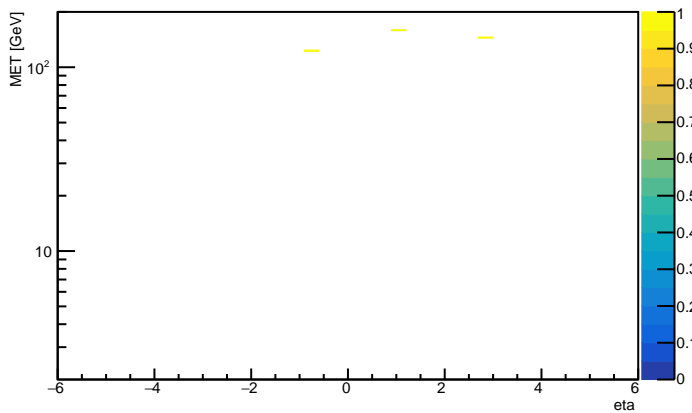
ctau 10mm gen leading Met eta vs pt: no cuts



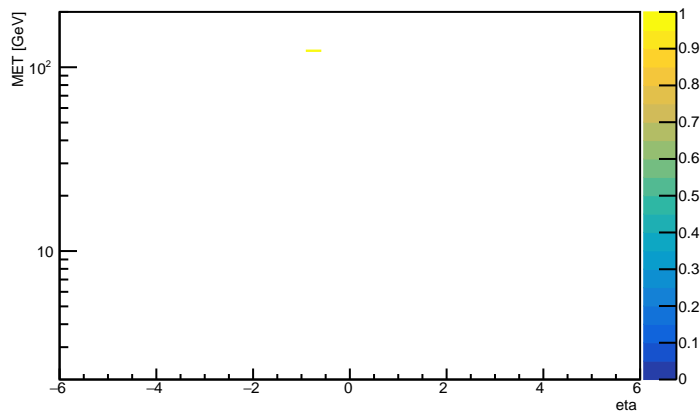
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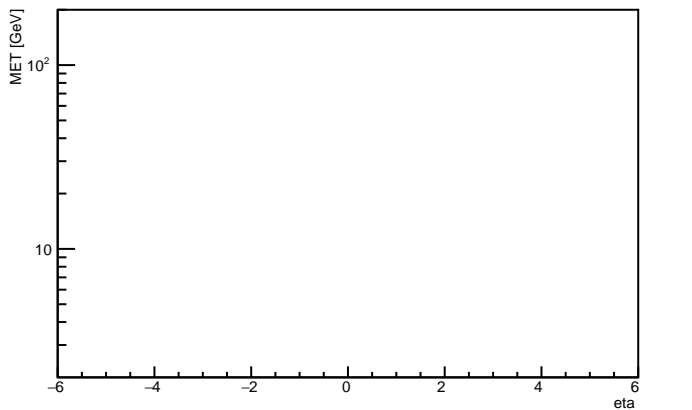
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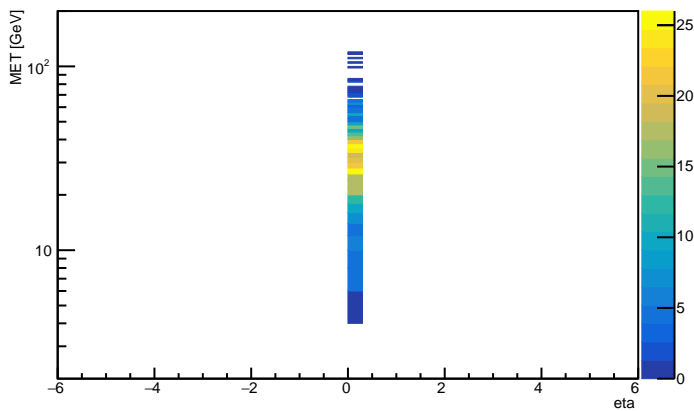
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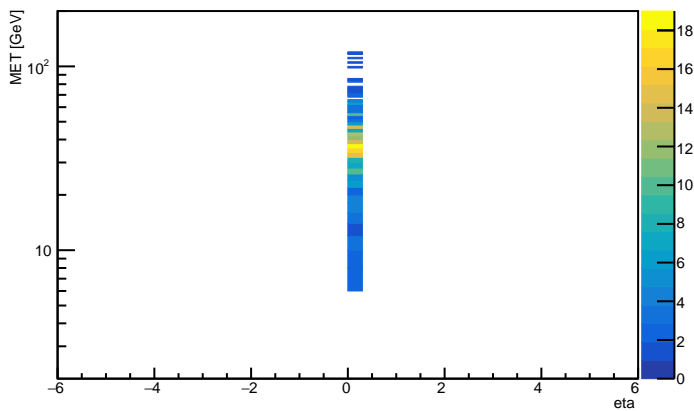
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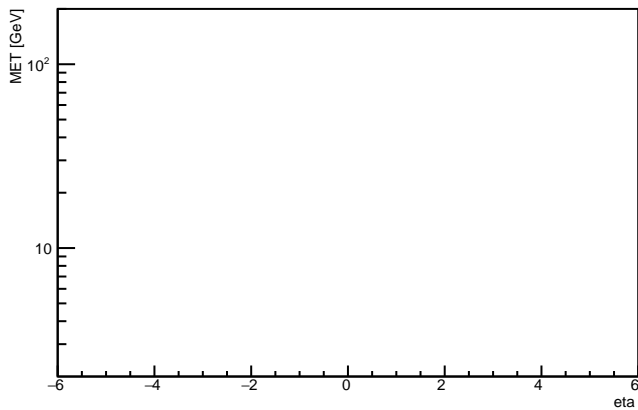
ctau 10mm reco leading Met eta vs pt: no cuts



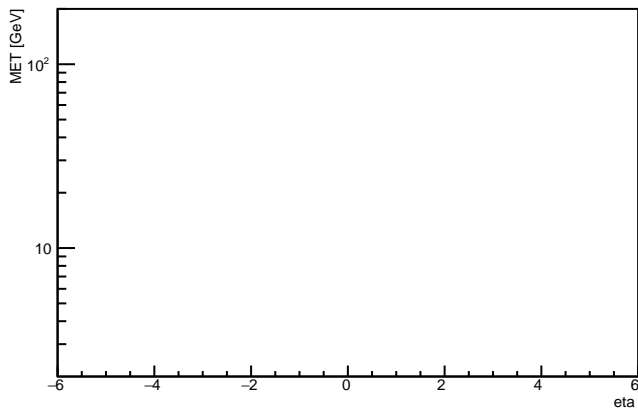
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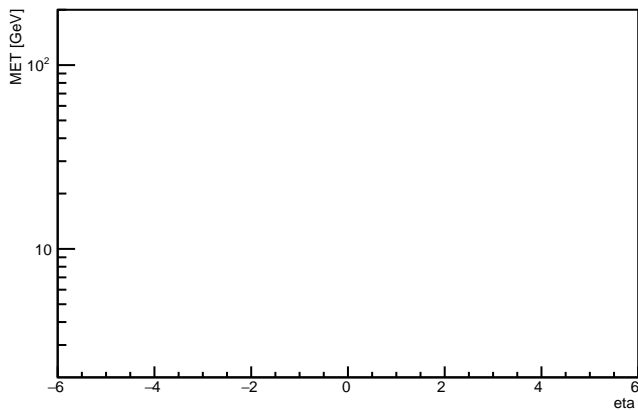
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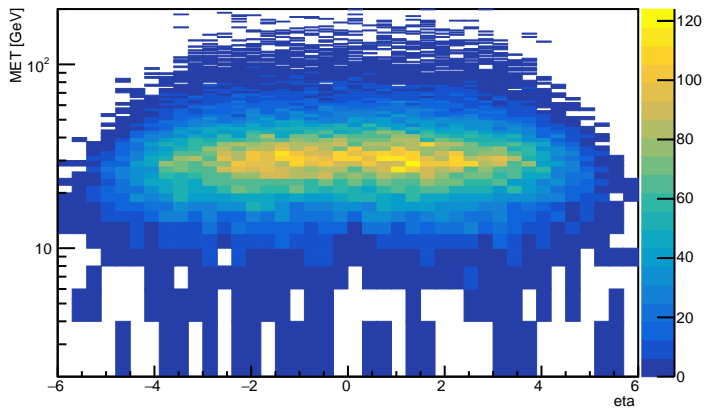
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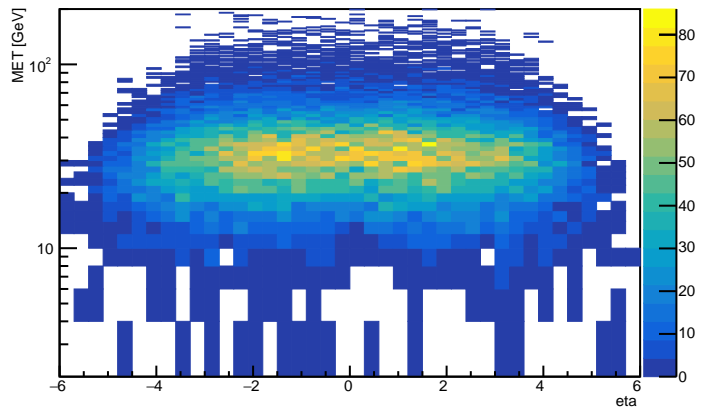
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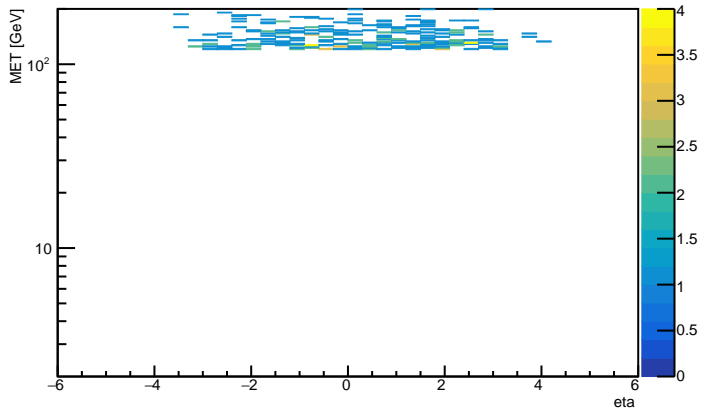
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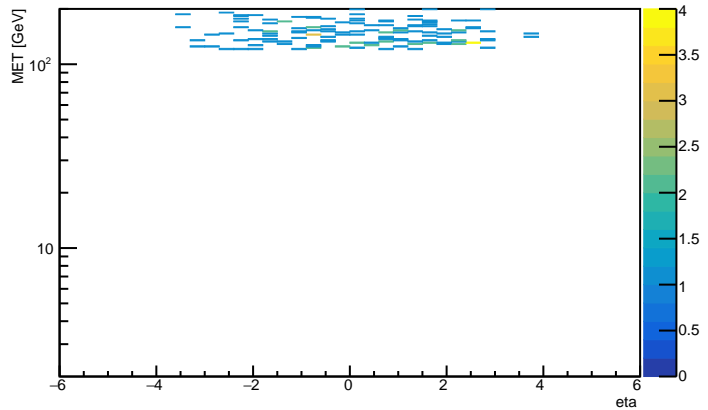
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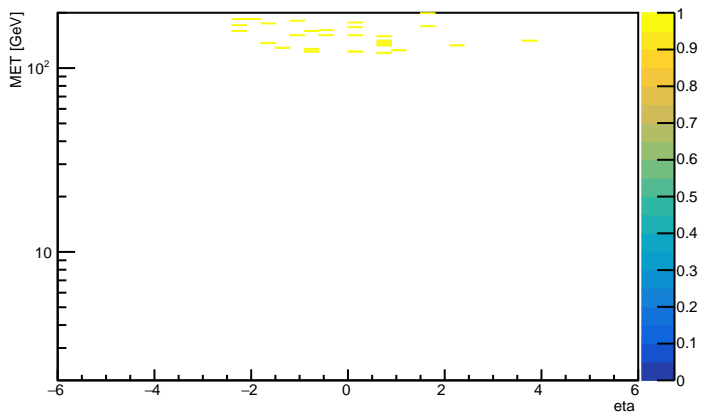
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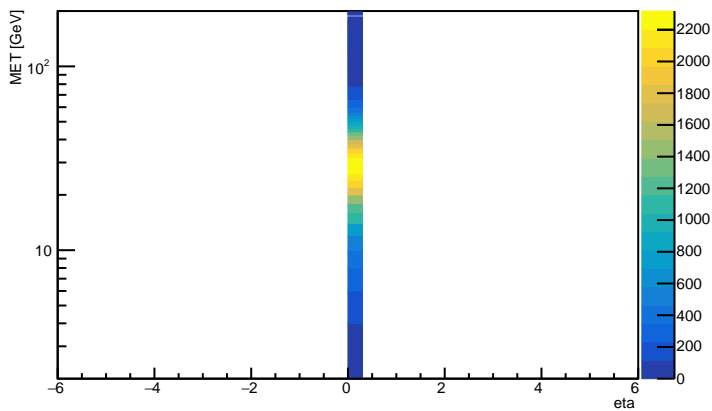
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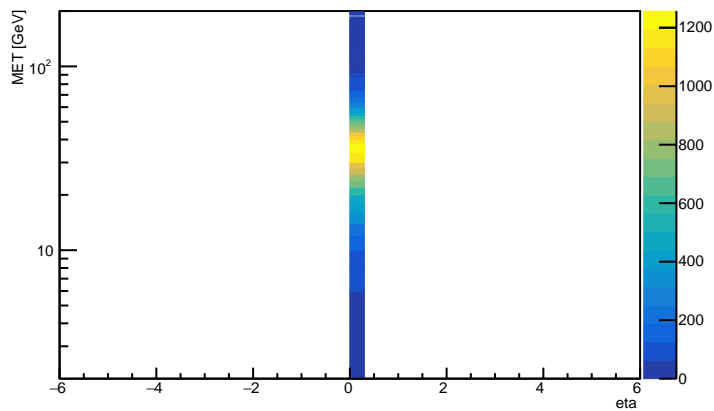
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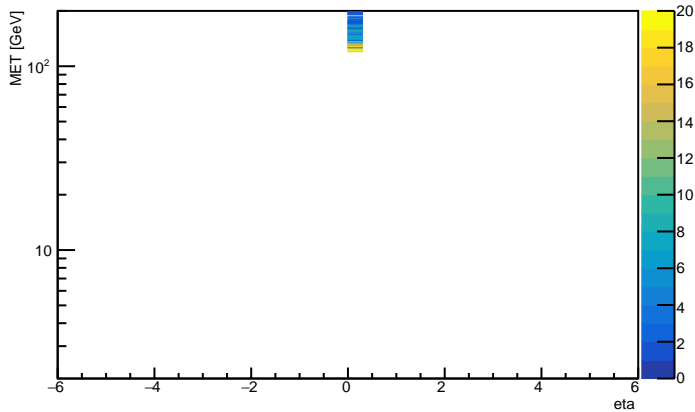
ctau 100mm reco leading Met eta vs pt: no cuts



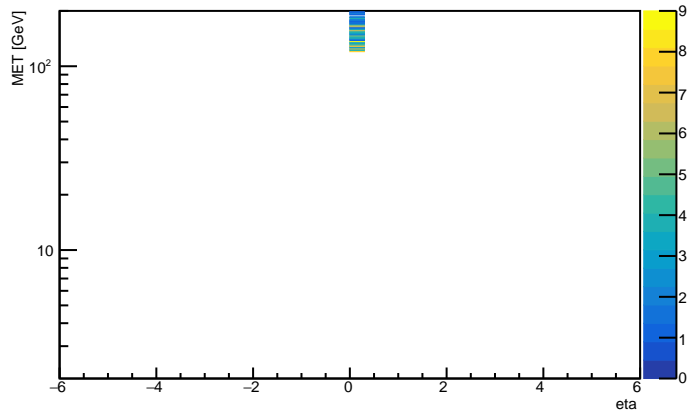
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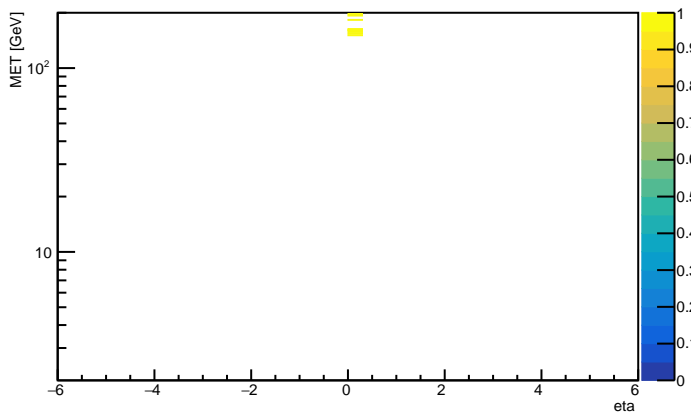
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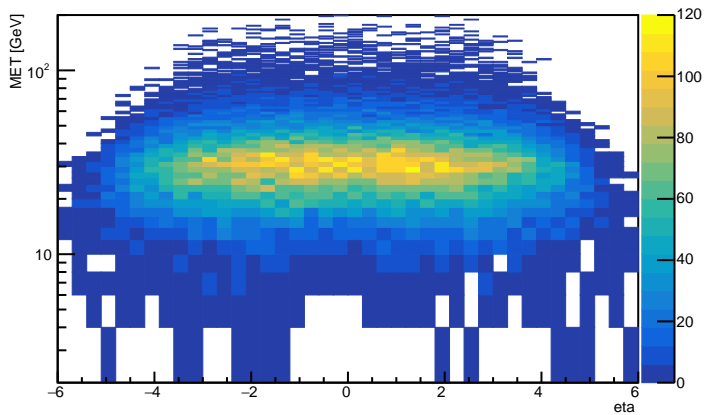
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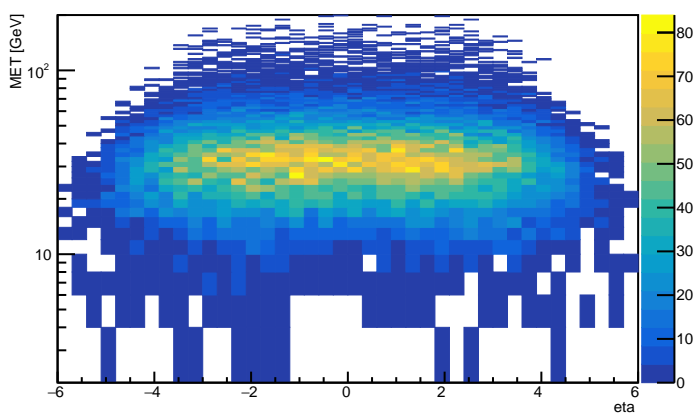
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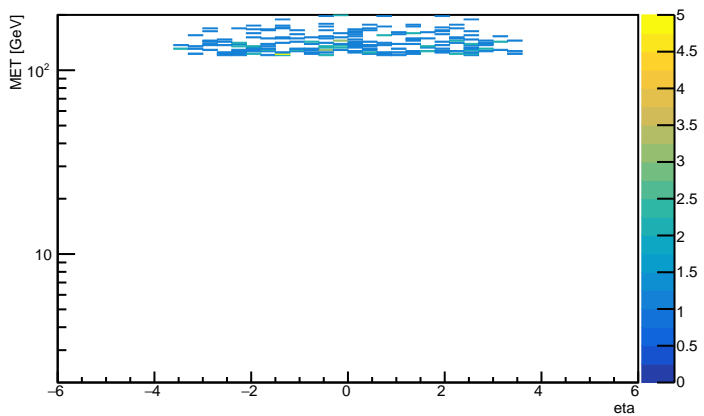
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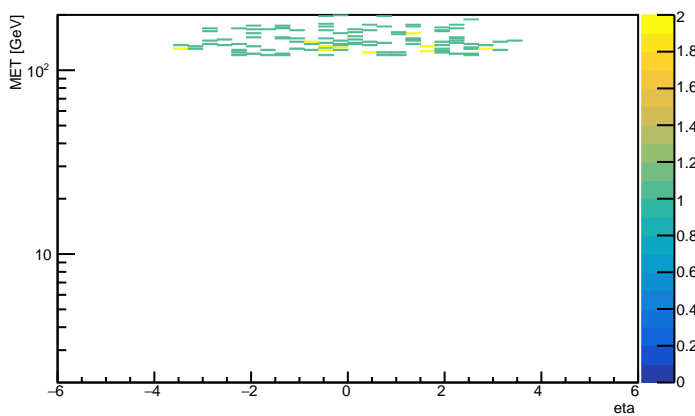
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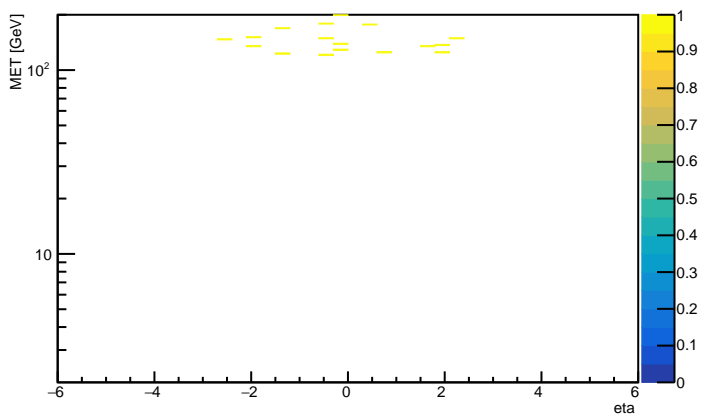
ctau 1000mm gen leading Met eta vs pt: MET > 120 GeV



ctau 1000mm gen leading Met eta vs pt:  $j1pt > 120$ , at most 2 jets w/  $pt > 30$  GeV

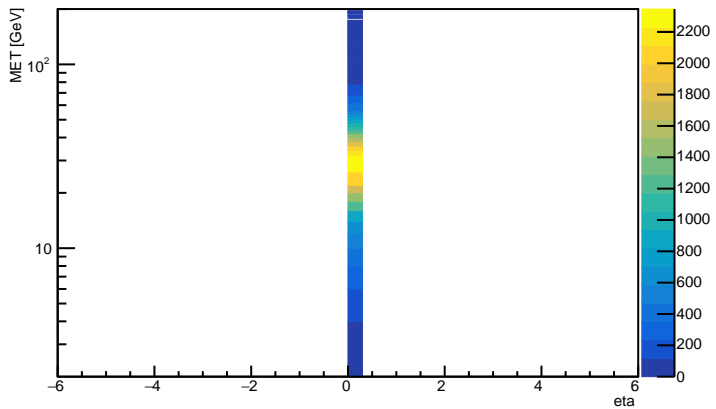


ctau 1000mm gen leading Met eta vs pt: at least 2 mu w/  $vxy < 740$  cm,  $|vz| < 960$  cm &  $|\eta| < 2.4$

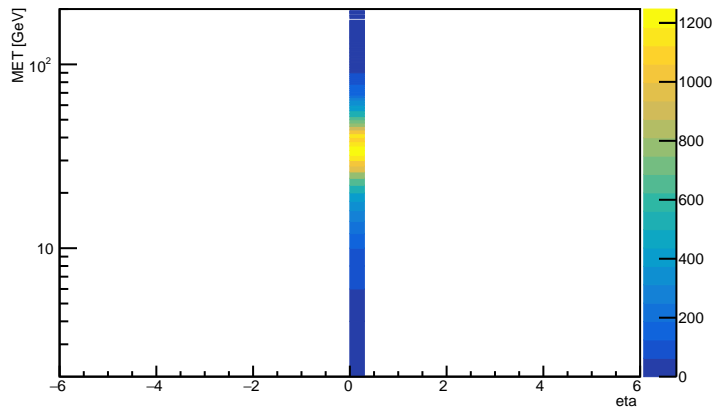




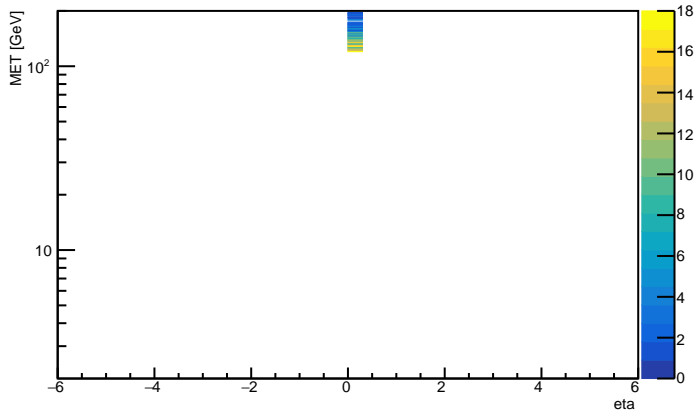
ctau 1000mm reco leading Met eta vs pt: no cuts



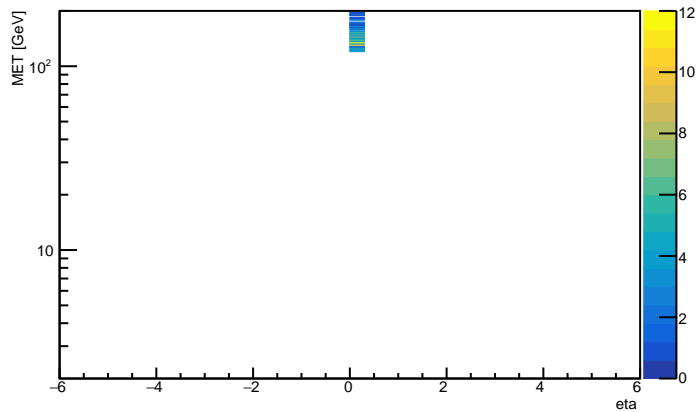
ctau 1000mm reco leading Met eta vs pt:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV



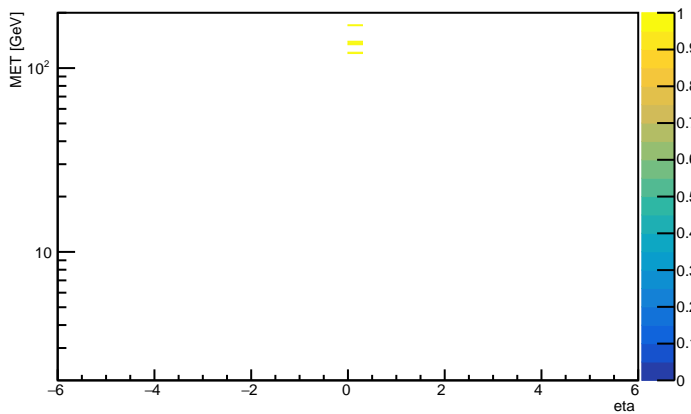
ctau 1000mm reco leading Met eta vs pt: MET > 120 GeV



ctau 1000mm reco leading Met eta vs pt:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeV

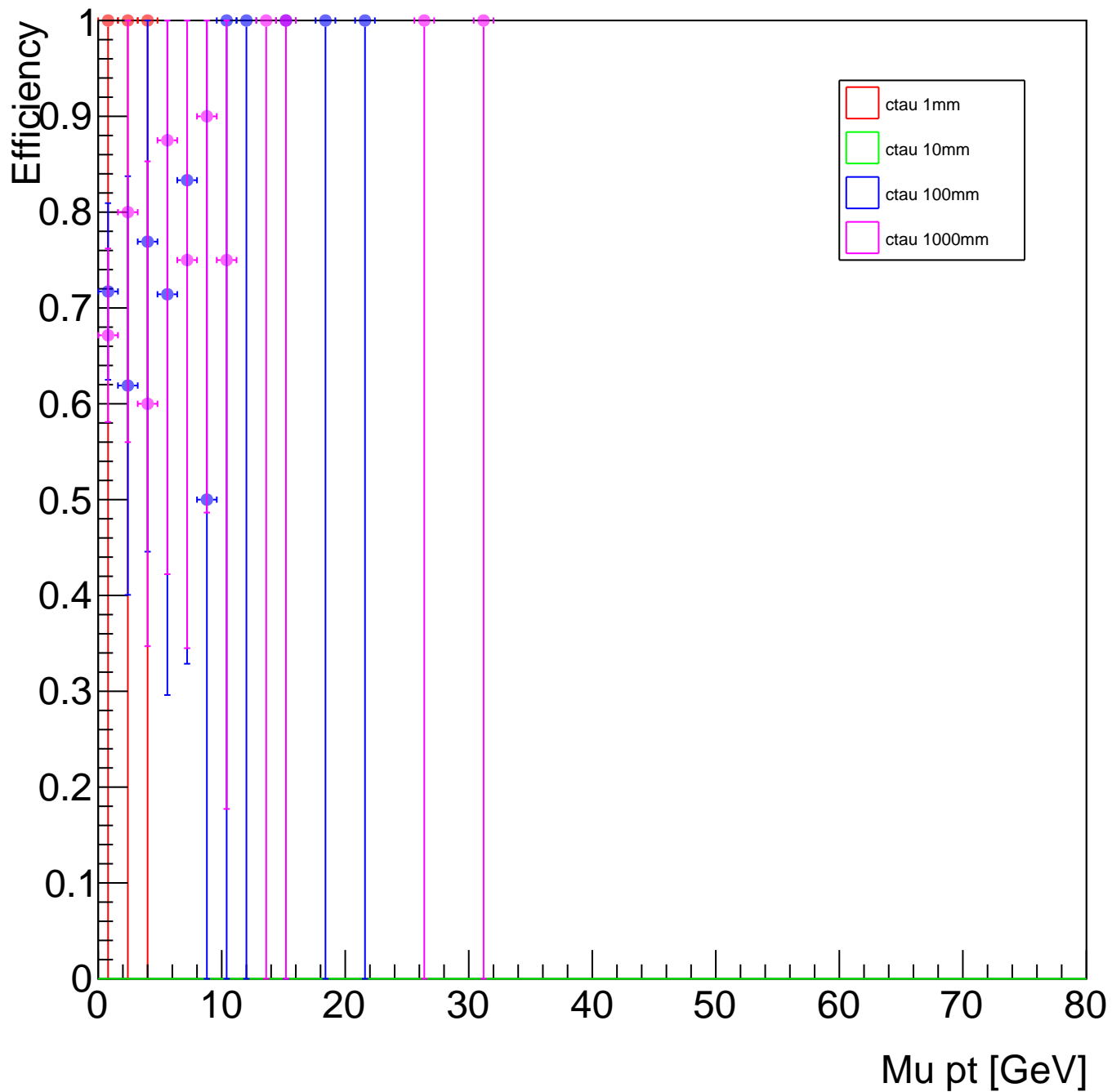


ctau 1000mm reco leading Met eta vs pt: at least 2 mu w/  $v_{xy} < 740$  cm,  $|v_z| < 960$  cm &  $|\eta| < 2.4$

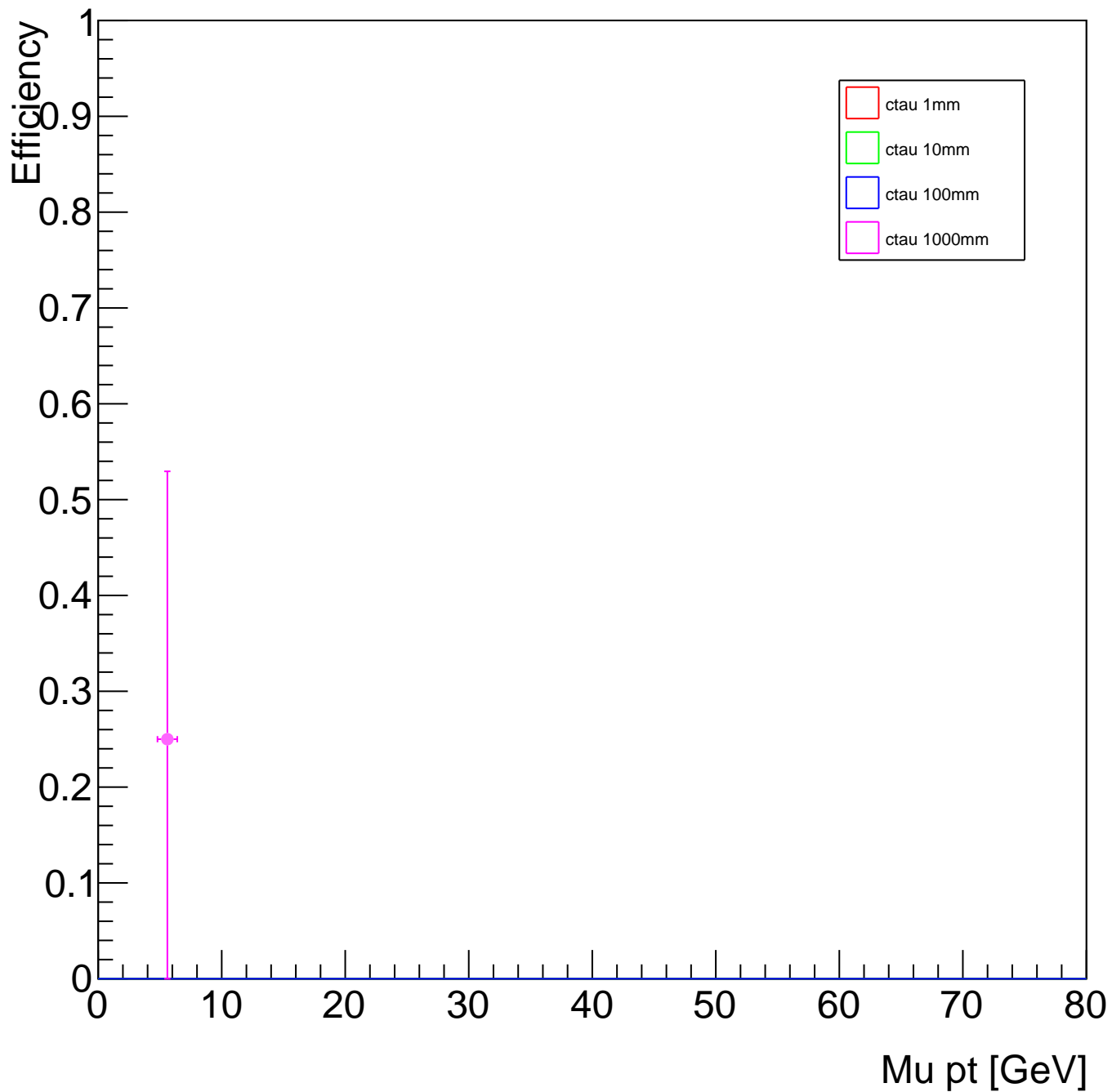


**efficiencies**

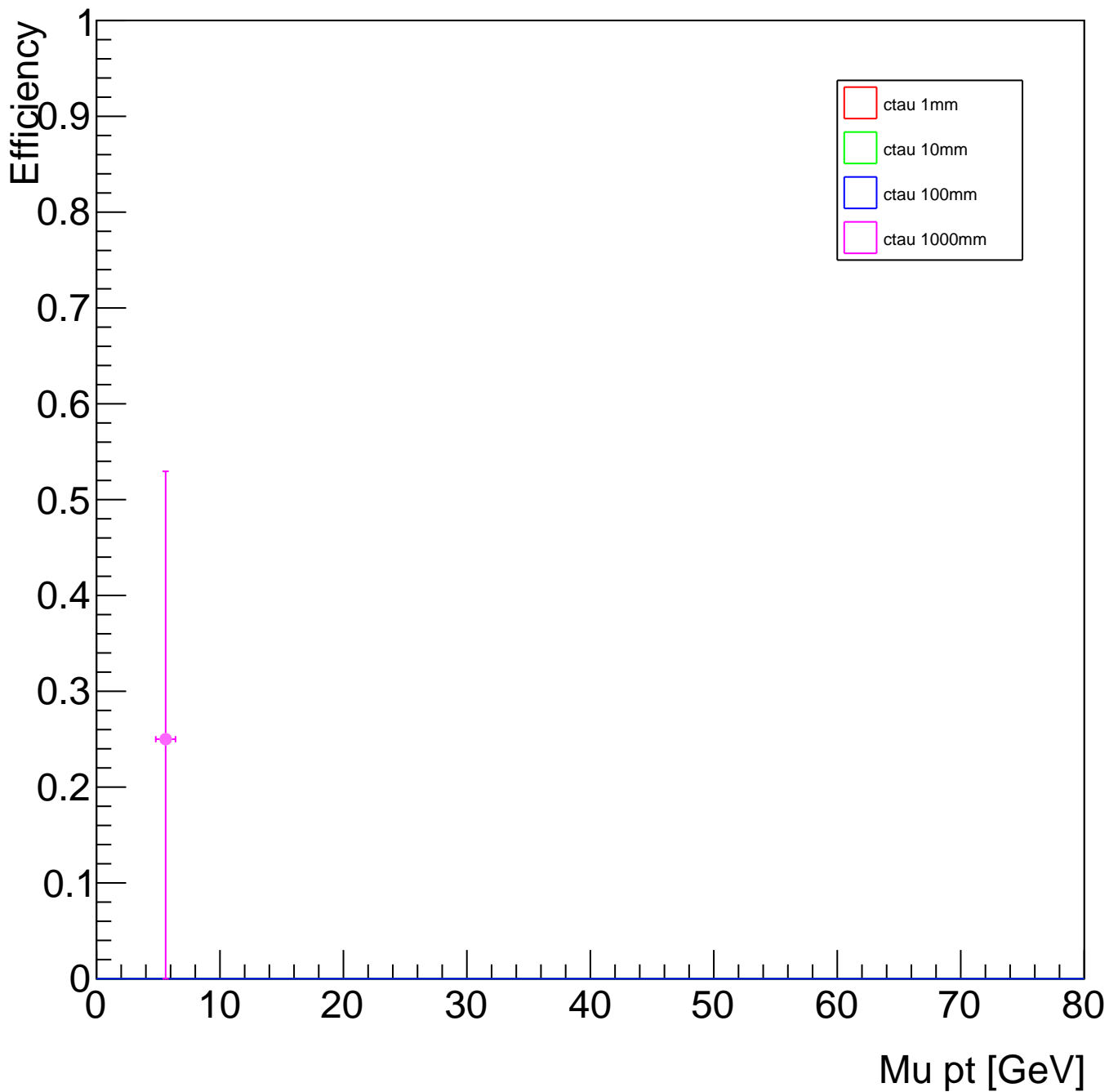
# trigefficiency HLT\_PFMET120\_PFMHT120



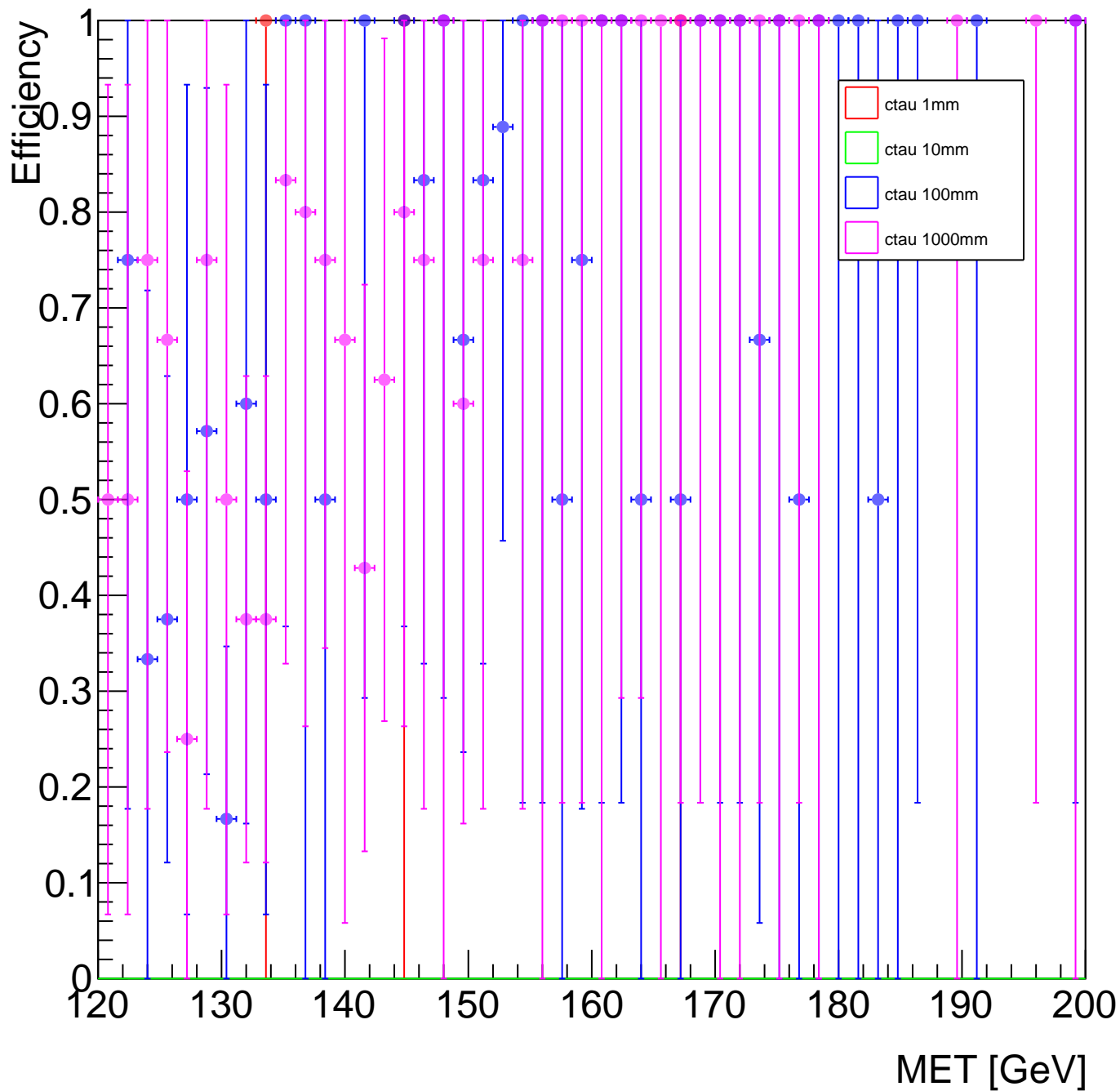
trigefficiency HLT\_DoubleMu3\_DCA\_PFMET50\_PFMHT60



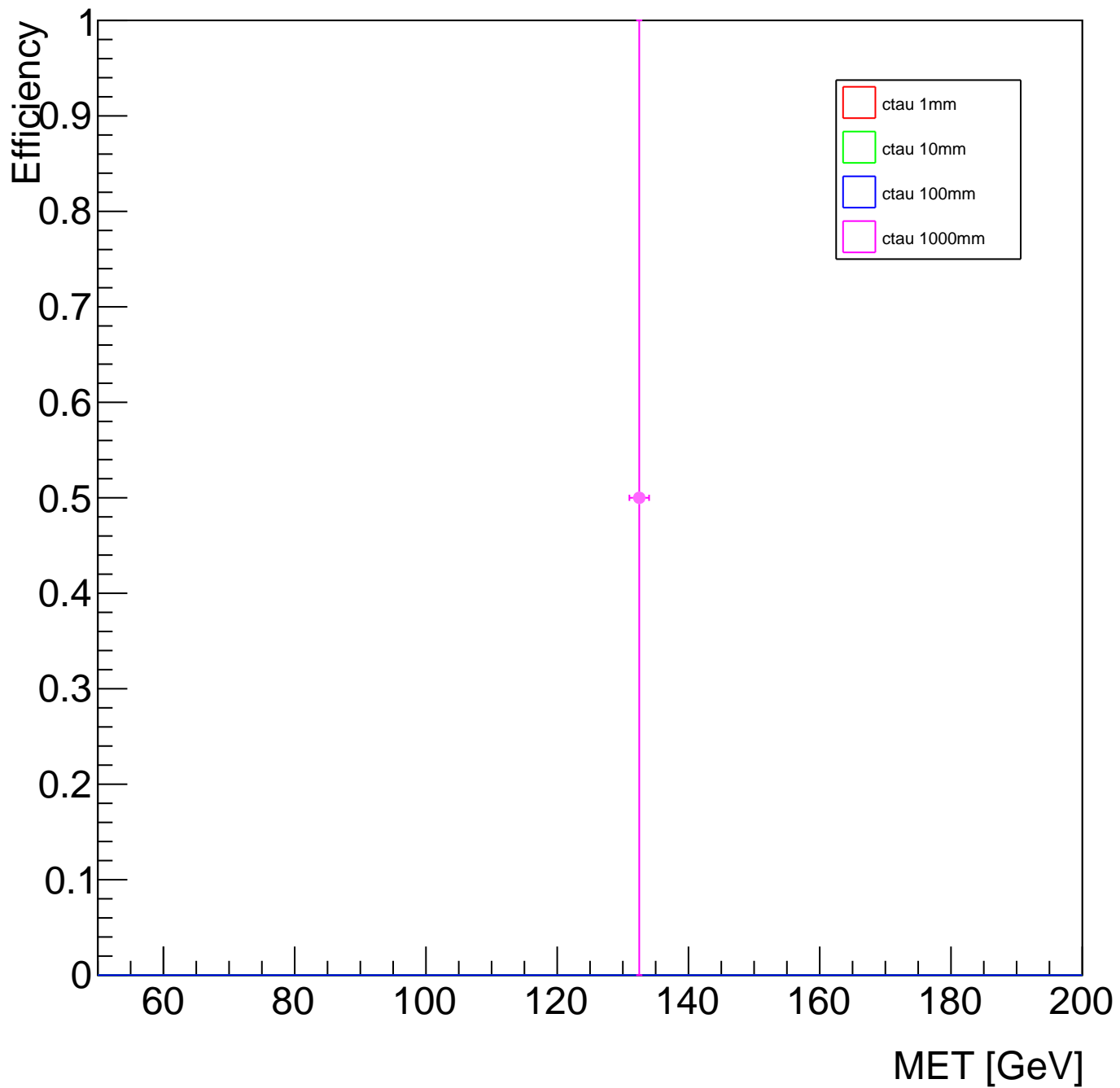
trigefficiency HLT\_DoubleMu3\_DZ\_PFMET50\_PFMHT60



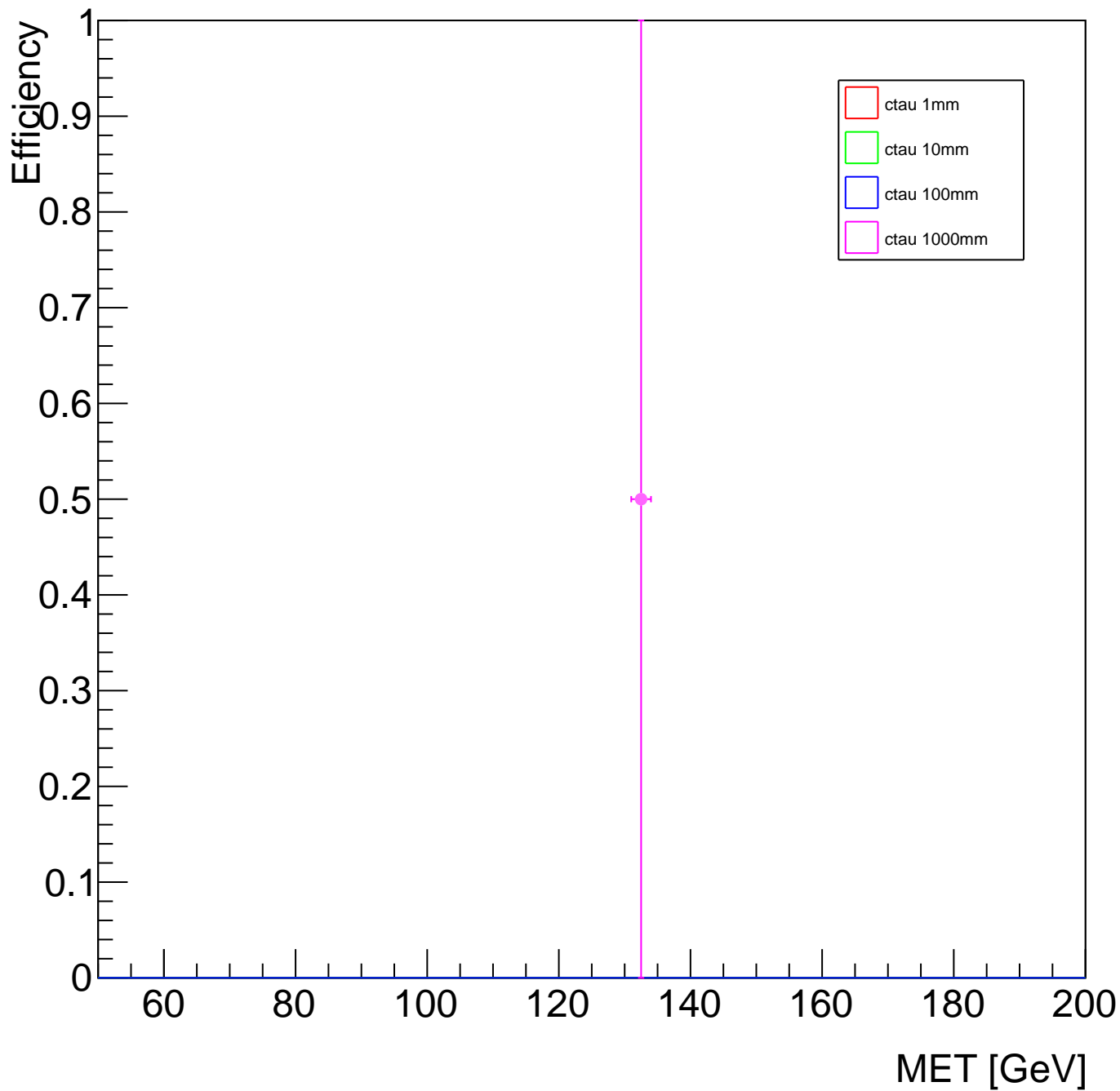
# trigefficiency HLT\_PFMET120\_PFMHT120



trigefficiency HLT\_DoubleMu3\_DCA\_PFMET50\_PFMHT60

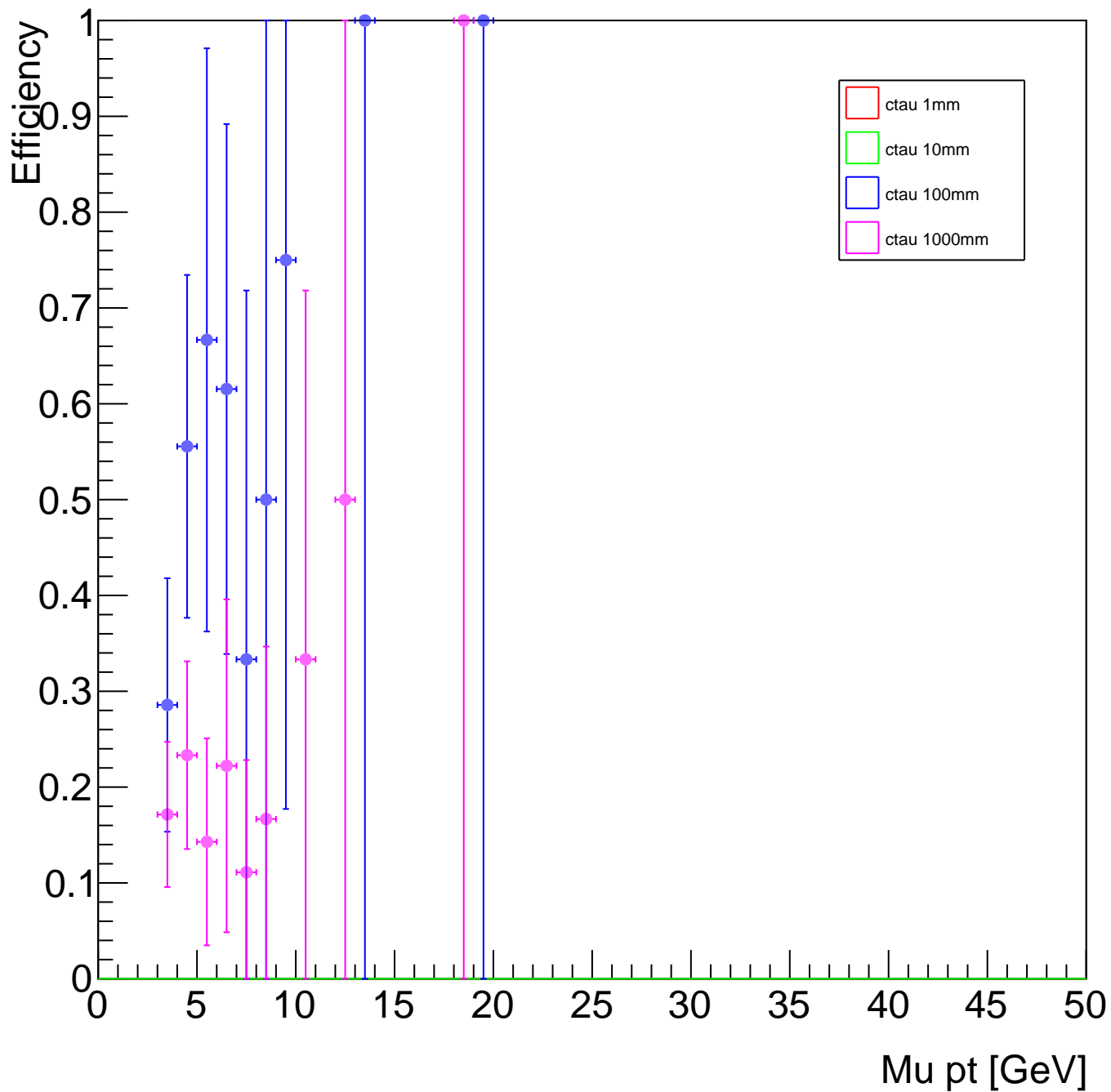


trigefficiency HLT\_DoubleMu3\_DZ\_PFMET50\_PFMHT60

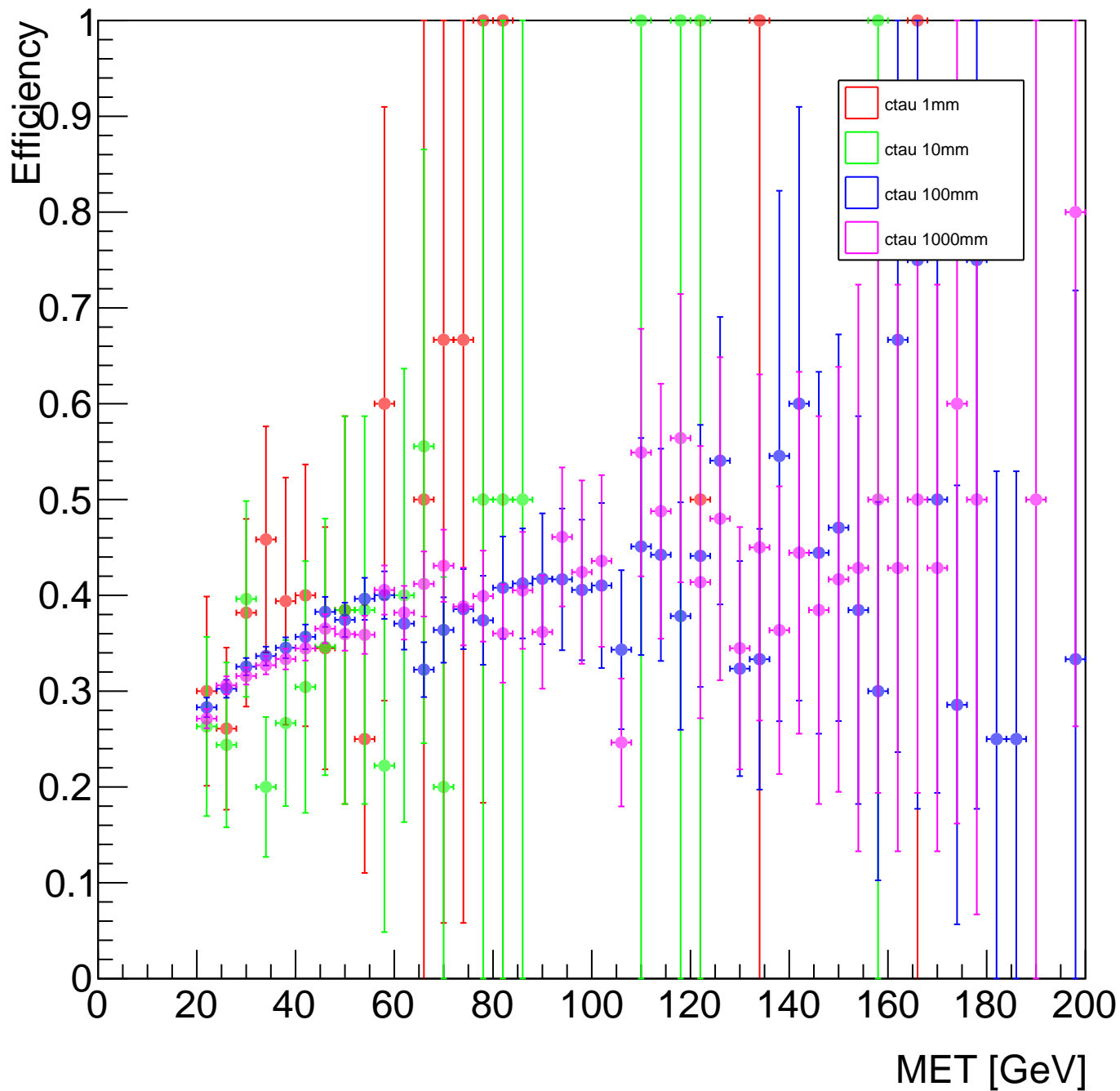




# recoefficiency mu



# recoefficiency met



# recoefficiency met

