

## **ctau 1cm**

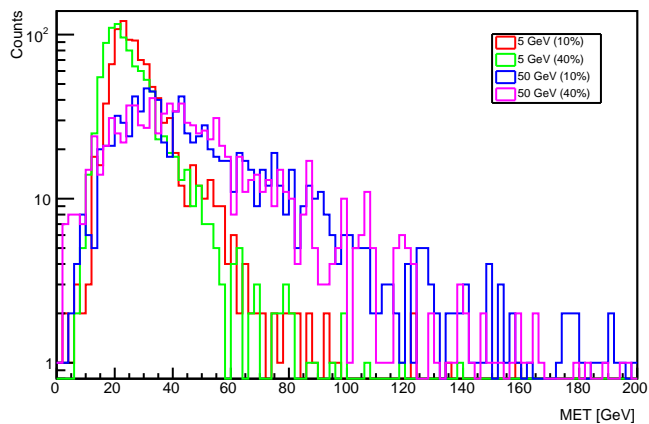
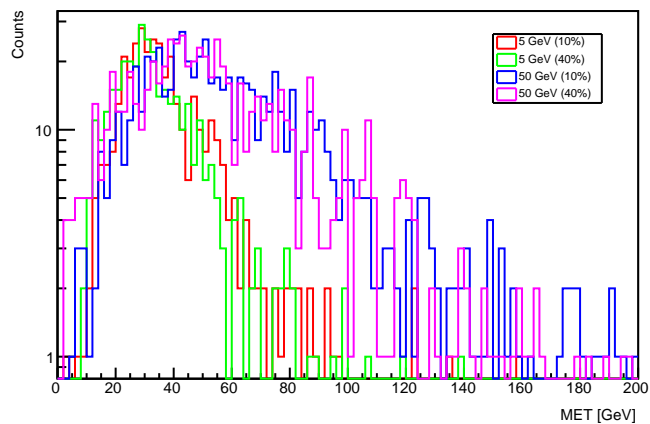
**nevents 5 GeV (10%): 1000(c1:373(308),c2:4(3),c3:1(1),c4:0(1))**

**nevents 5 GeV (40%): 1000(c1:353(264),c2:1(0),c3:1(0),c4:0(0))**

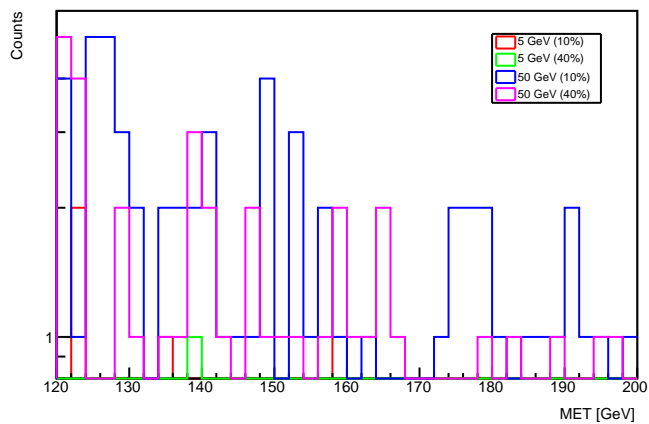
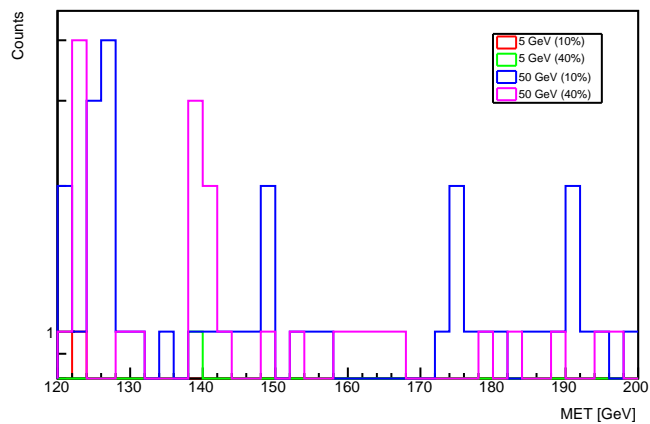
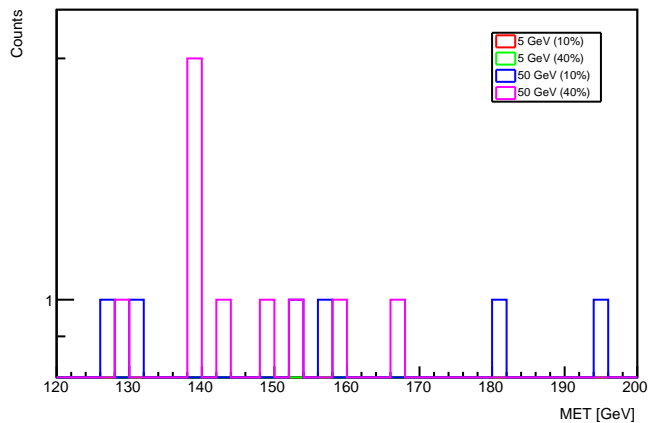
**nevents 50 GeV (10%): 1000(c1:709(619),c2:74(63),c3:51(42),c4:11(42))**

**nevents 50 GeV (40%): 1000(c1:709(634),c2:44(37),c3:30(28),c4:9(28))**

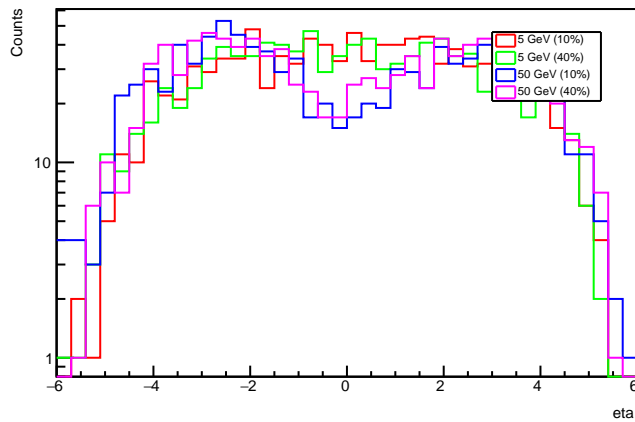
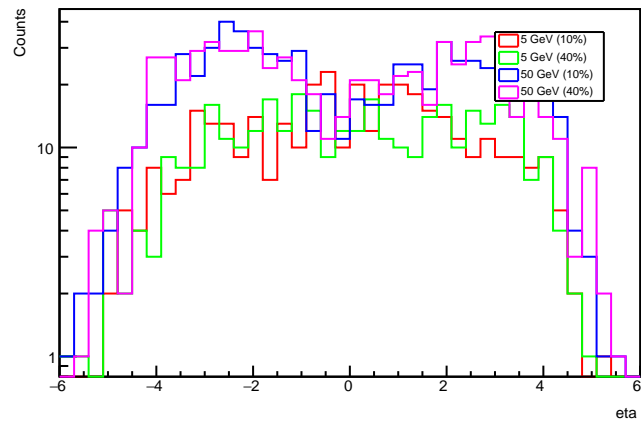
gen leading MET: no cuts

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

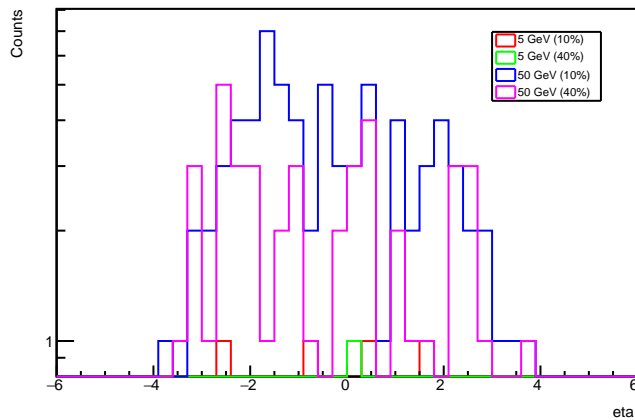
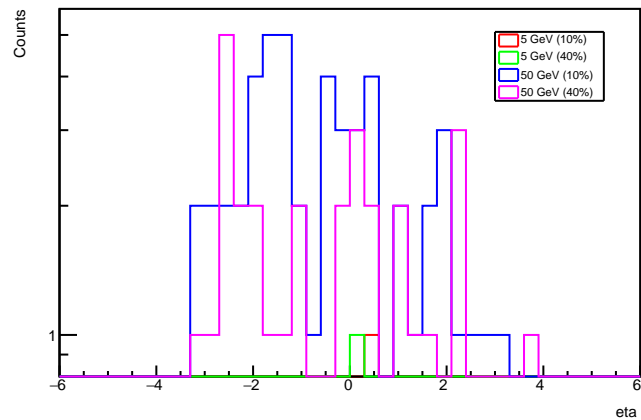
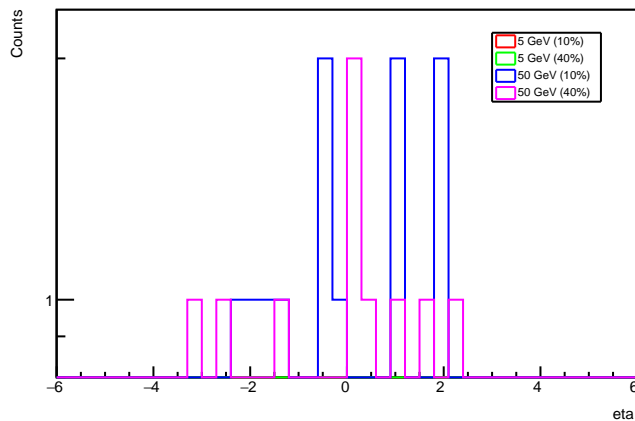
gen leading MET: MET &gt; 120 GeV

gen leading MET:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVgen leading MET: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$ 

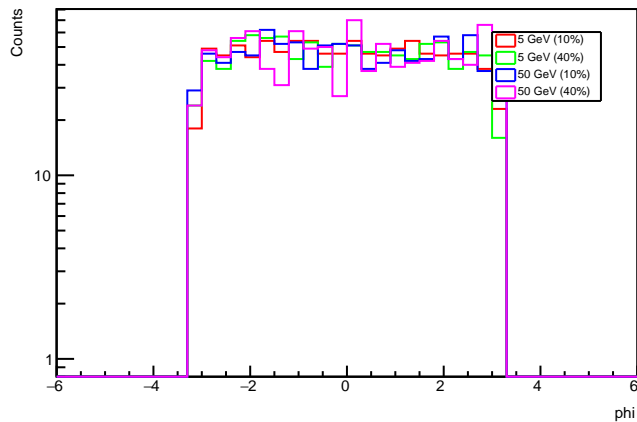
gen leading Met eta: no cuts

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

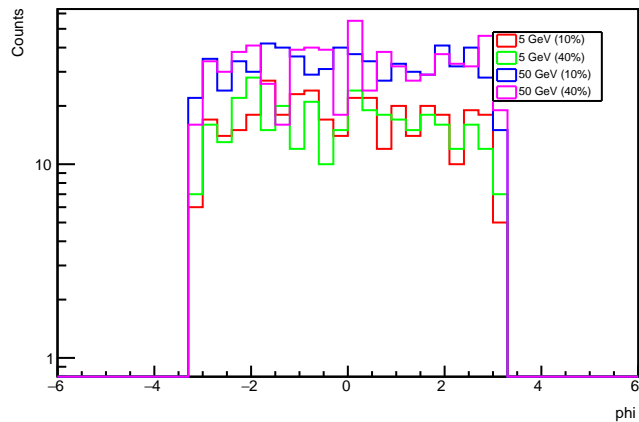
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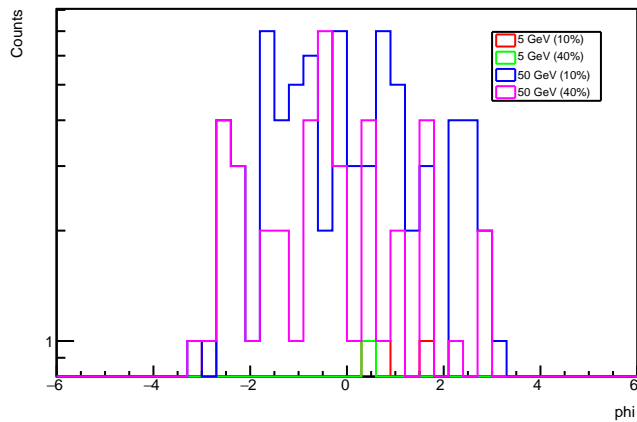
gen leading Met phi: no cuts



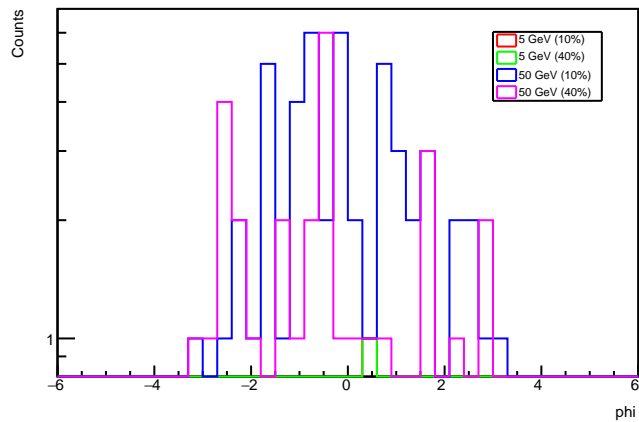
gen leading Met phi: n\_jet &gt;=1, j1pt &gt; 30 GeV



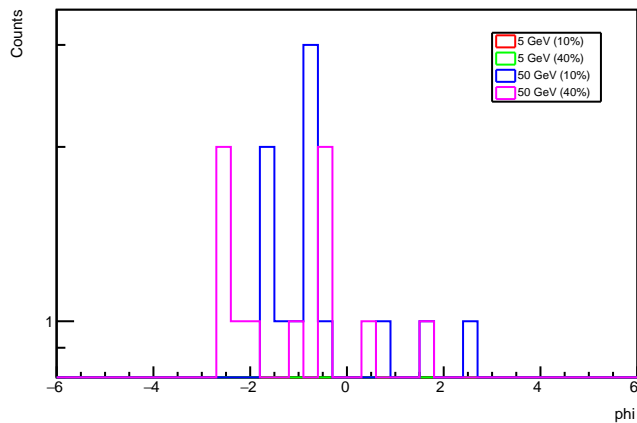
gen leading Met phi: MET &gt; 120 GeV



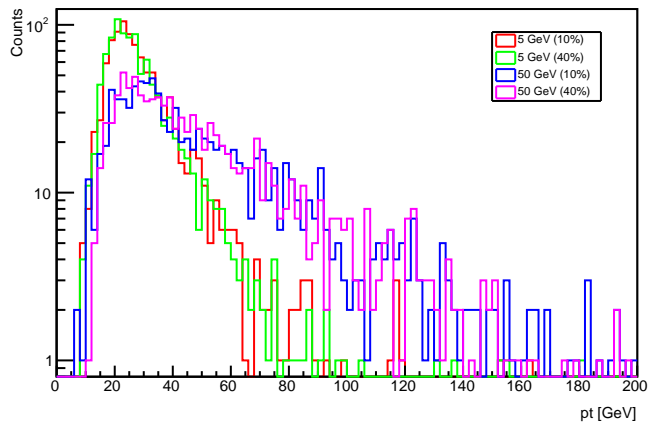
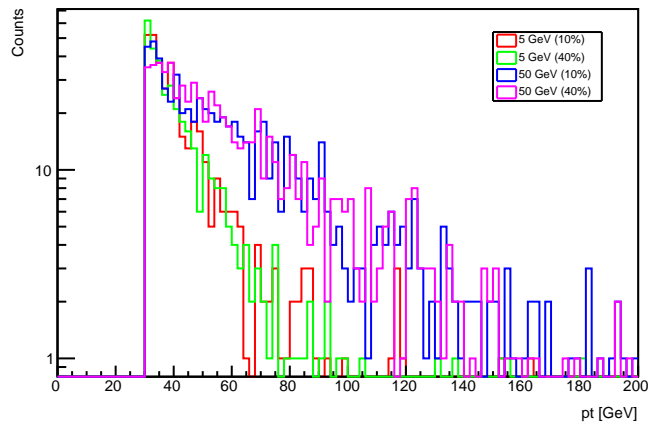
gen leading Met phi: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



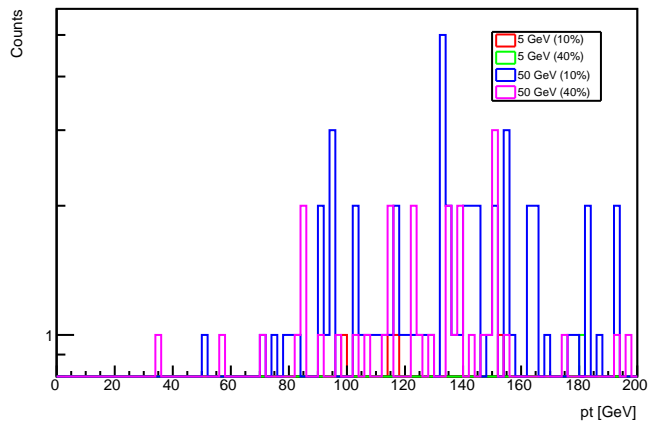
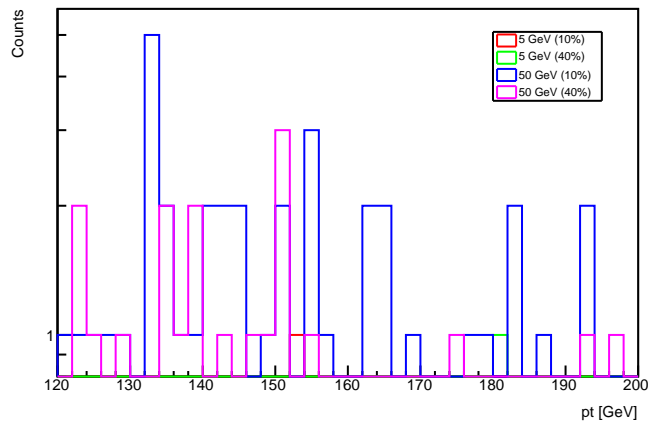
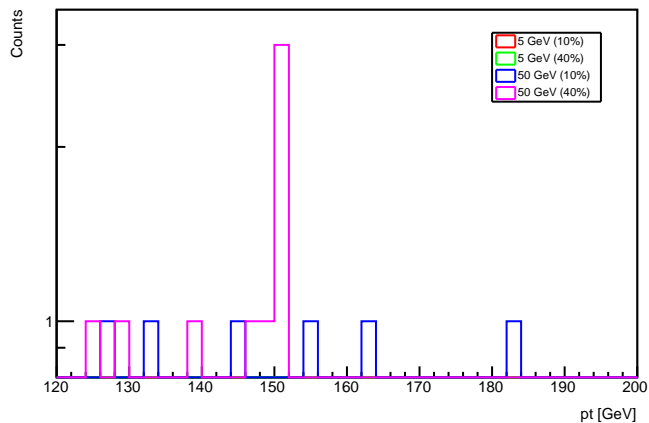
gen leading Met phi: at least 2 mu w/ pt &gt; 2 GeV and eta &lt; 2.5



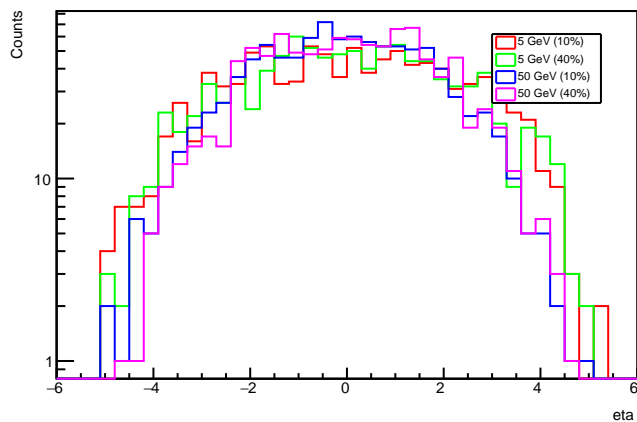
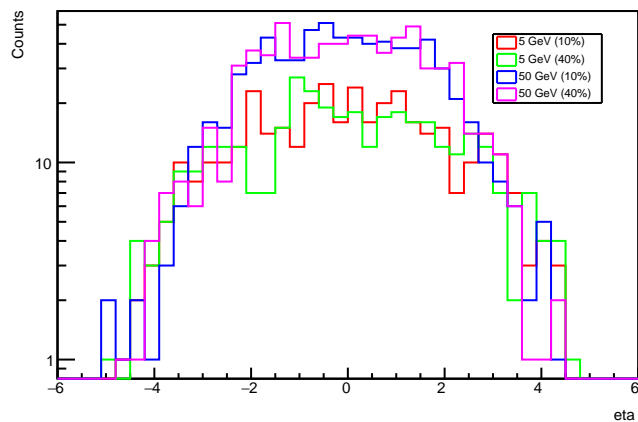
gen leading Jet pt: no cuts

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

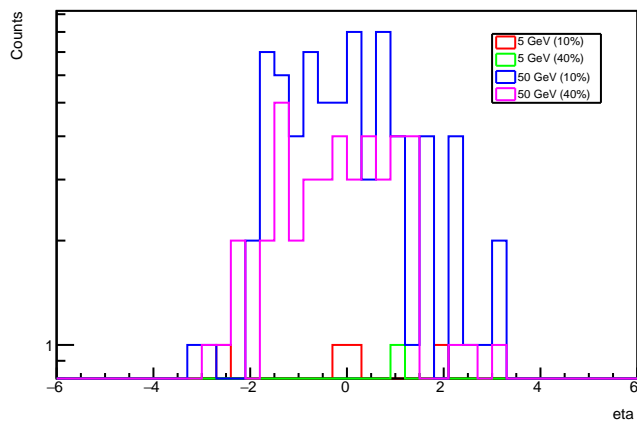
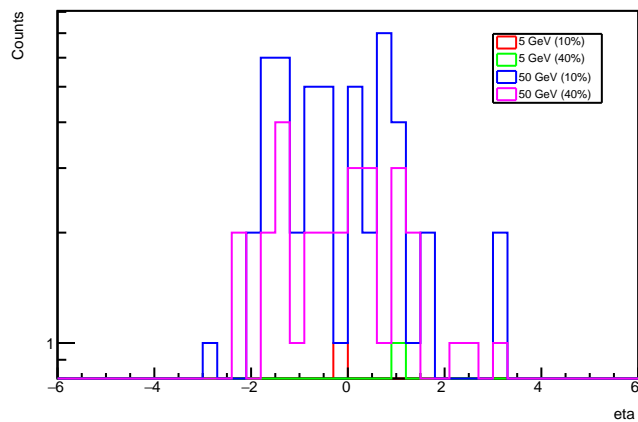
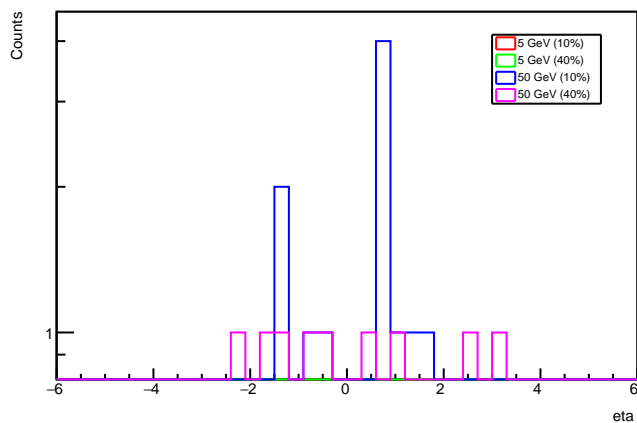
gen leading Jet pt: MET &gt; 120 GeV

gen leading Jet pt:  $j_{1\text{pt}} > 120$ , at most 2 jets w/ pt > 30 GeVgen leading Jet pt: at least 2 mu w/ pt > 2 GeV and  $\eta < 2.5$ 

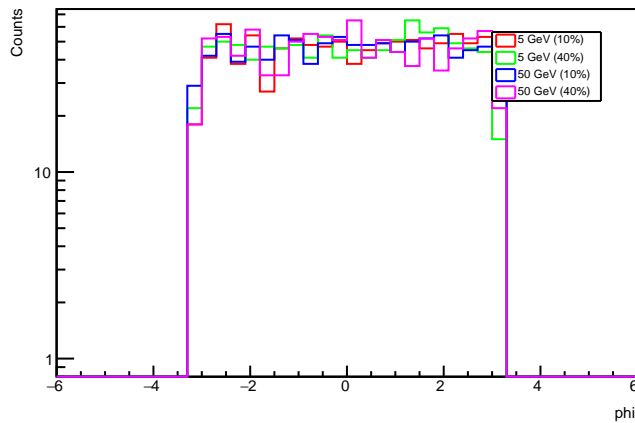
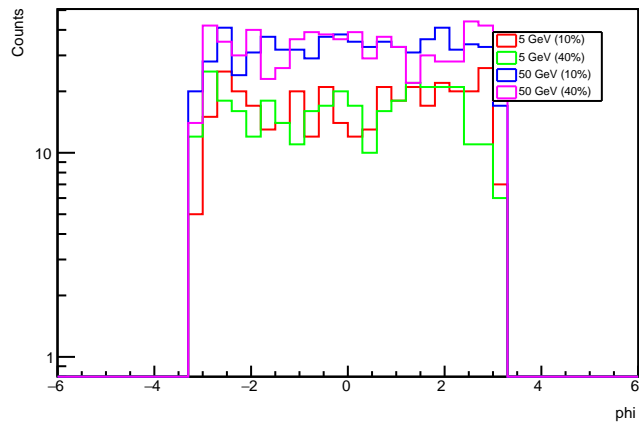
gen leading Jet eta: no cuts

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

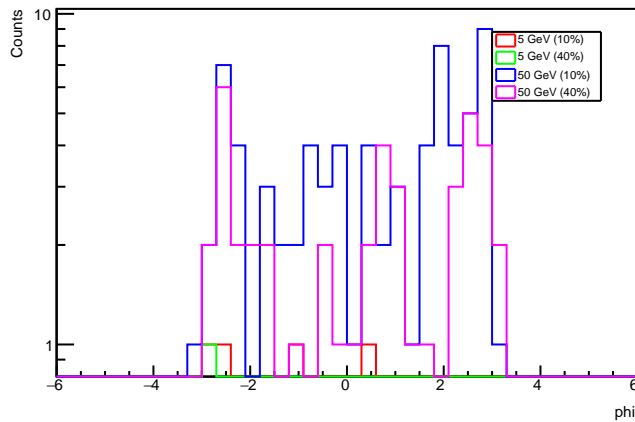
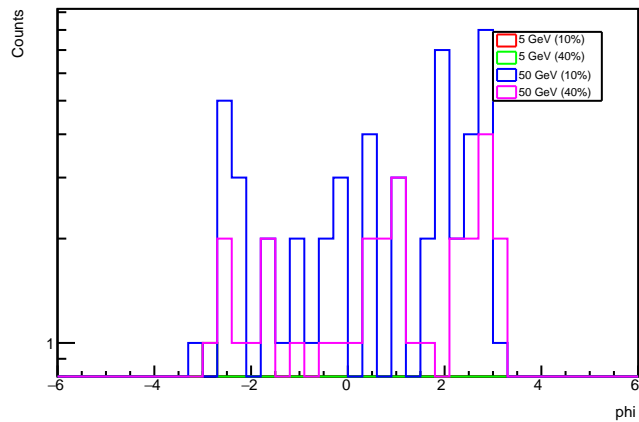
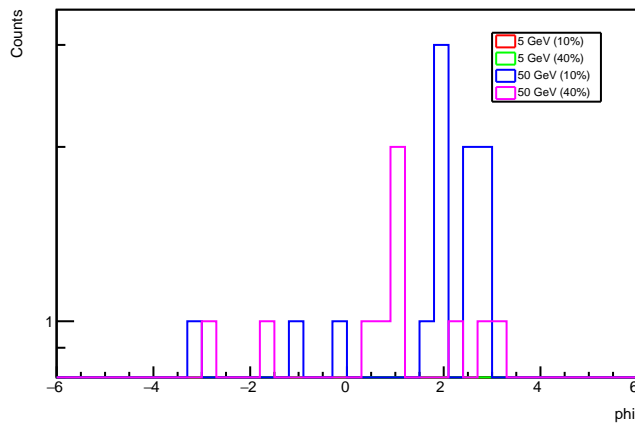
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gen leading Jet eta:  $j1pt > 120$ , at most 2 jets w/  $p_T > 30$  GeVgen leading Jet eta: at least 2 mu w/  $p_T > 2$  GeV and  $\eta < 2.5$ 

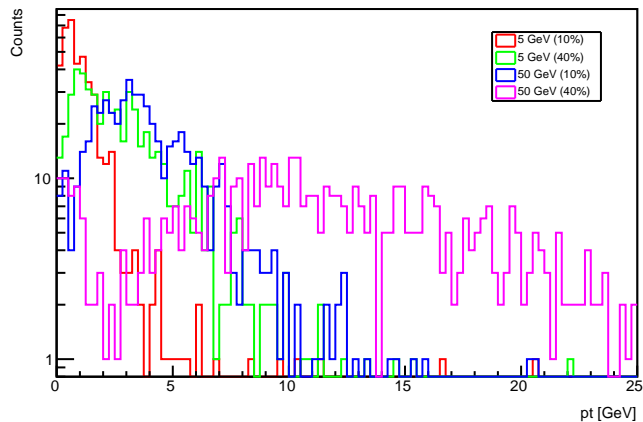
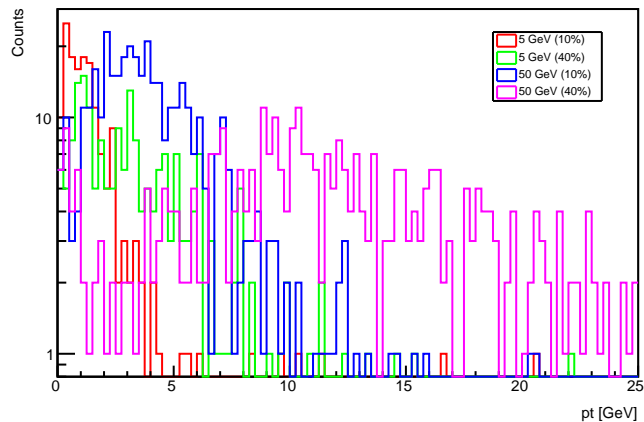
gen leading Jet phi: no cuts

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

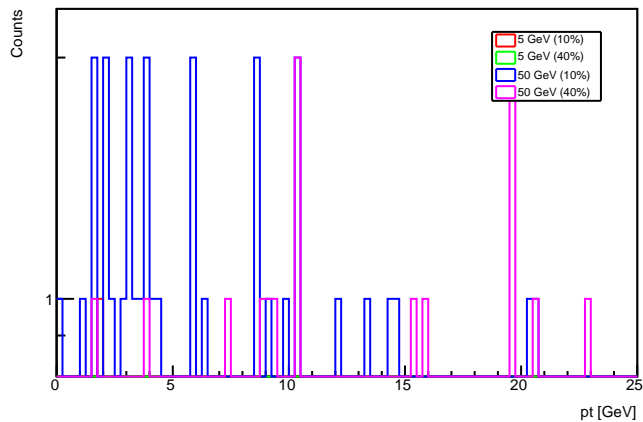
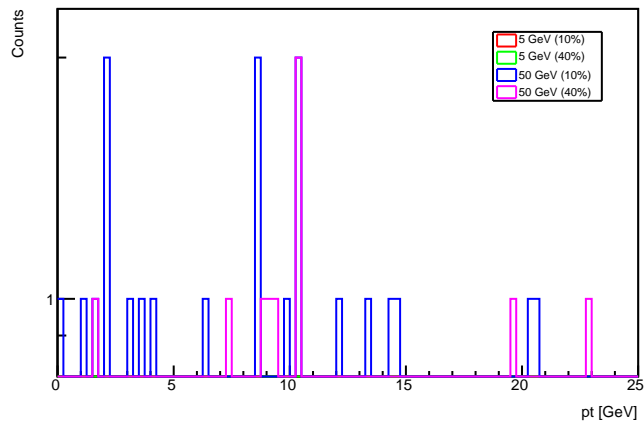
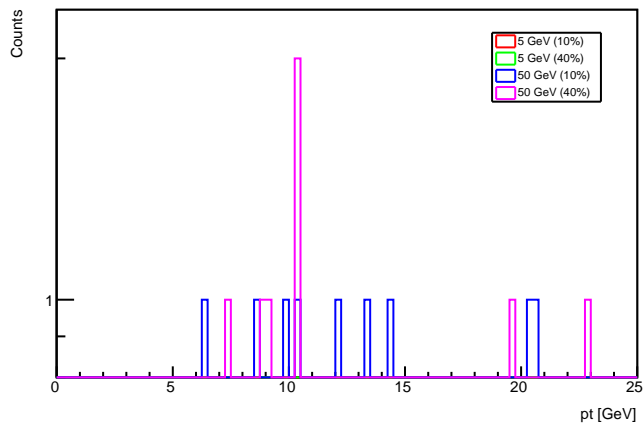
gen leading Jet phi: MET &gt; 120 GeV

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gen leading Mu pt: no cuts

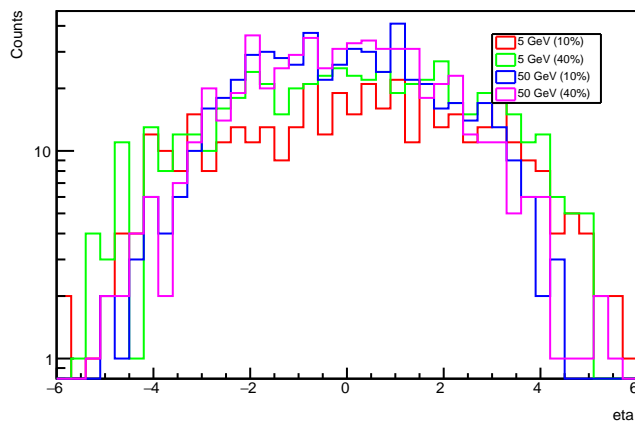
gen leading Mu pt:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

gen leading Mu pt: MET &gt; 120 GeV

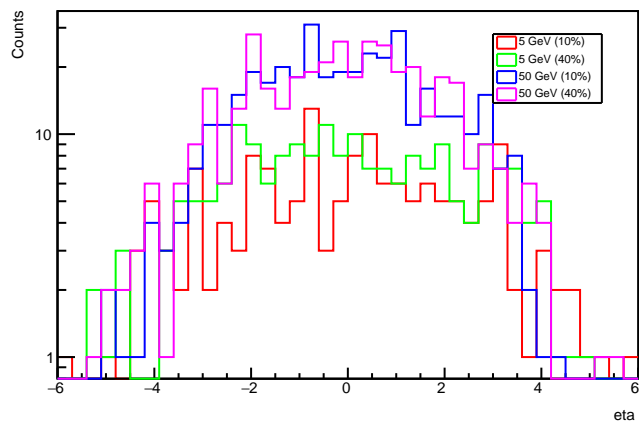
gen leading Mu pt:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_{\text{T}} > 30$  GeVgen leading Mu pt: at least 2 mu w/  $p_{\text{T}} > 2$  GeV and  $\eta < 2.5$ 



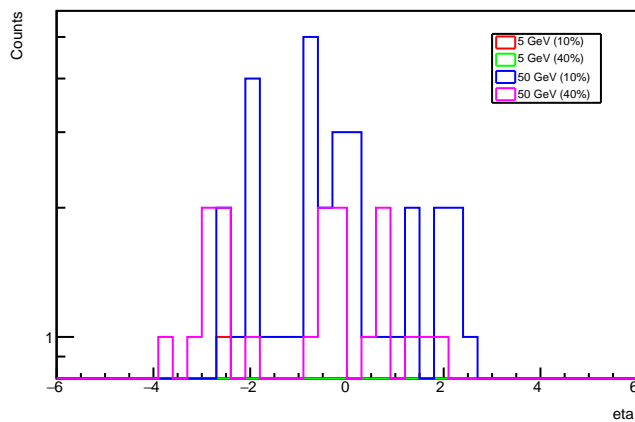
gen leading Mu eta: no cuts



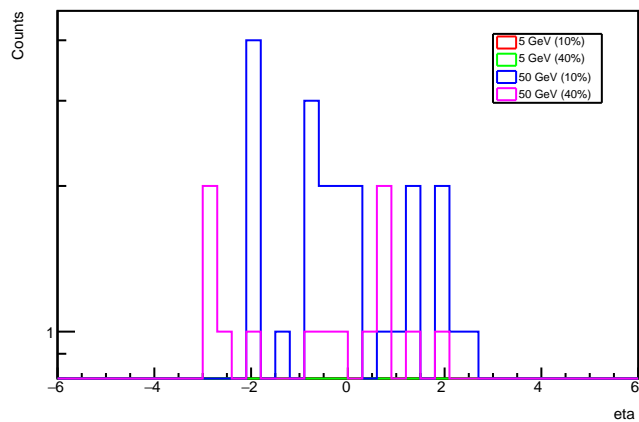
gen leading Mu eta: n\_jet &gt;=1, j1pt &gt; 30 GeV



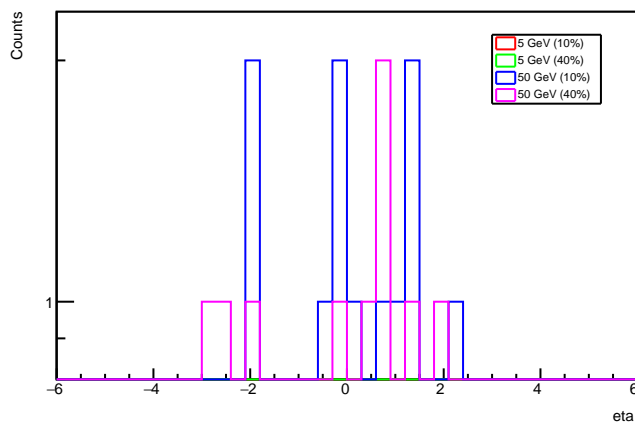
gen leading Mu eta: MET &gt; 120 GeV



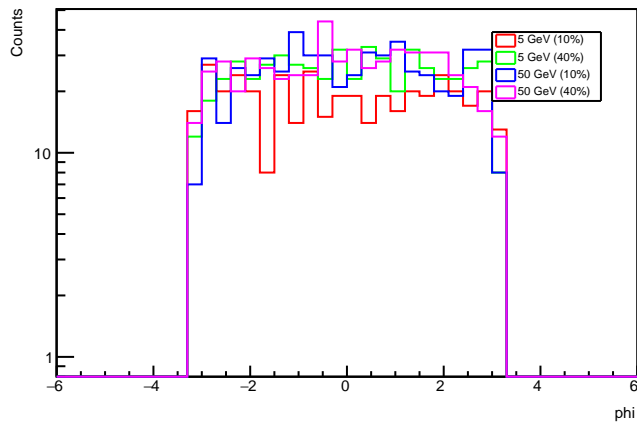
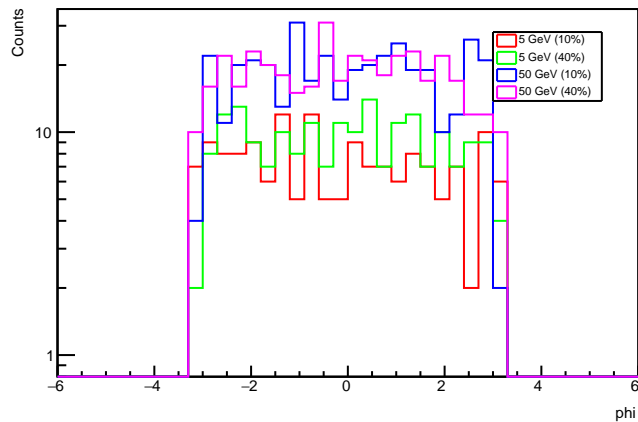
gen leading Mu eta: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



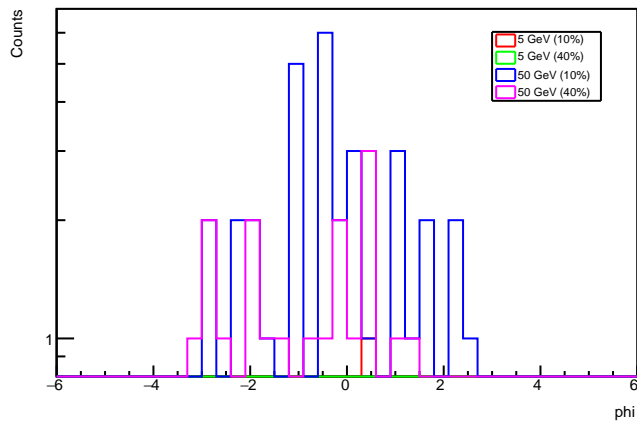
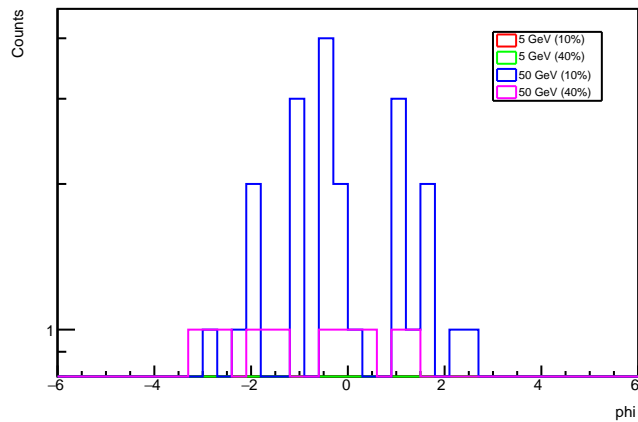
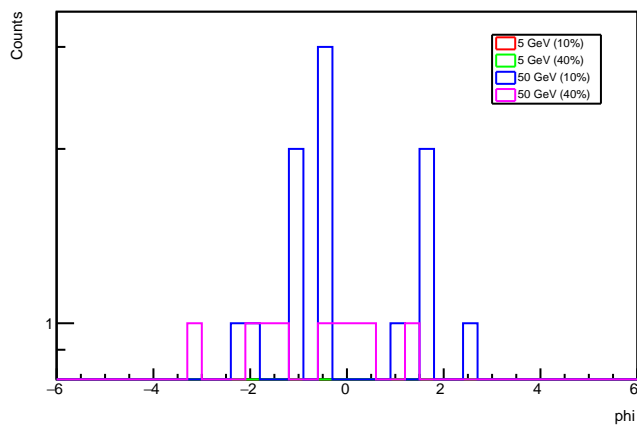
gen leading Mu eta: at least 2 mu w/ pt &gt; 2 GeV and eta &lt; 2.5



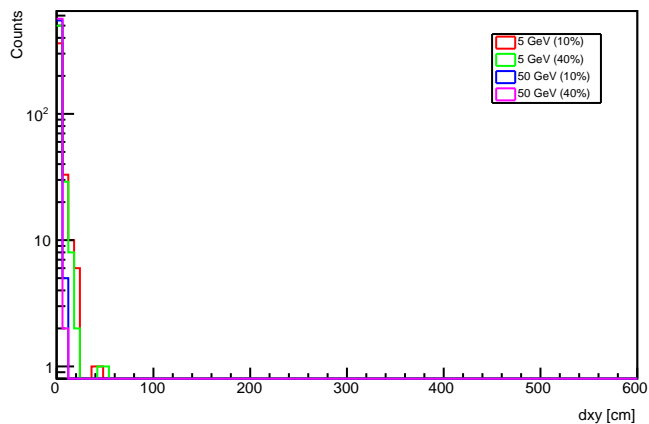
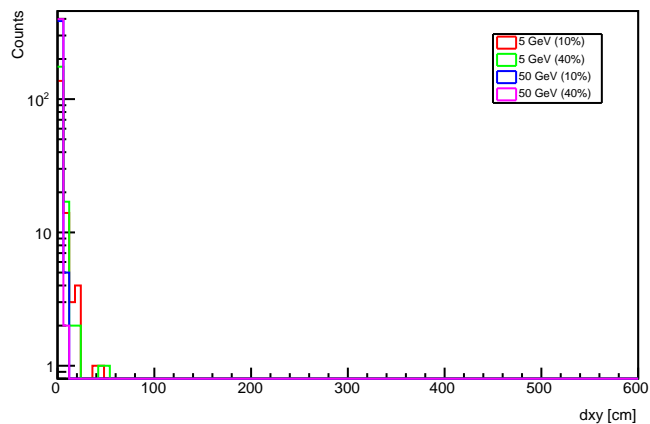
gen leading Mu phi: no cuts

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

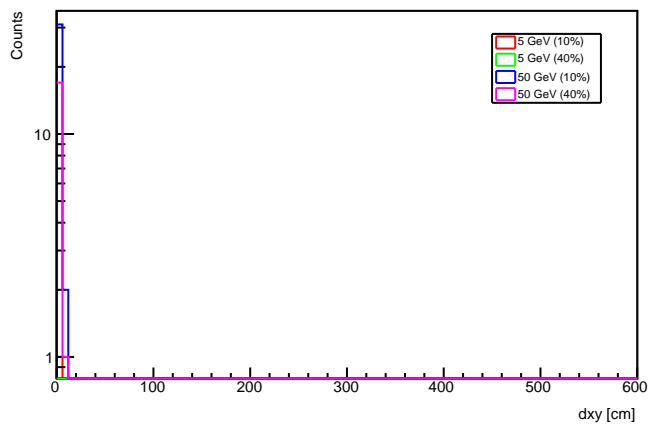
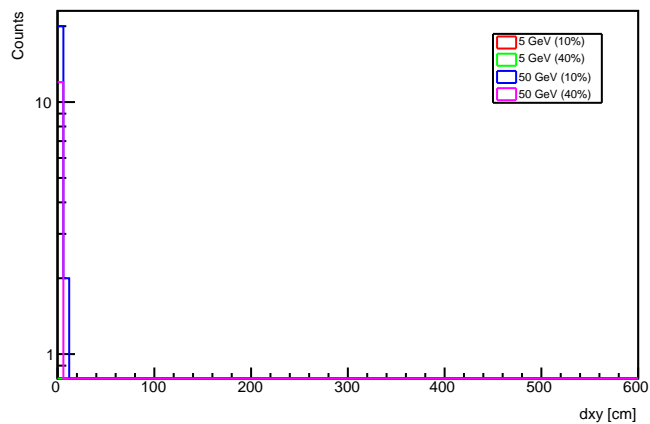
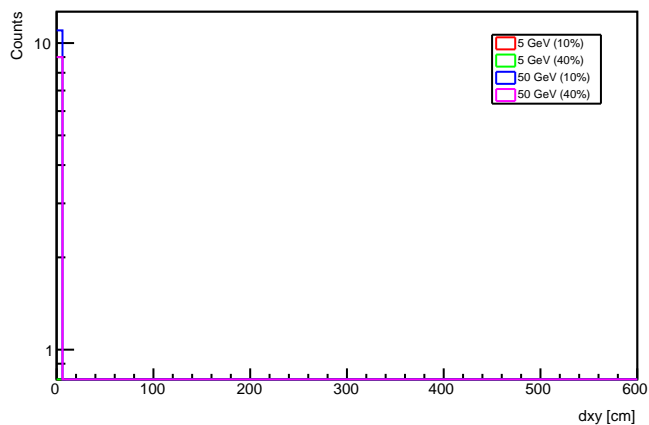
gen leading Mu phi: MET &gt; 120 GeV

gen leading Mu phi:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVgen leading Mu phi: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$ 

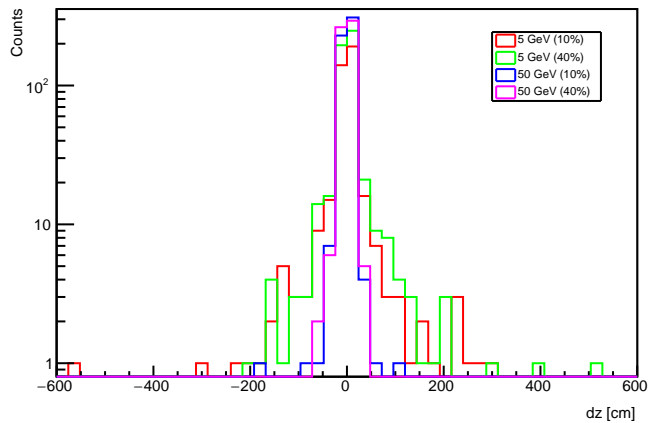
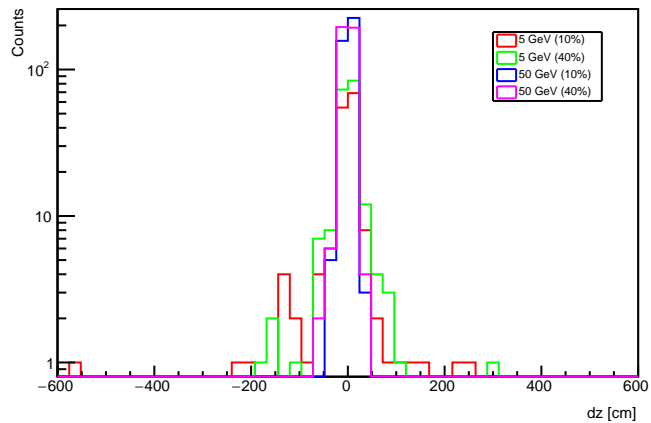
gen leading Mu vxy: no cuts

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

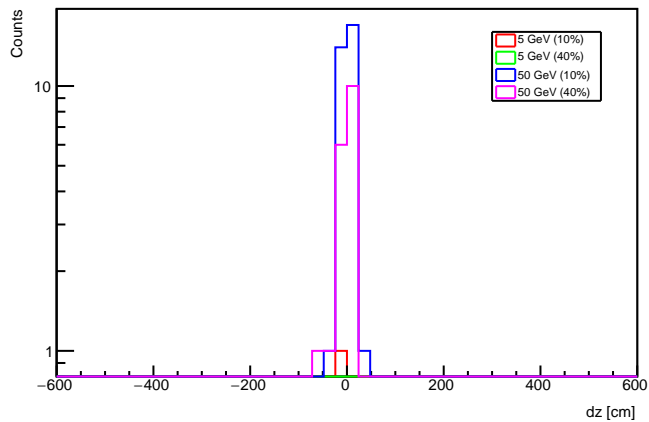
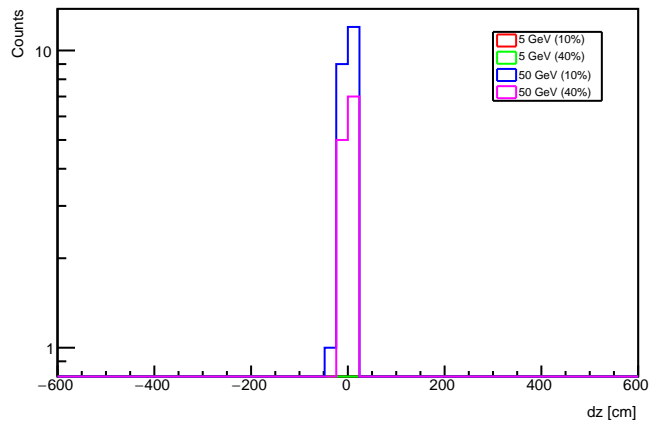
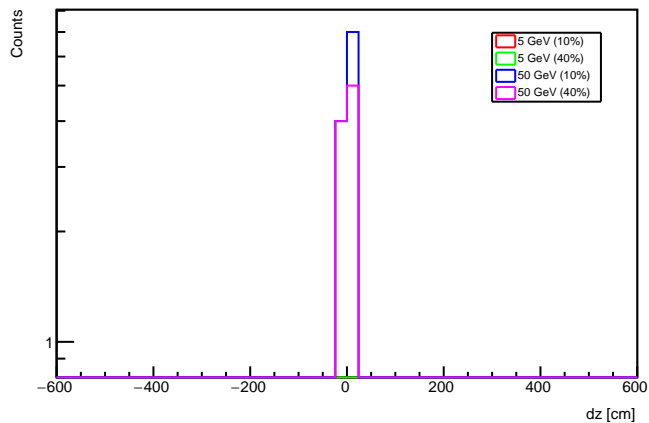
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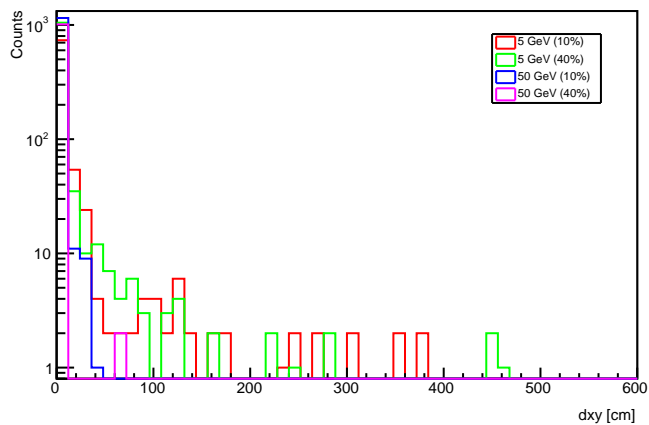
gen leading Mu vz: no cuts

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

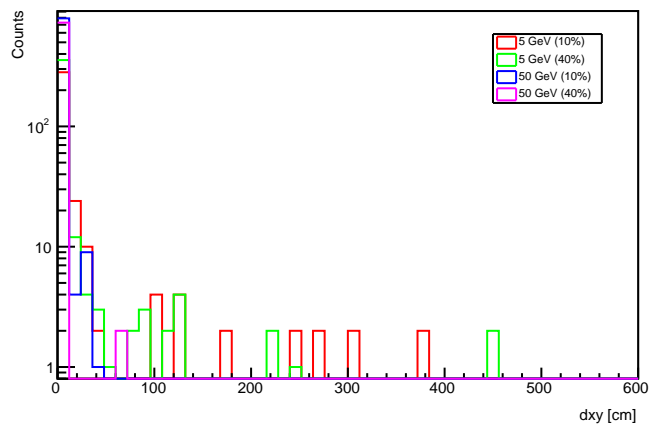
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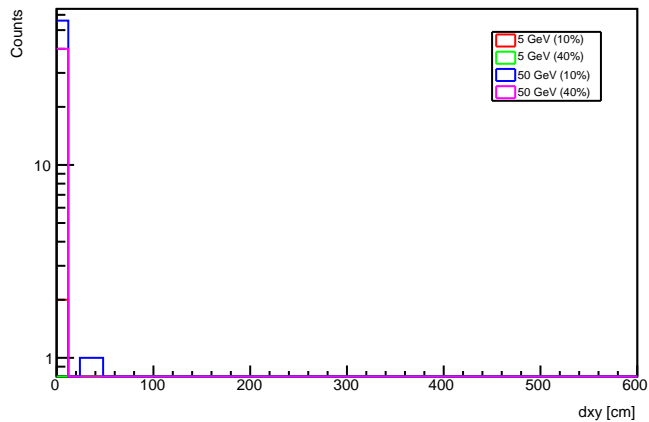
gen all Mu vxy: no cuts



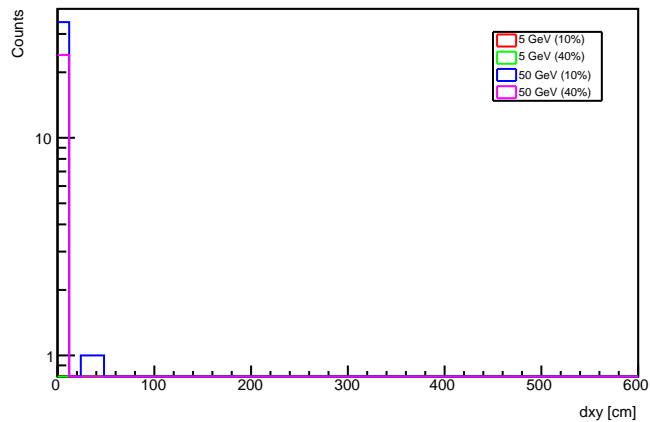
gen all Mu vxy: n\_jet &gt;=1, j1pt &gt; 30 GeV



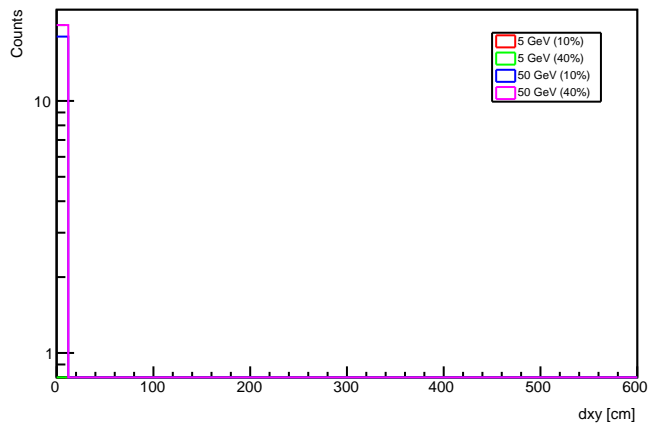
gen all Mu vxy: MET &gt; 120 GeV



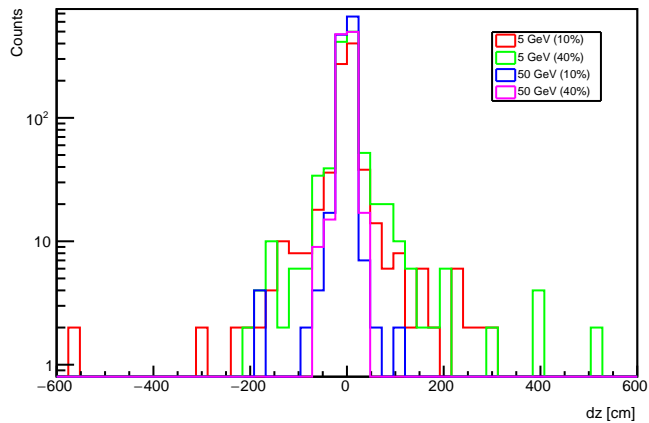
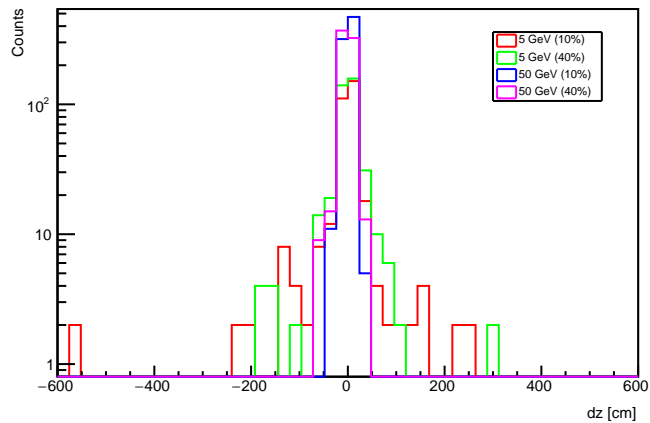
gen all Mu vxy: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



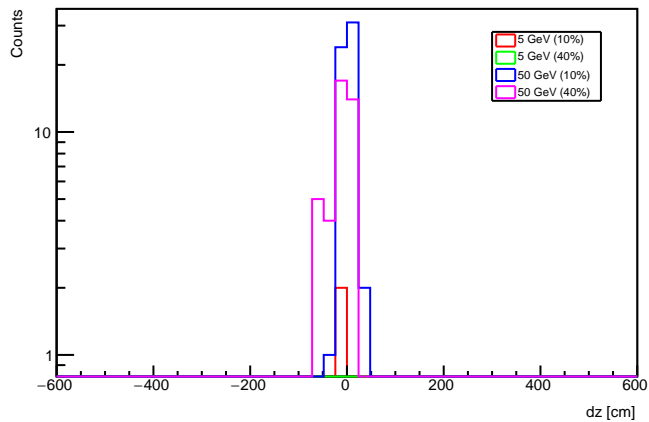
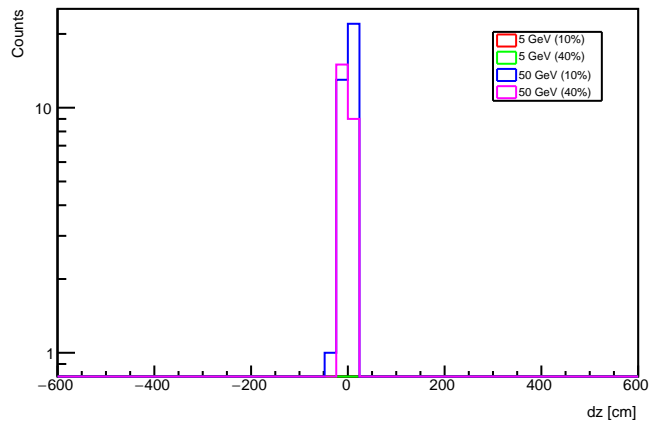
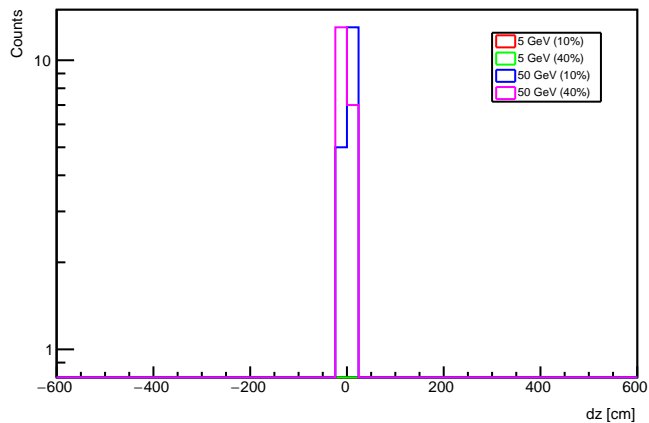
gen all Mu vxy: at least 2 mu w/ pt &gt; 2 GeV and eta&lt;2.5



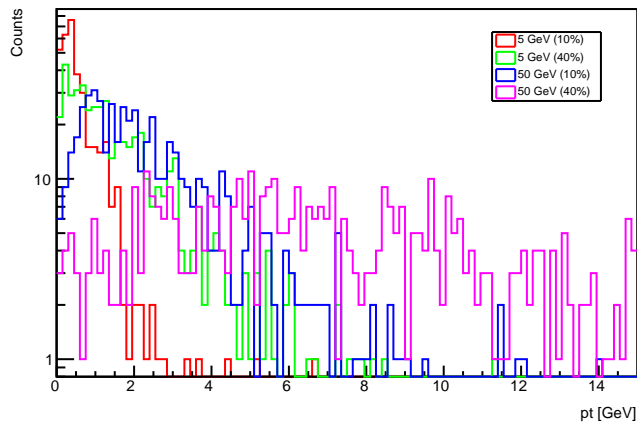
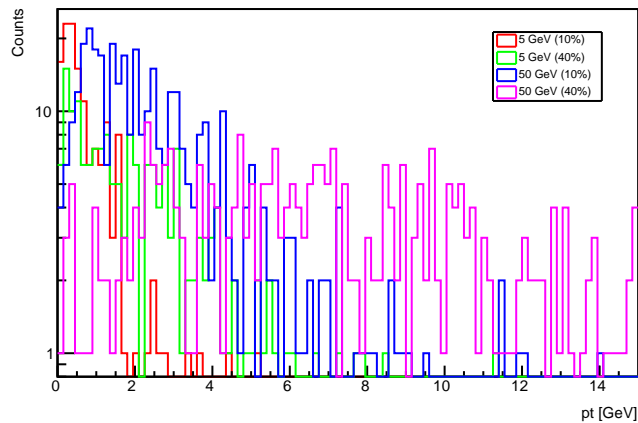
gen all Mu vz: no cuts

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

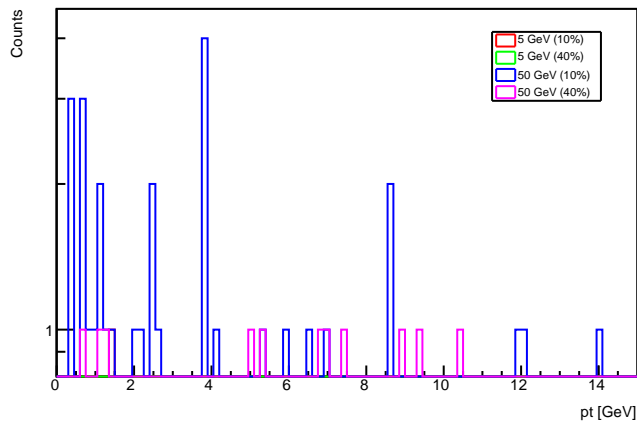
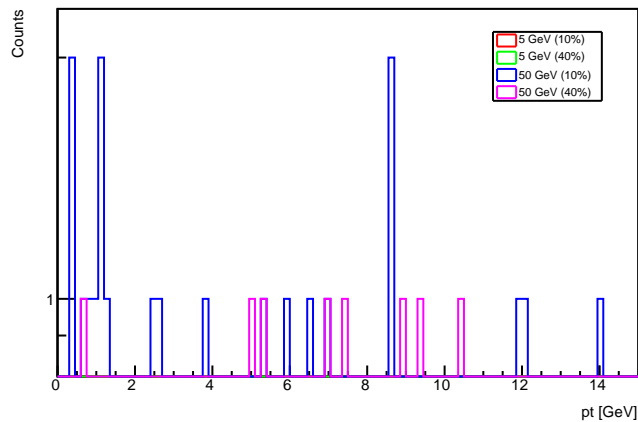
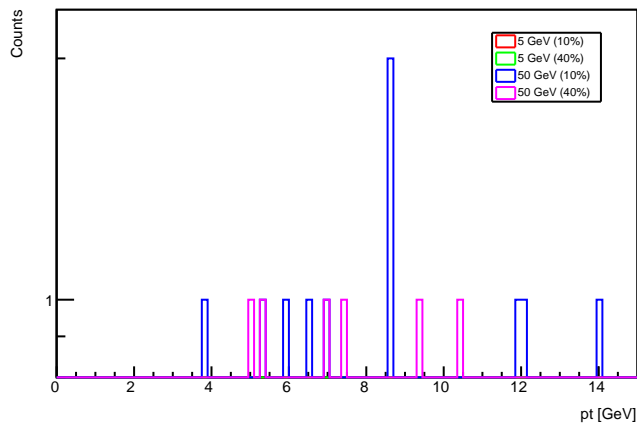
gen all Mu vz: MET &gt; 120 GeV

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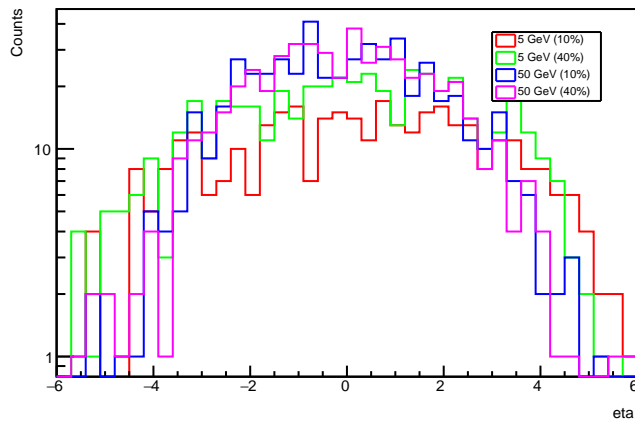
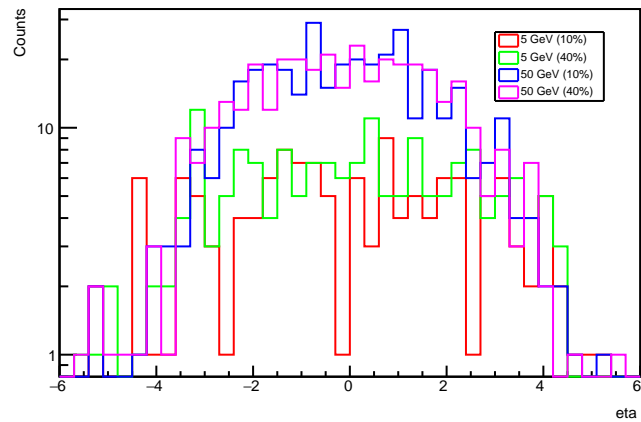
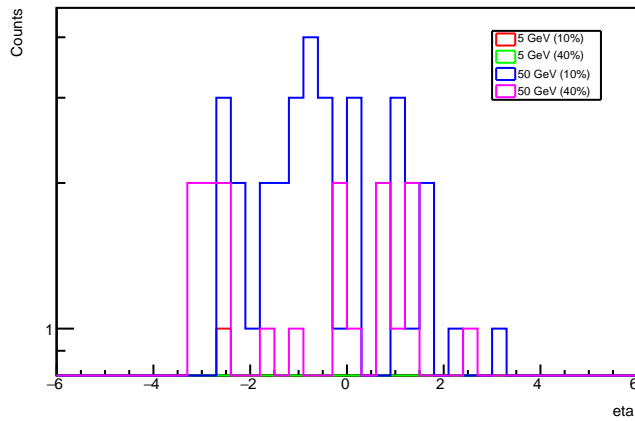
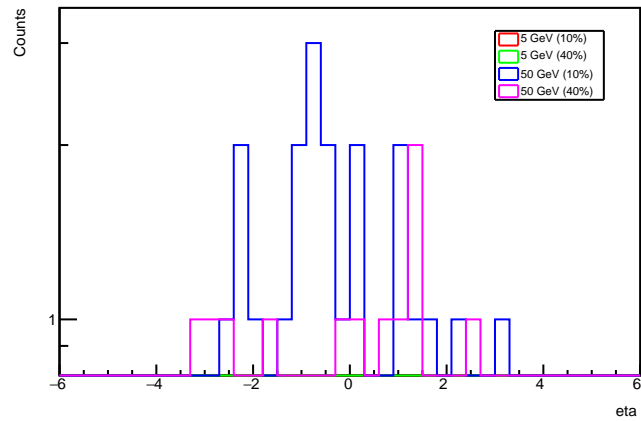
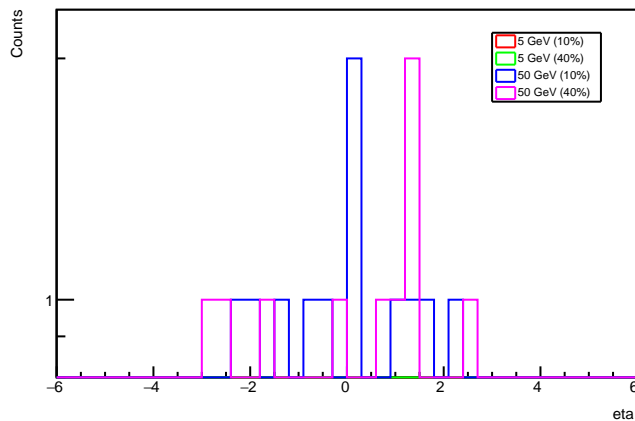
gen subleading Mu pt: no cuts

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

gen subleading Mu pt: MET &gt; 120 GeV

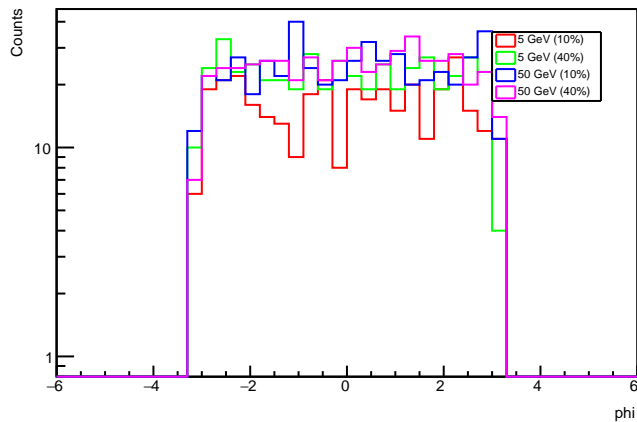
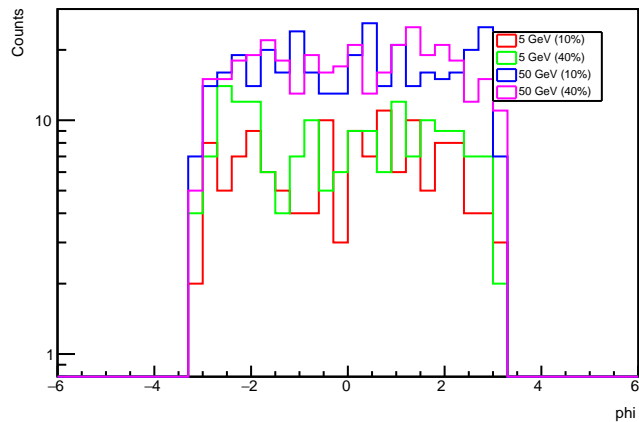
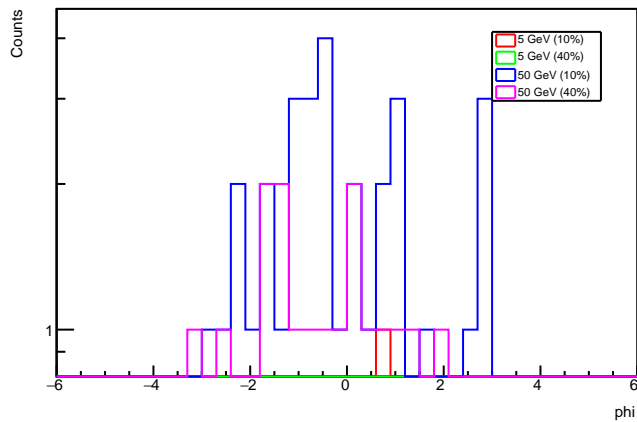
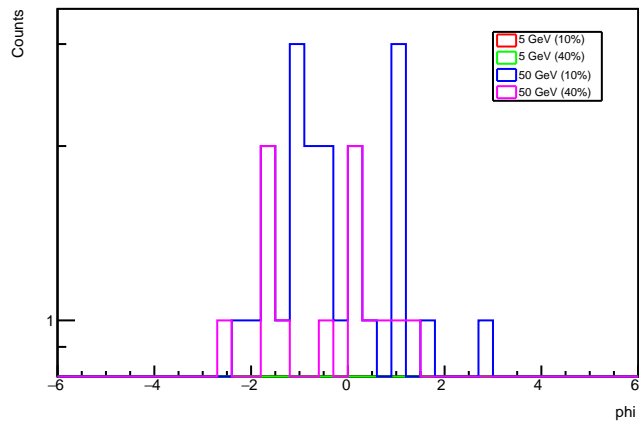
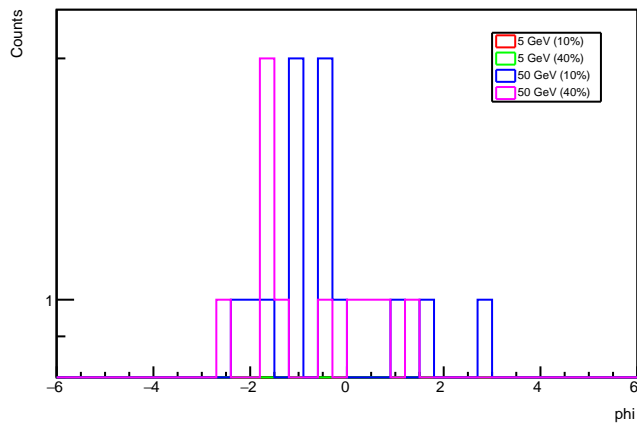
gen subleading Mu pt:  $j1pt > 120$ , at most 2 jets w/  $pt > 30$  GeVgen subleading Mu pt: at least 2 mu w/  $pt > 2$  GeV and  $eta < 2.5$ 

gen subleading Mu eta: no cuts

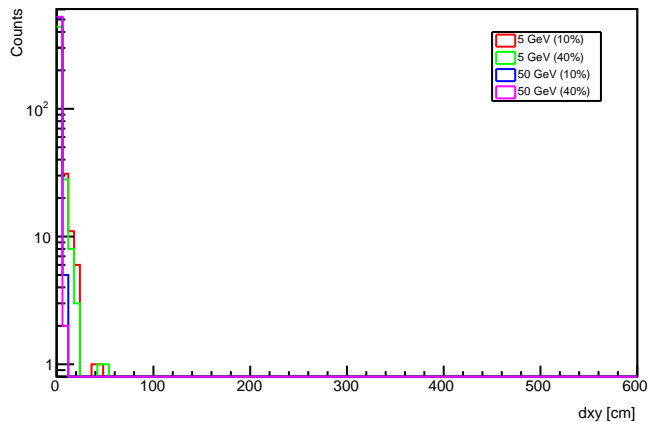
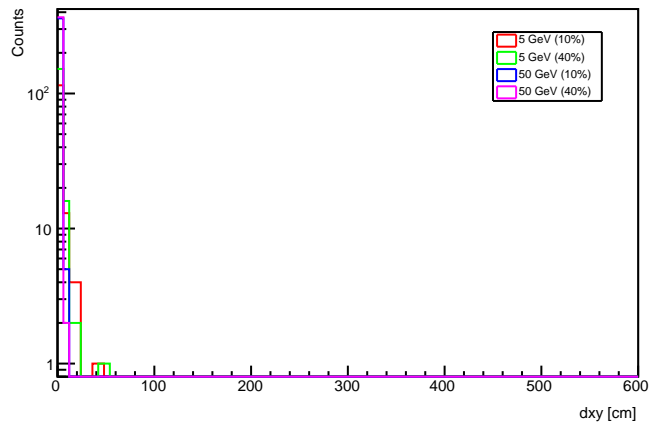
gen subleading Mu eta:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeVgen subleading Mu eta:  $\text{MET} > 120$  GeVgen subleading Mu eta:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVgen subleading Mu eta: at least 2 mu w/  $p_t > 2$  GeV and  $\text{eta} < 2.5$ 



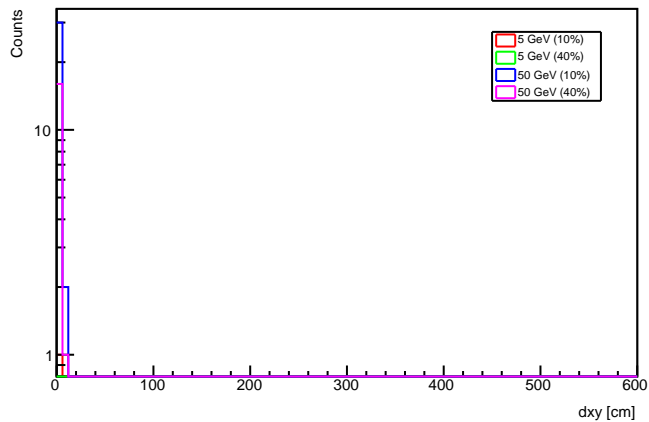
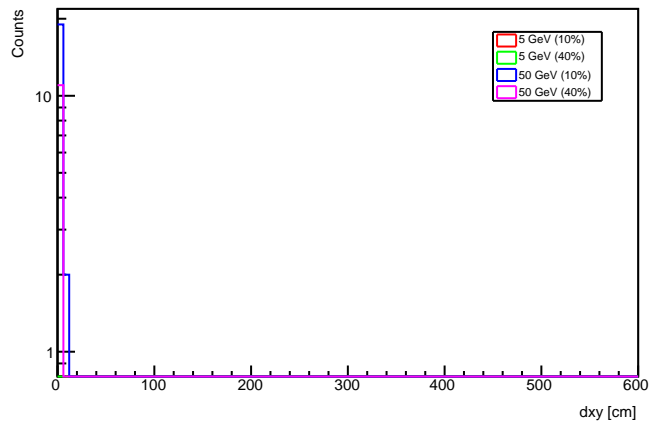
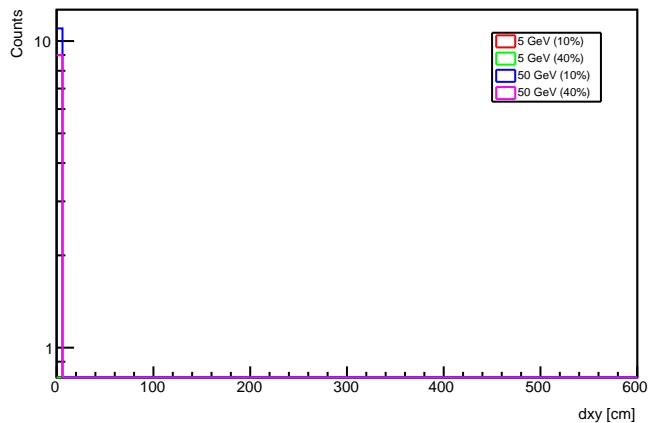
gen subleading Mu phi: no cuts

gen subleading Mu phi:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeVgen subleading Mu phi:  $\text{MET} > 120$  GeVgen subleading Mu phi:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVgen subleading Mu phi: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$ 

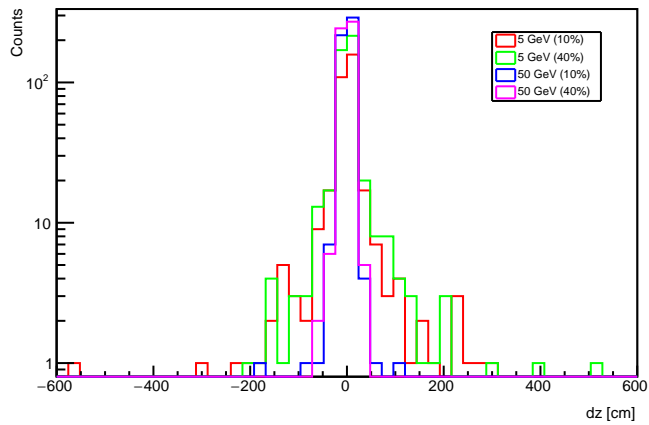
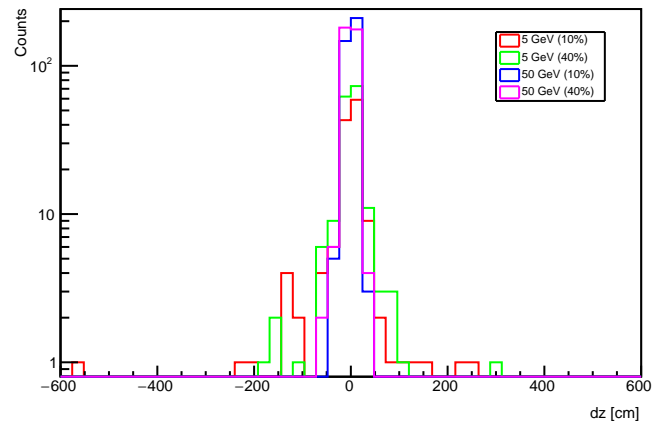
gen subleading Mu vxy: no cuts

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

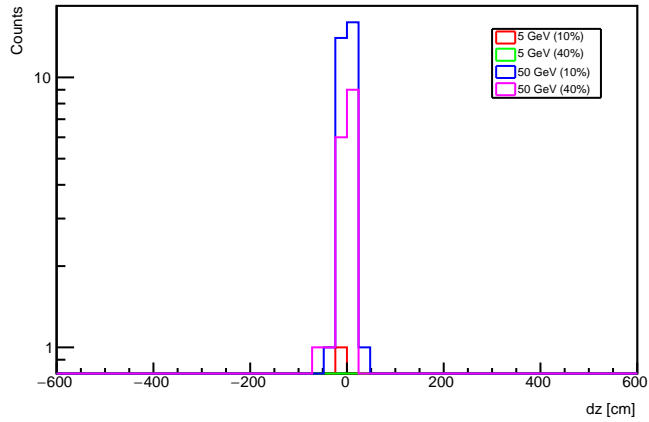
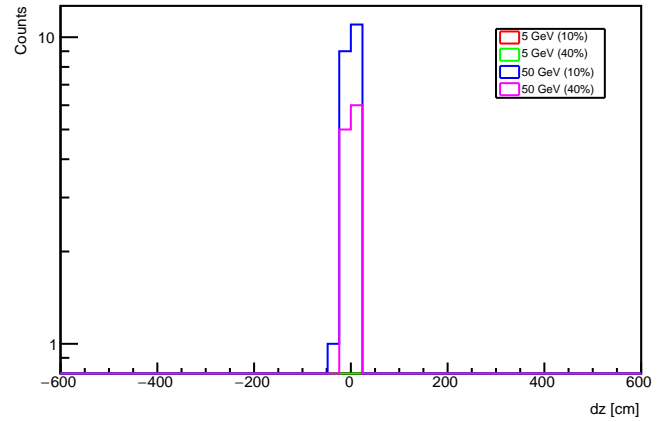
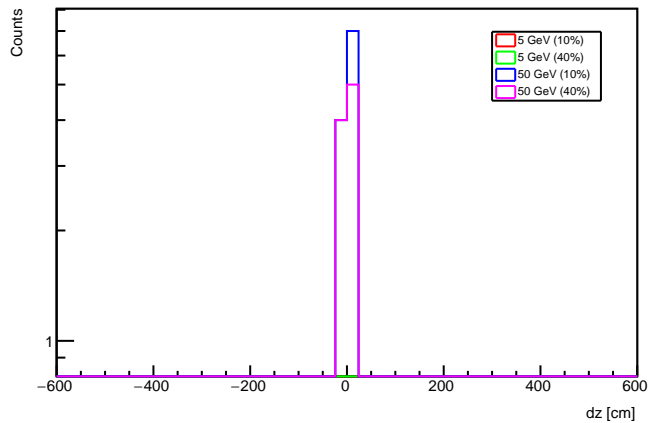
gen subleading Mu vxy: MET &gt; 120 GeV

gen subleading Mu vxy:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVgen subleading Mu vxy: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$ 

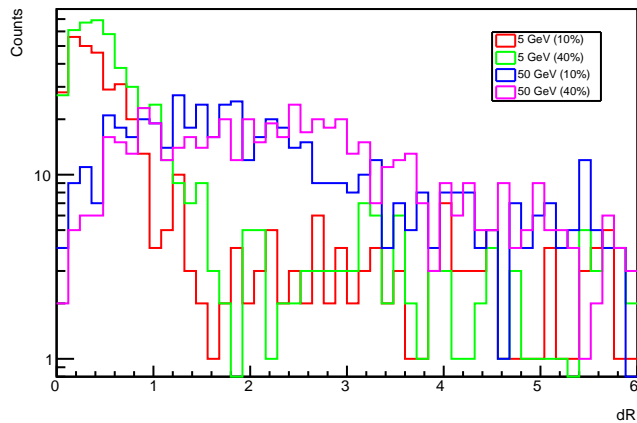
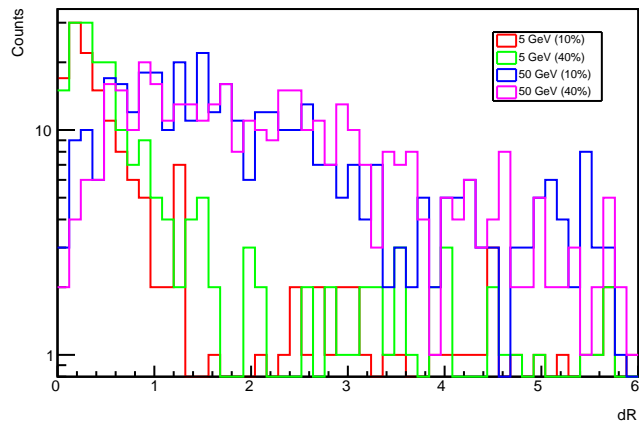
gen subleading Mu vz: no cuts

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

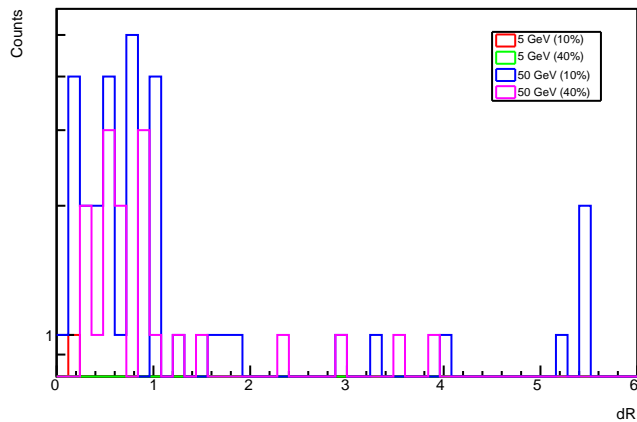
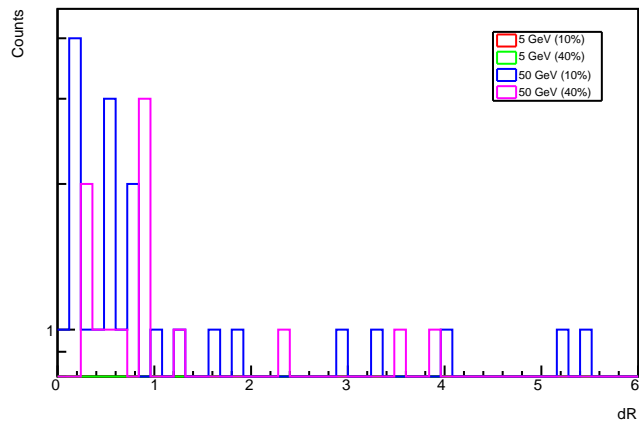
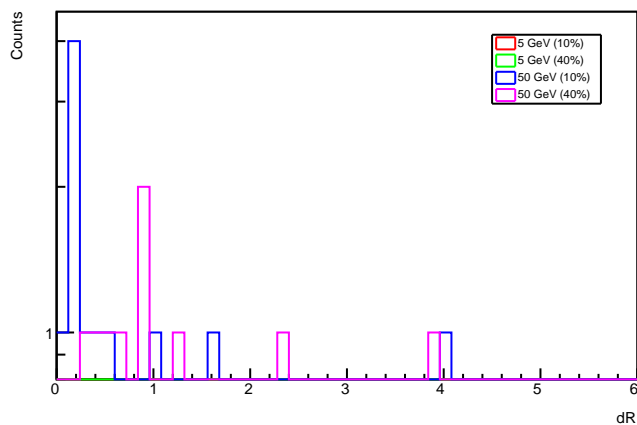
gen subleading Mu vz: MET &gt; 120 GeV

gen subleading Mu vz:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVgen subleading Mu vz: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$ 

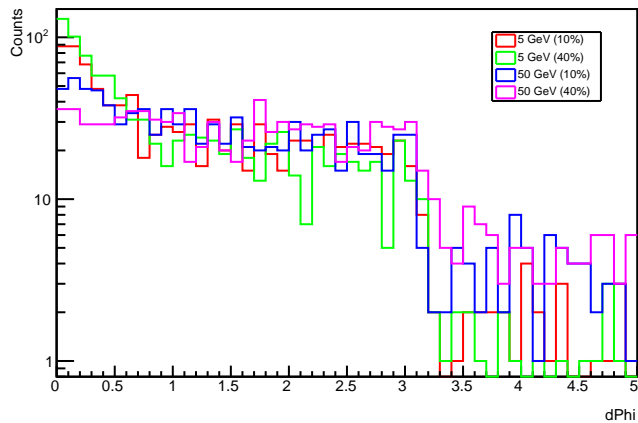
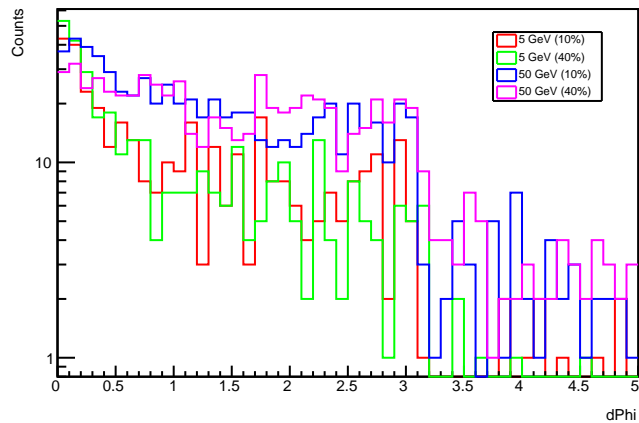
dR: gen leading mu and subleading mu: no cuts

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

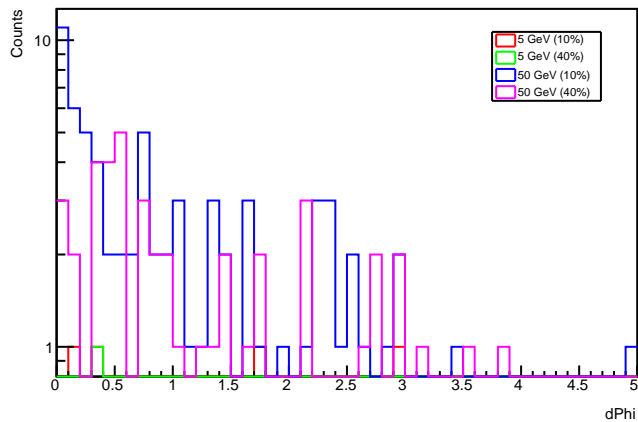
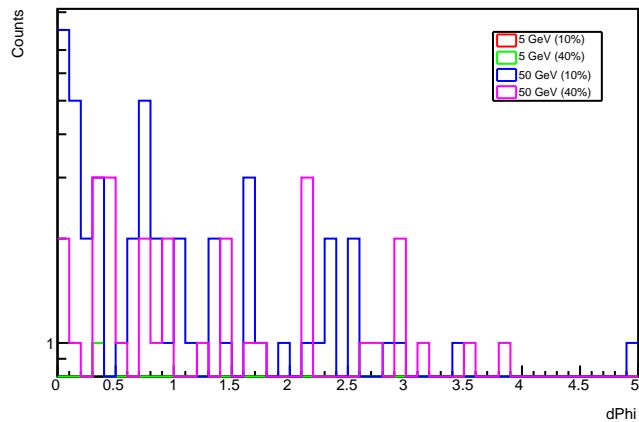
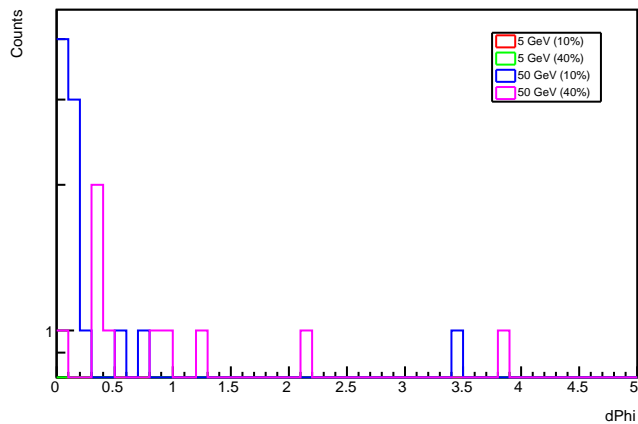
dR: gen leading mu and subleading mu: MET &gt; 120 GeV

dR: gen leading mu and subleading mu:  $j_{1pt} > 120$ , at most 2 jets w/  $pt > 30$  GeVdR: gen leading mu and subleading mu: at least 2 mu w/  $pt > 2$  GeV and  $\eta < 2.5$ 

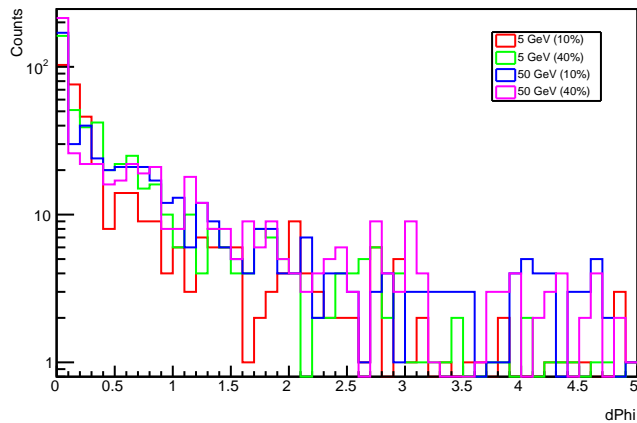
dPhi: gen MET and leading mu: no cuts

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

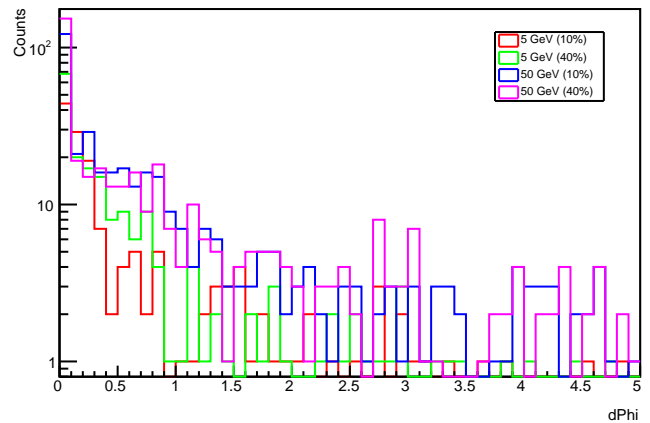
dPhi: gen MET and leading mu: MET &gt; 120 GeV

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/  $p_t > 2$  GeV and  $\eta < 2.5$ 

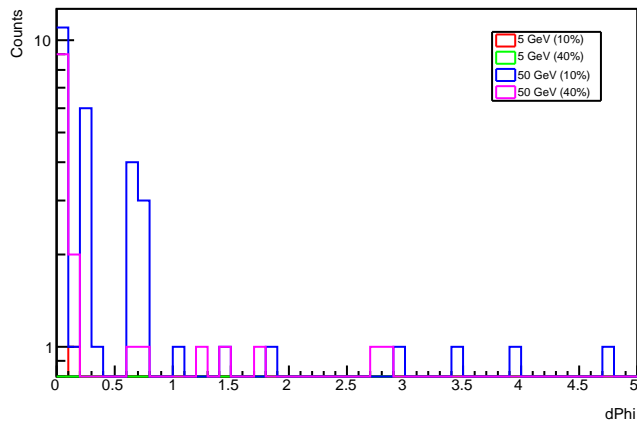
dPhi: gen leading mu and subleading mu: no cuts



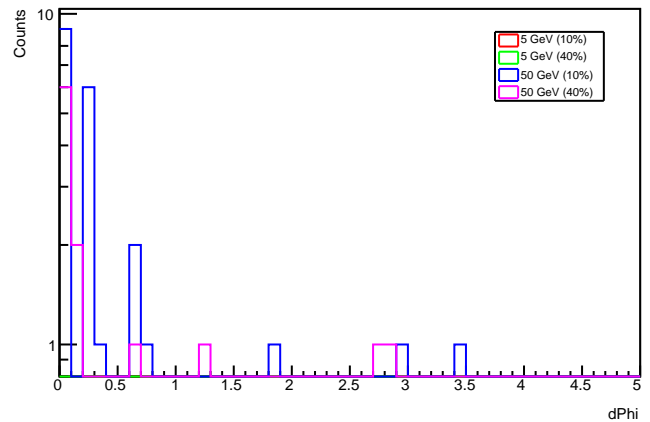
dPhi: gen leading mu and subleading mu:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV



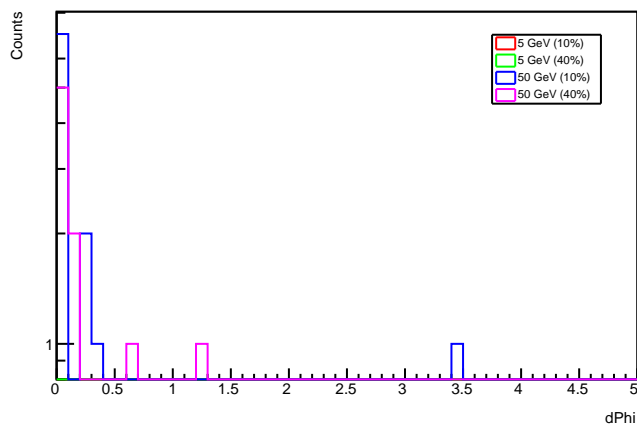
dPhi: gen leading mu and subleading mu: MET > 120 GeV



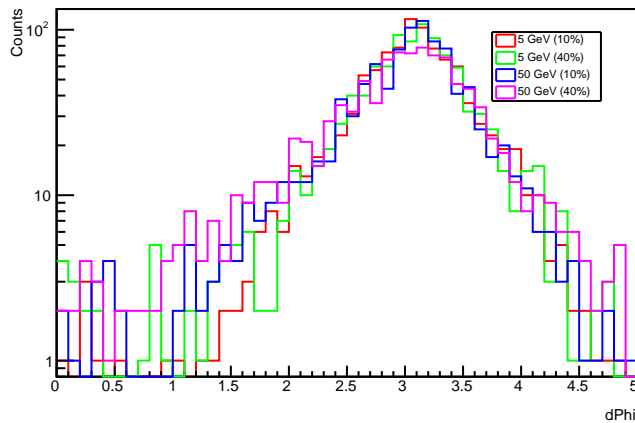
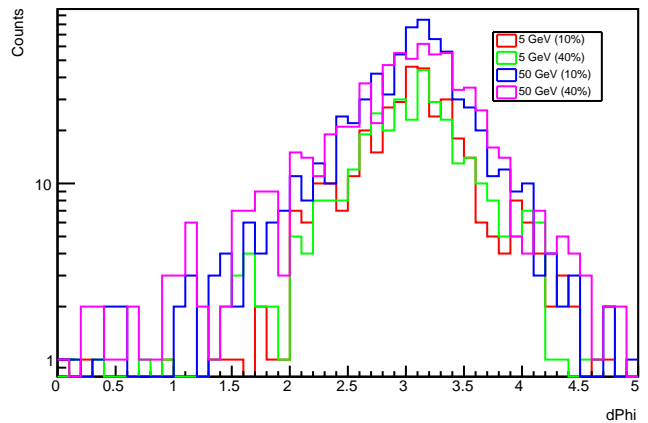
dPhi: gen leading mu and subleading mu:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeV



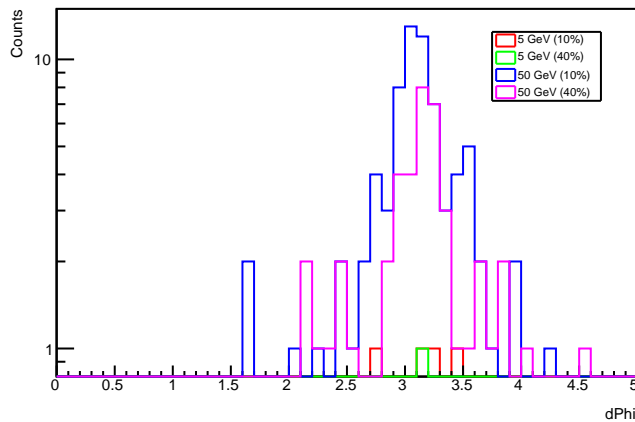
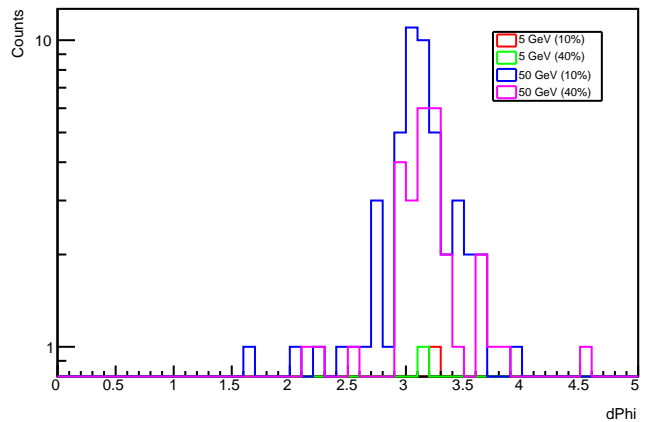
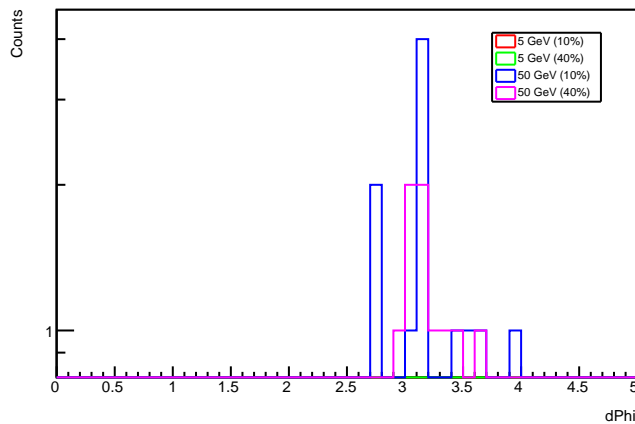
dPhi: gen leading mu and subleading mu: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$



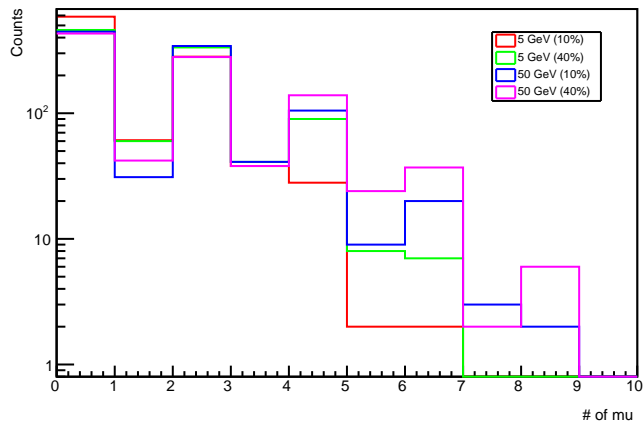
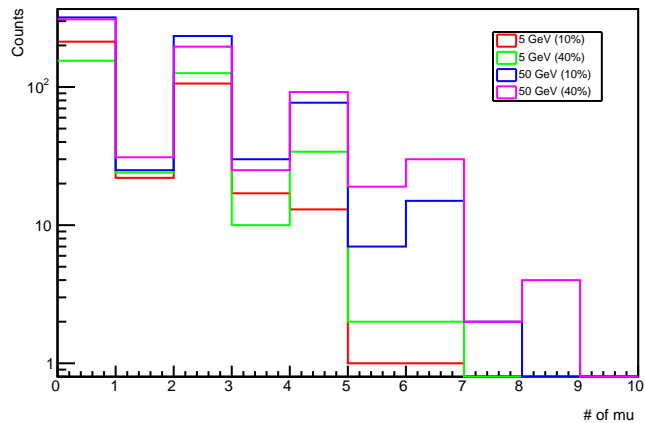
dPhi: gen MET and leading jet: no cuts

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

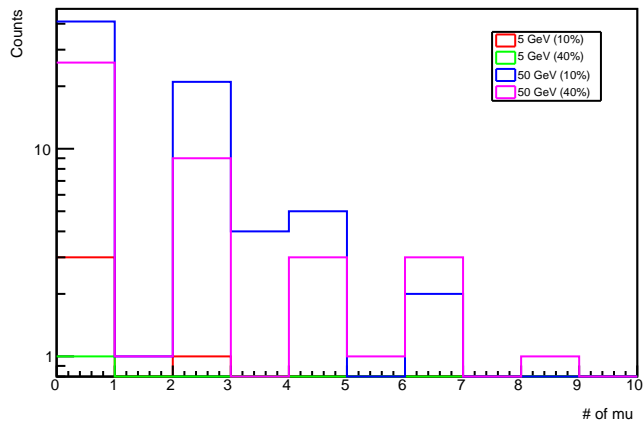
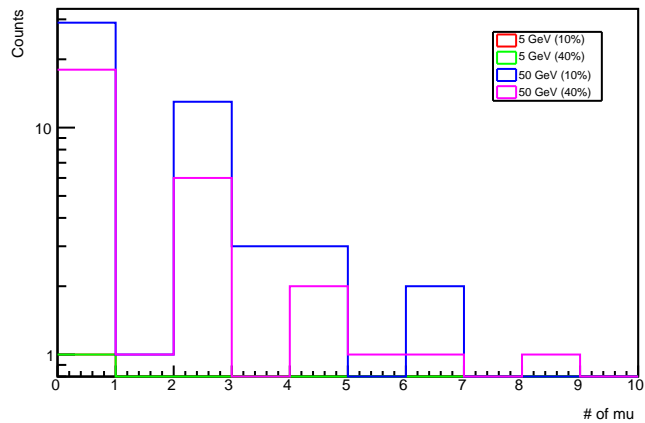
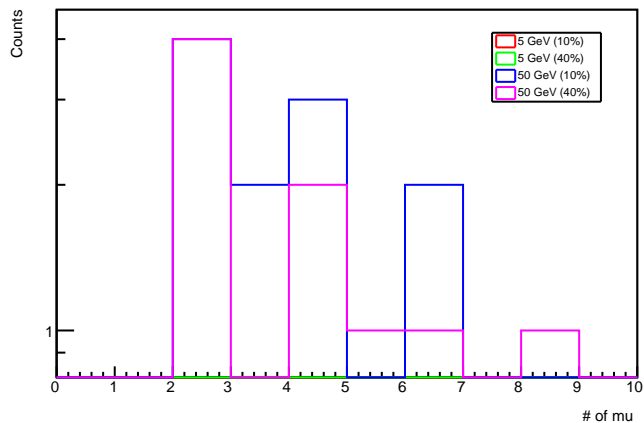
dPhi: gen MET and leading jet: MET &gt; 120 GeV

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/  $p_t > 2$  GeV and  $\eta < 2.5$ 

gen number of mu: no cuts

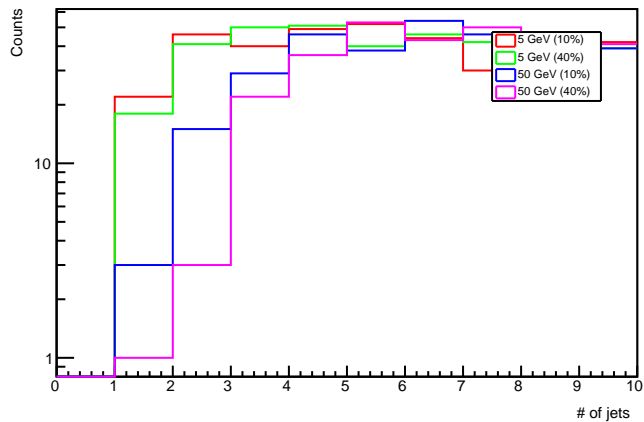
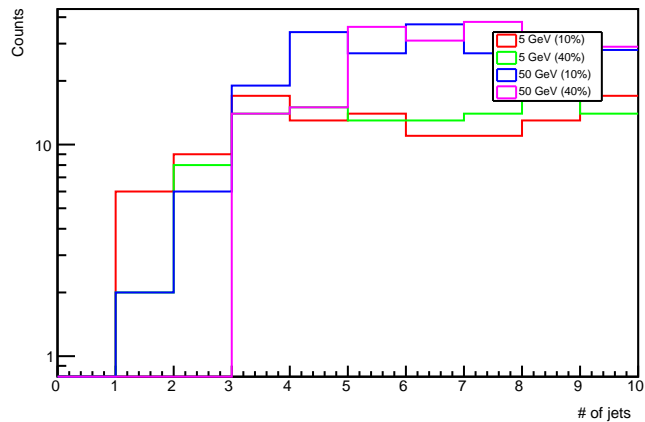
gen number of mu:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

gen number of mu: MET &gt; 120 GeV

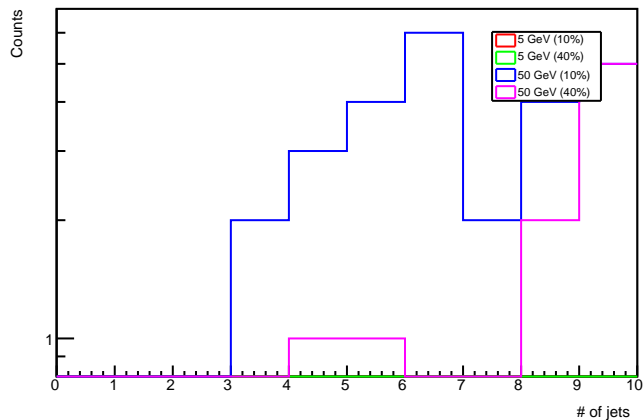
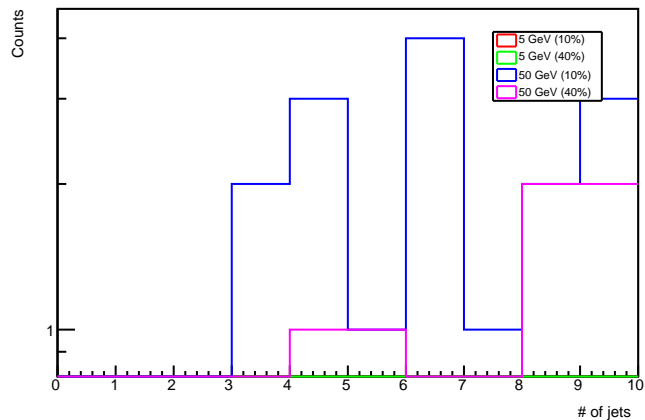
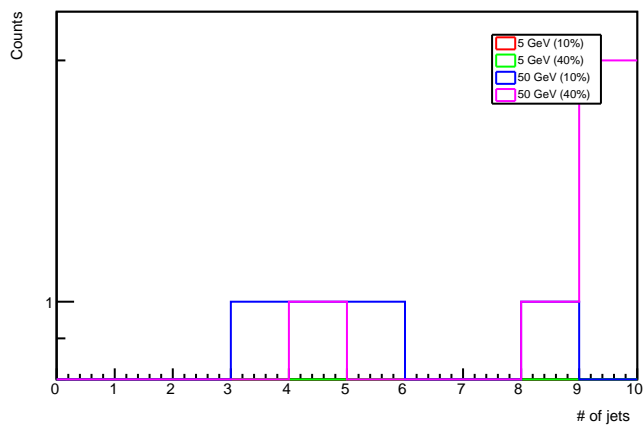
gen number of mu:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVgen number of mu: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$ 



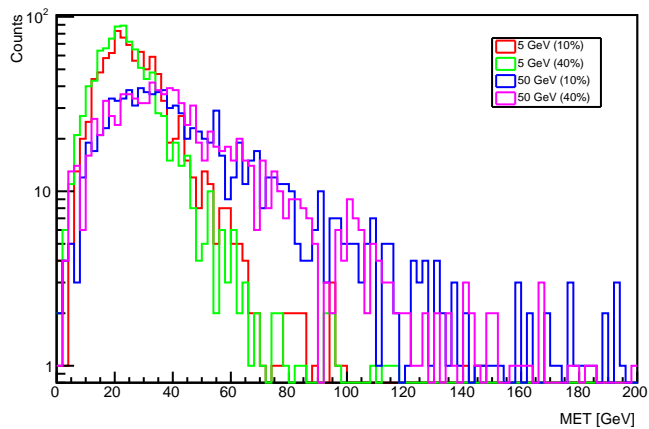
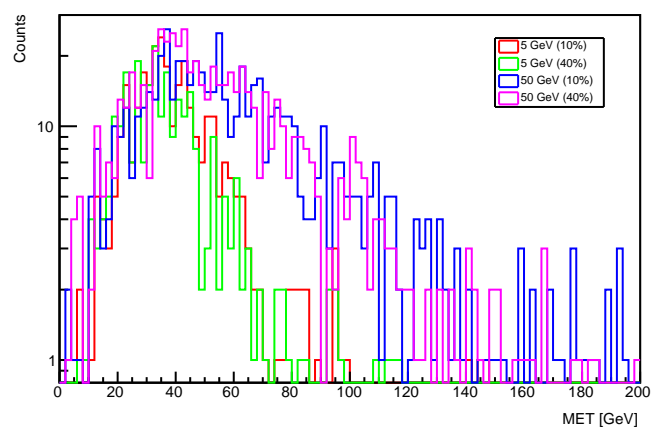
gen number of jets: no cuts

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

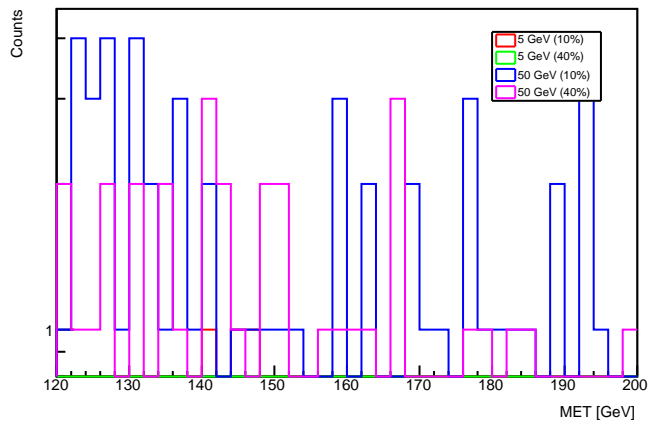
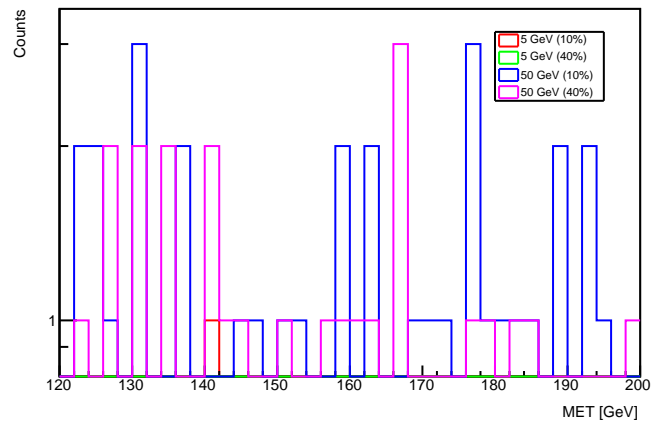
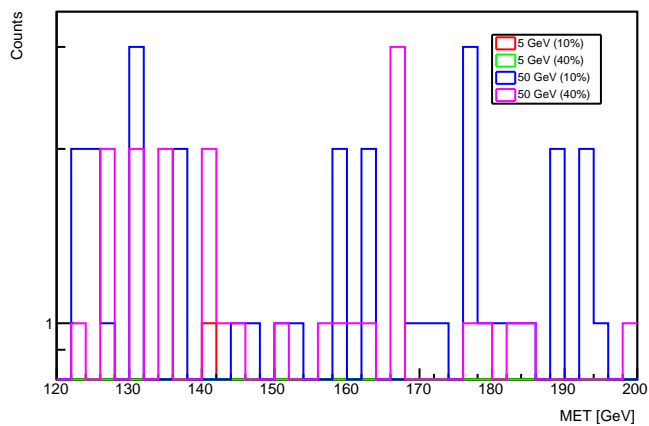
gen number of jets: MET &gt; 120 GeV

gen number of jets:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVgen number of jets: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$ 

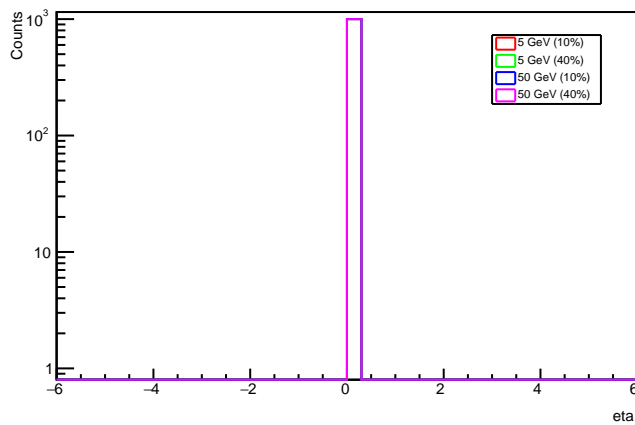
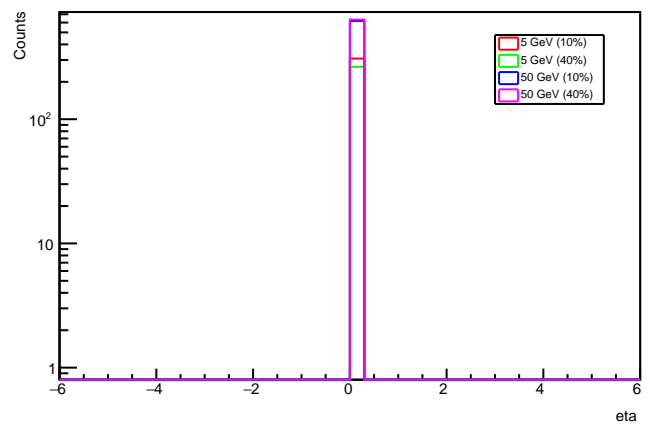
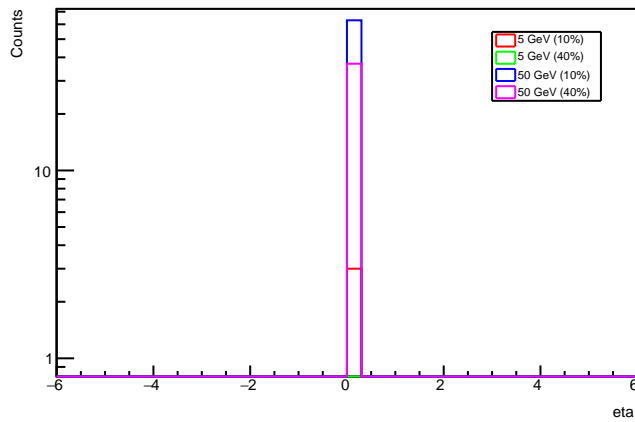
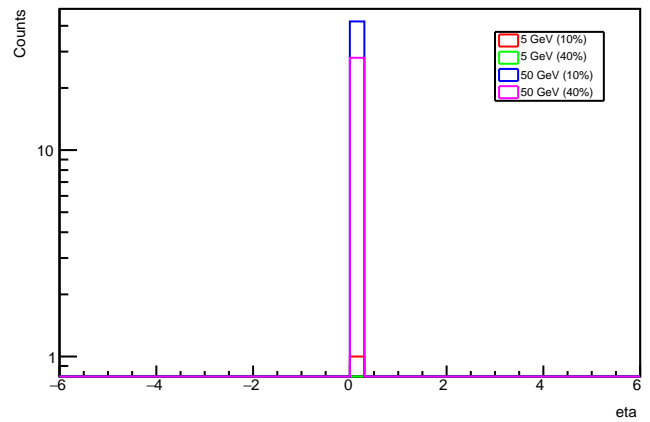
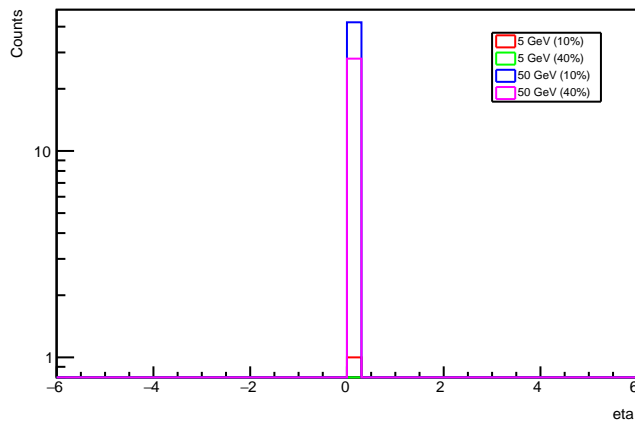
reco leading MET: no cuts

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

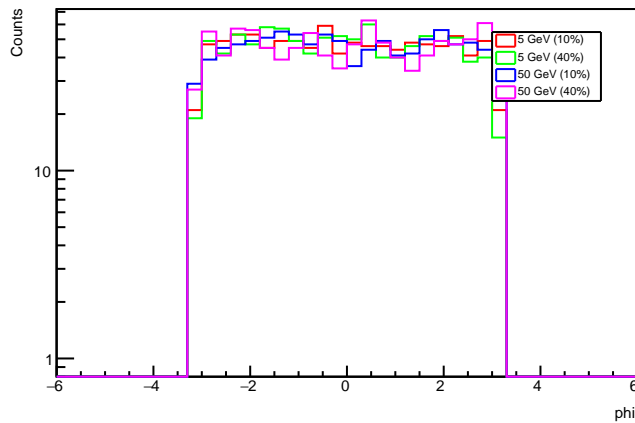
reco leading MET: MET &gt; 120 GeV

reco leading MET:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $pt > 30$  GeVreco leading MET: at least 2 mu w/  $pt > 2$  GeV and  $\eta < 2.5$ 

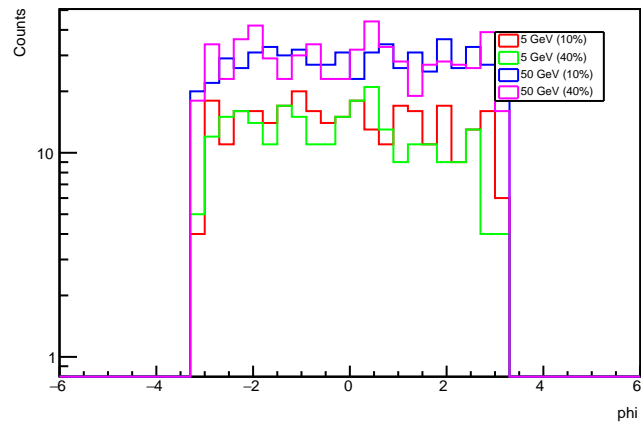
reco leading Met eta: no cuts

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/  $p_t > 2$  GeV and  $\text{eta} < 2.5$ 

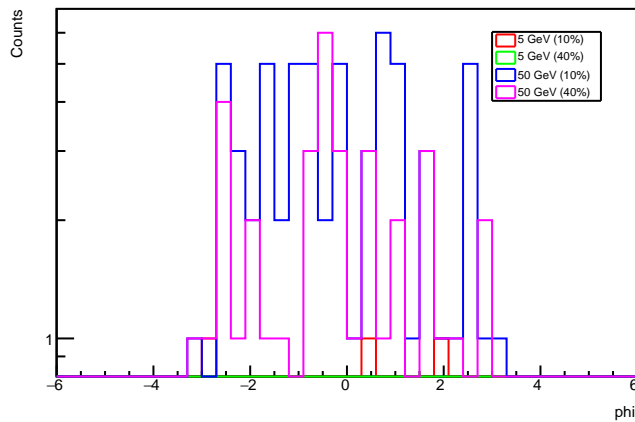
reco leading Met phi: no cuts



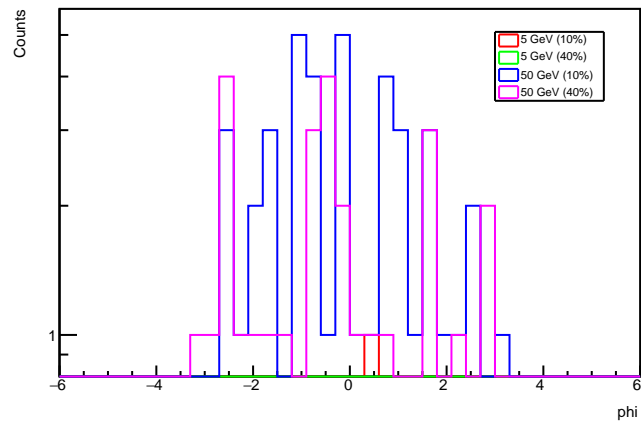
reco leading Met phi: n\_jet &gt;=1, j1pt &gt; 30 GeV



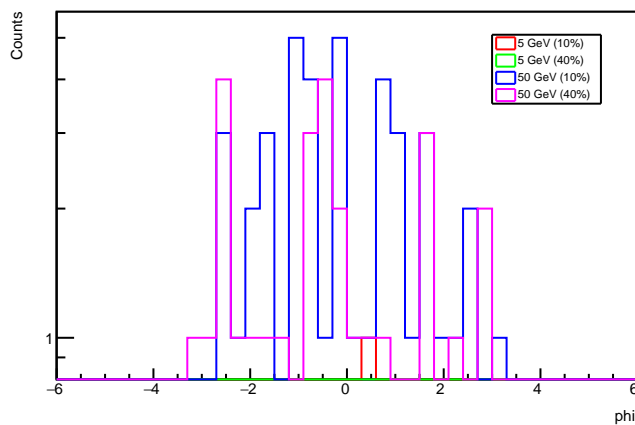
reco leading Met phi: MET &gt; 120 GeV



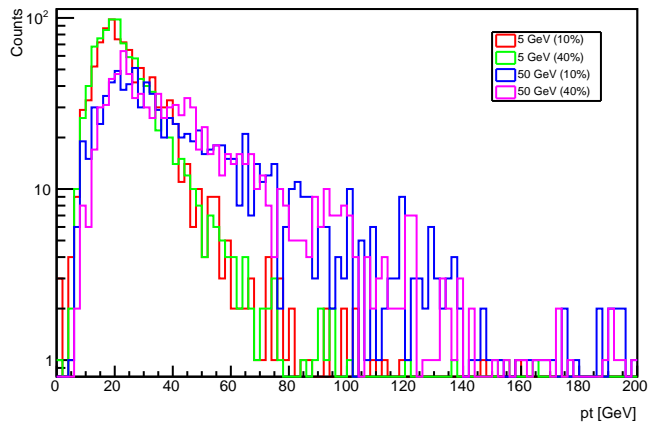
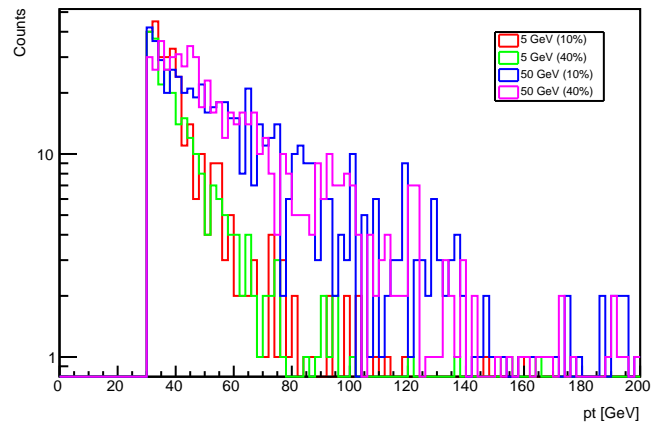
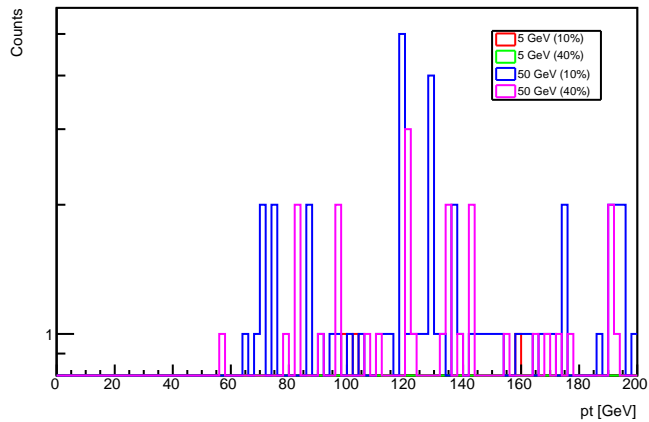
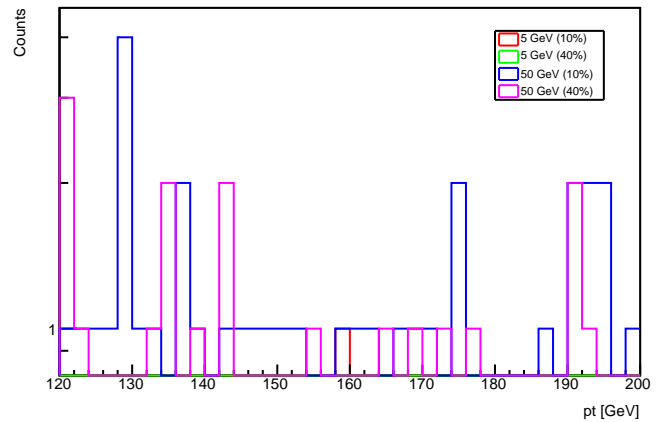
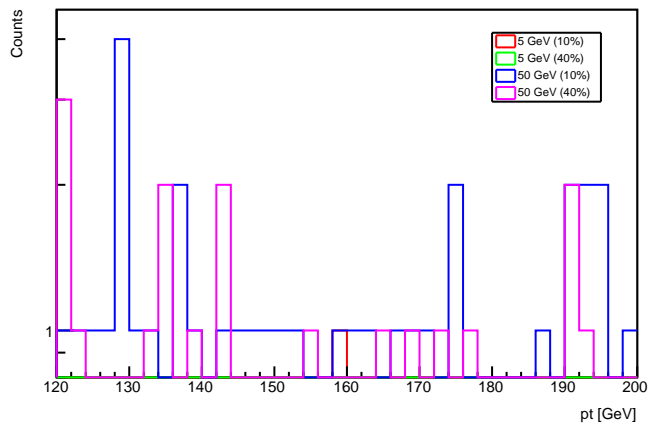
reco leading Met phi: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



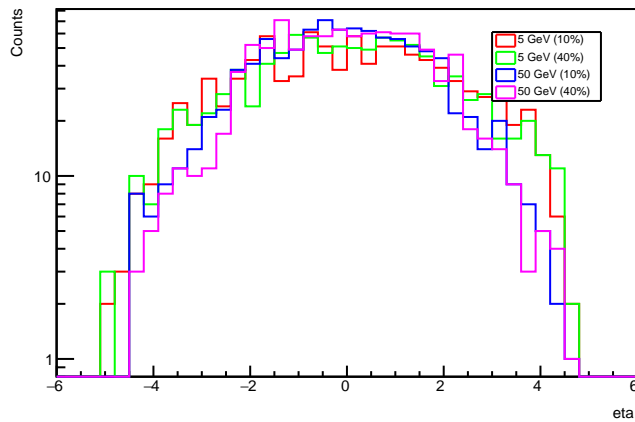
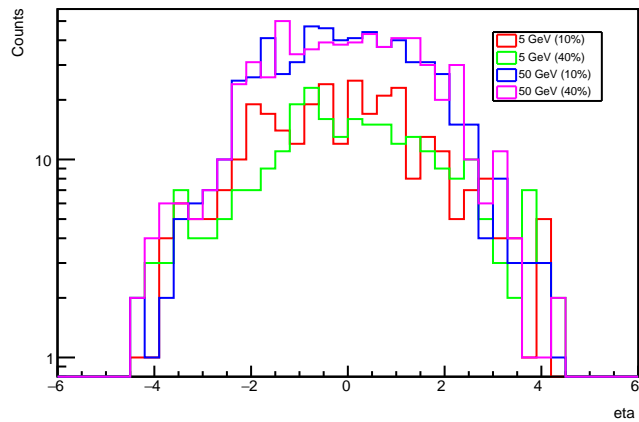
reco leading Met phi: at least 2 mu w/ pt &gt; 2 GeV and eta &lt; 2.5



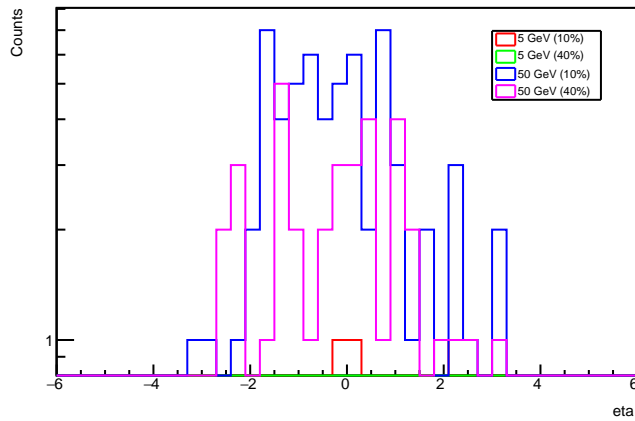
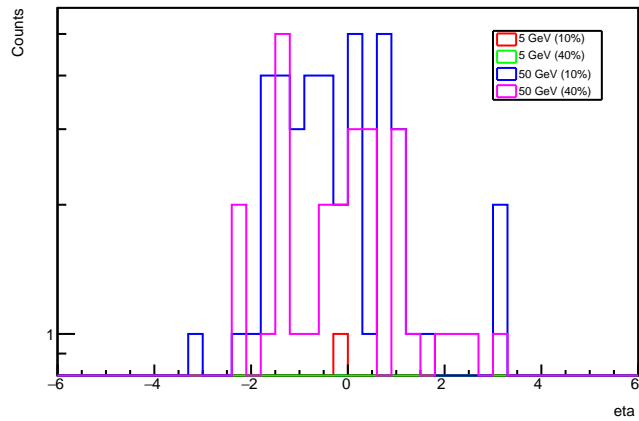
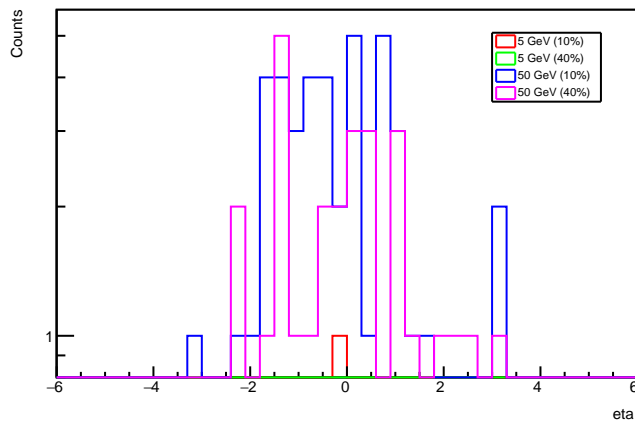
reco leading Jet pt: no cuts

reco leading Jet pt:  $n_{\text{jet}} \geq 1$ ,  $j_1 \text{pt} > 30 \text{ GeV}$ reco leading Jet pt:  $\text{MET} > 120 \text{ GeV}$ reco leading Jet pt:  $j_1 \text{pt} > 120$ , at most 2 jets w/  $\text{pt} > 30 \text{ GeV}$ reco leading Jet pt: at least 2 mu w/  $\text{pt} > 2 \text{ GeV}$  and  $\eta < 2.5$ 

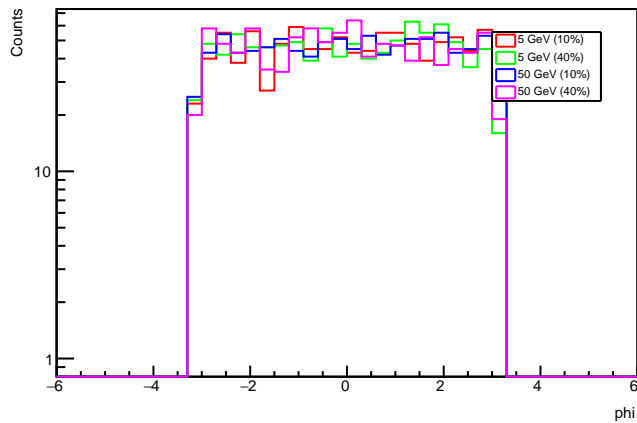
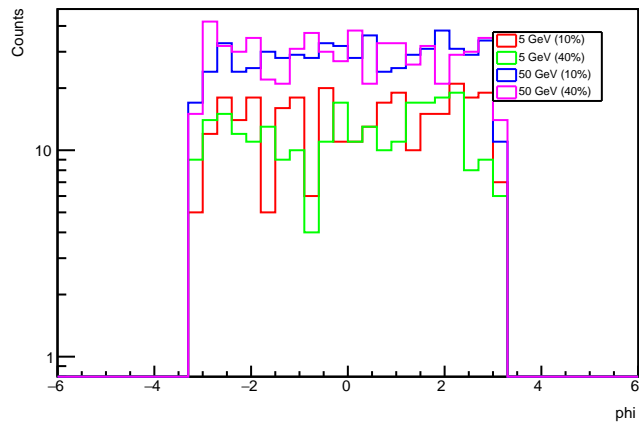
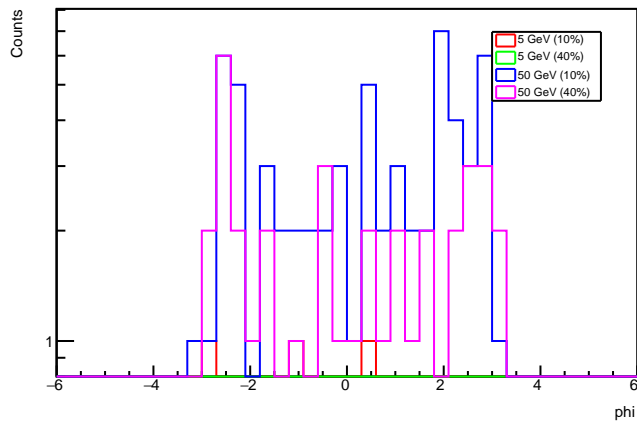
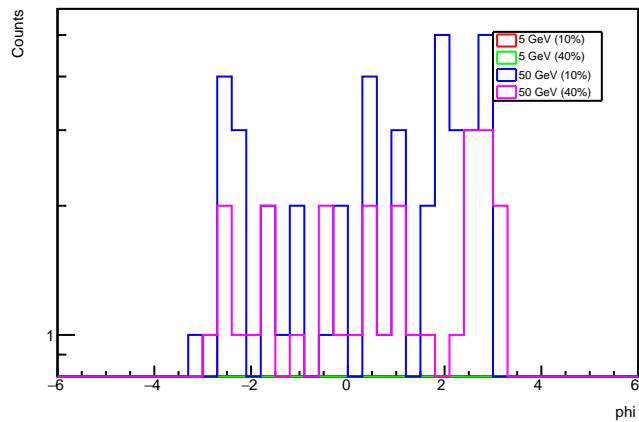
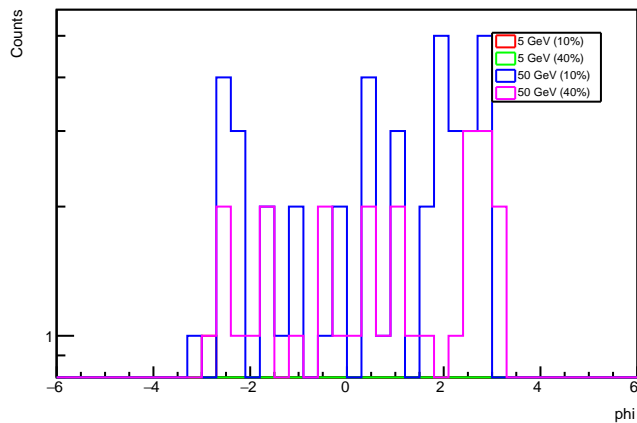
reco leading Jet eta: no cuts

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

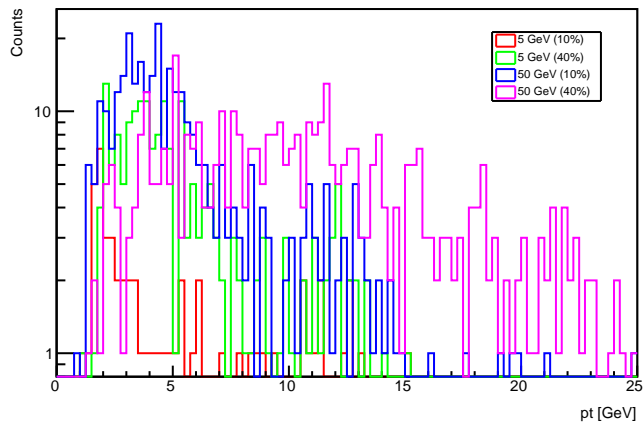
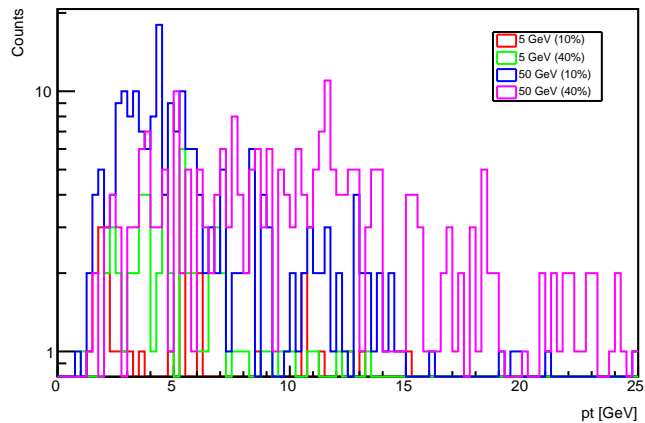
reco leading Jet eta: MET &gt; 120 GeV

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/  $p_t > 2$  GeV and  $\eta < 2.5$ 

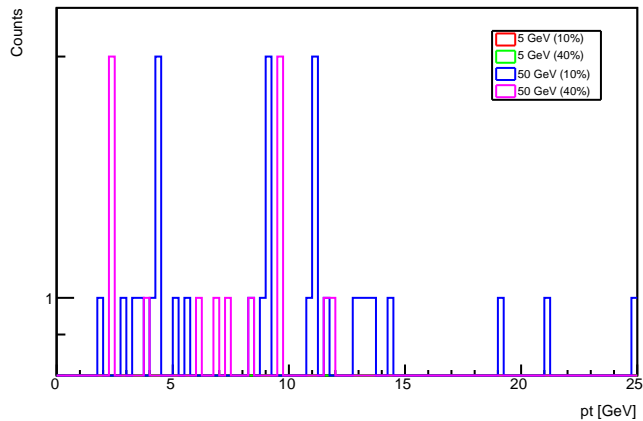
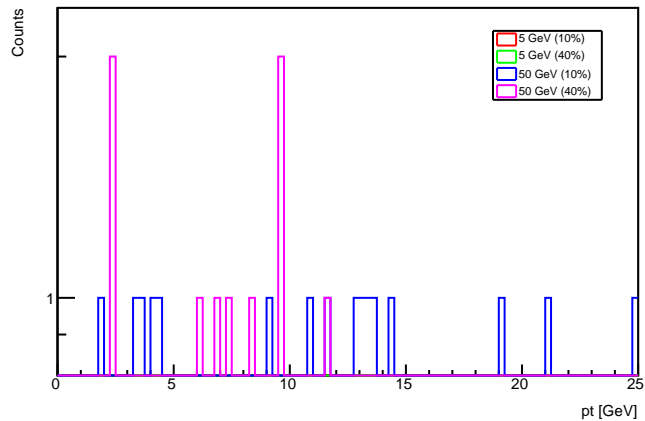
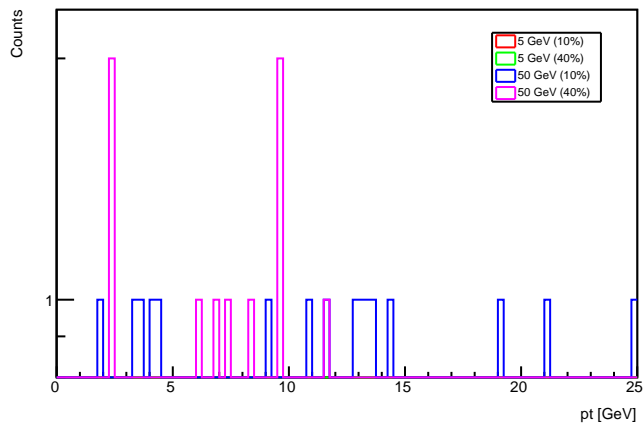
reco leading Jet phi: no cuts

reco leading Jet phi:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeVreco leading Jet phi:  $\text{MET} > 120$  GeVreco leading Jet phi:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVreco leading Jet phi: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$ 

reco leading Mu pt: no cuts

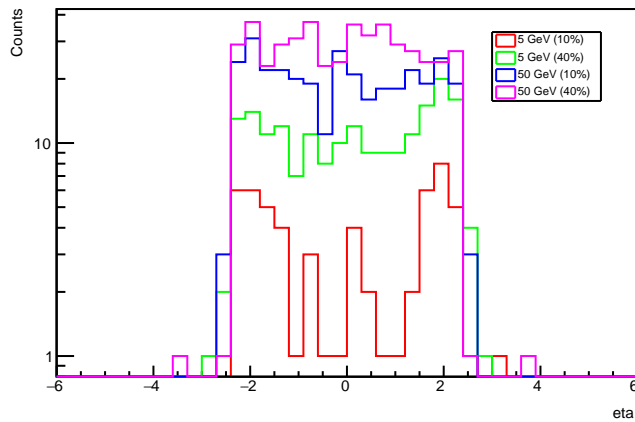
reco leading Mu pt:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

reco leading Mu pt: MET &gt; 120 GeV

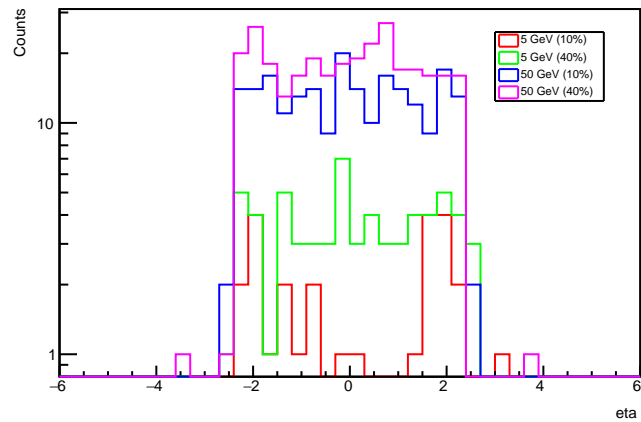
reco leading Mu pt:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_{\text{T}} > 30$  GeVreco leading Mu pt: at least 2 mu w/  $p_{\text{T}} > 2$  GeV and  $\eta < 2.5$ 



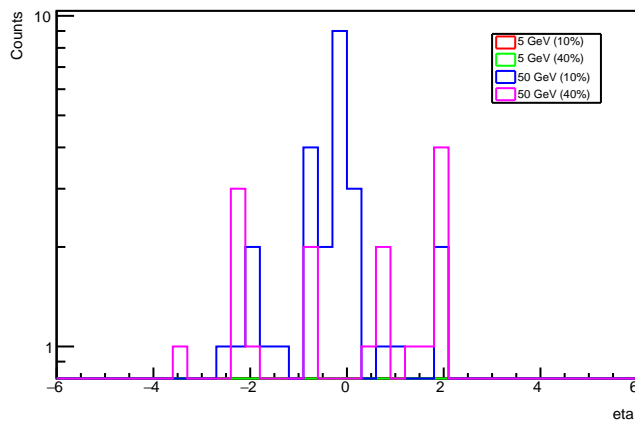
reco leading Mu eta: no cuts



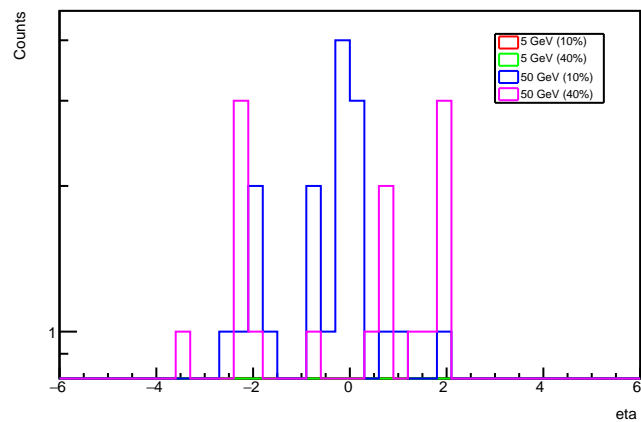
reco leading Mu eta: n\_jet &gt;=1, j1pt &gt; 30 GeV



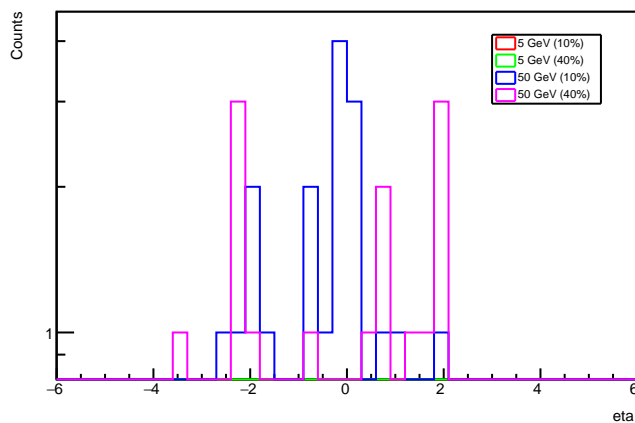
reco leading Mu eta: MET &gt; 120 GeV



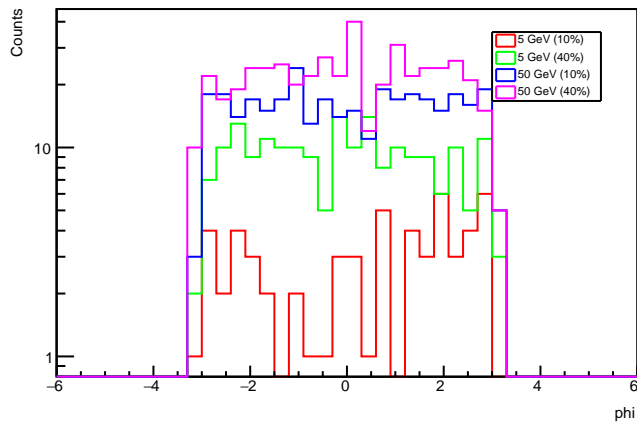
reco leading Mu eta: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



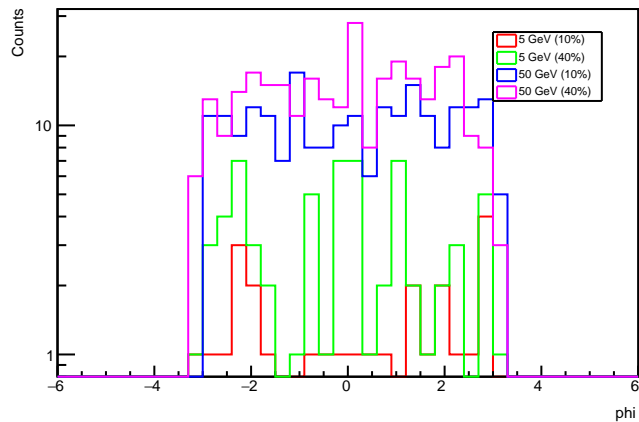
reco leading Mu eta: at least 2 mu w/ pt &gt; 2 GeV and eta &lt; 2.5



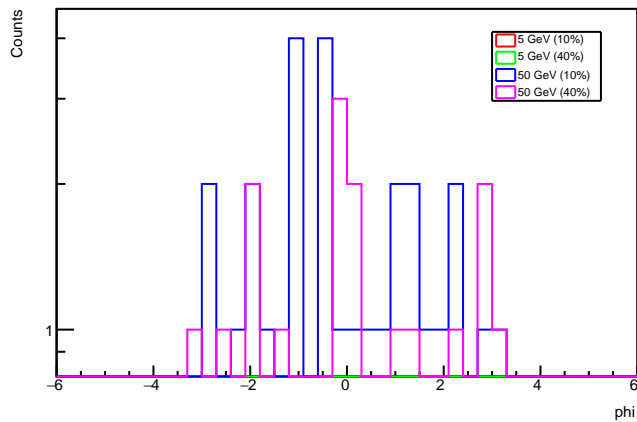
reco leading Mu phi: no cuts



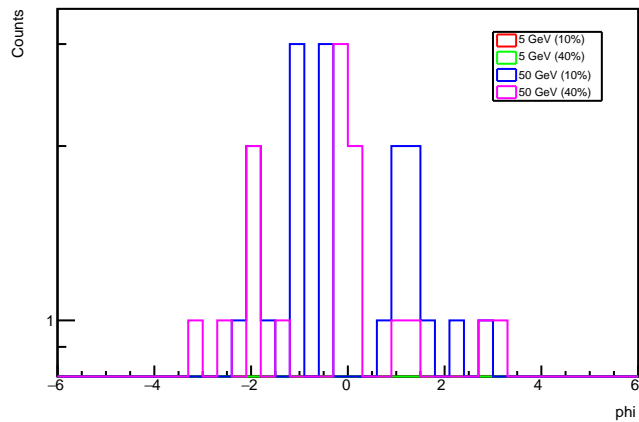
reco leading Mu phi: n\_jet &gt;= 1, j1pt &gt; 30 GeV



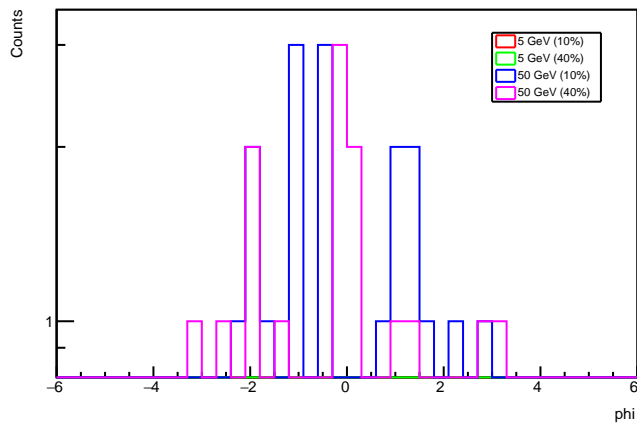
reco leading Mu phi: MET &gt; 120 GeV



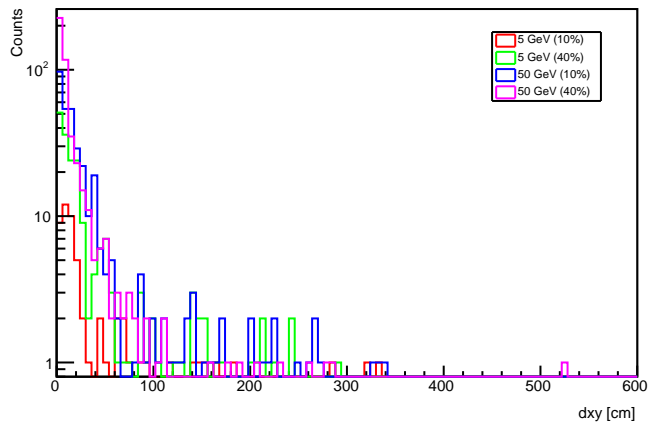
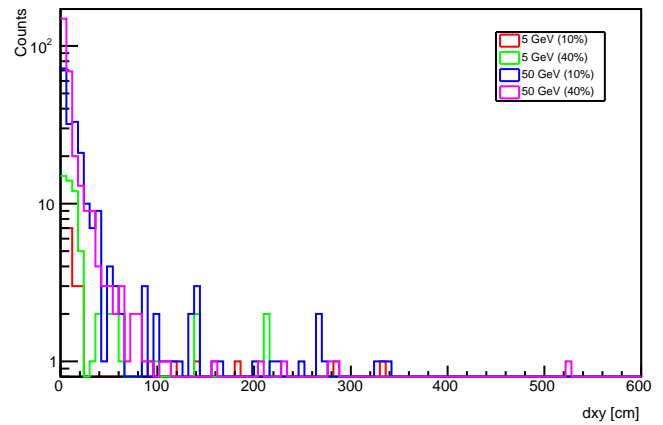
reco leading Mu phi: j1pt &gt; 120, at most 2 jets w/ pt &gt; 30 GeV



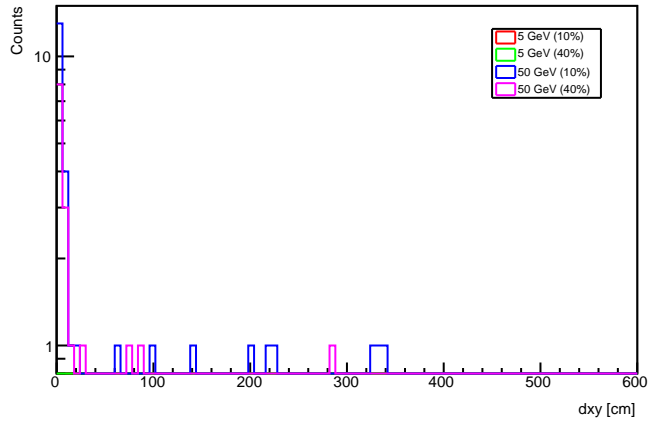
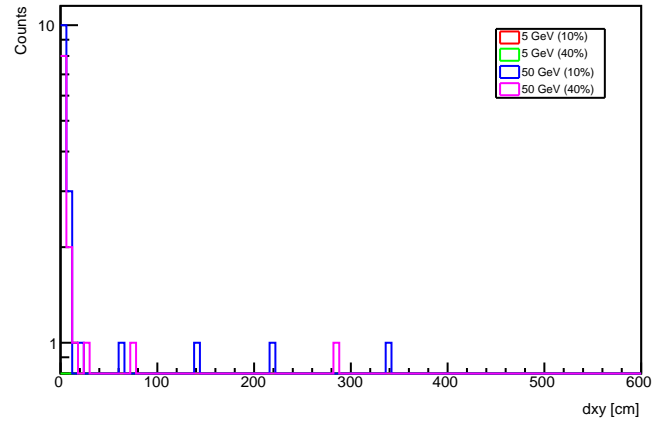
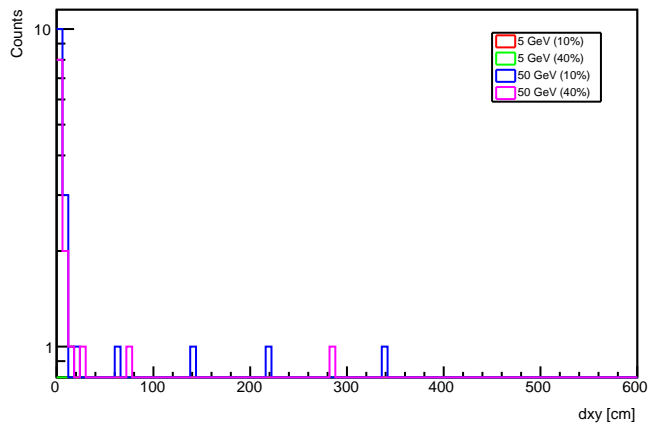
reco leading Mu phi: at least 2 mu w/ pt &gt; 2 GeV and eta &lt; 2.5



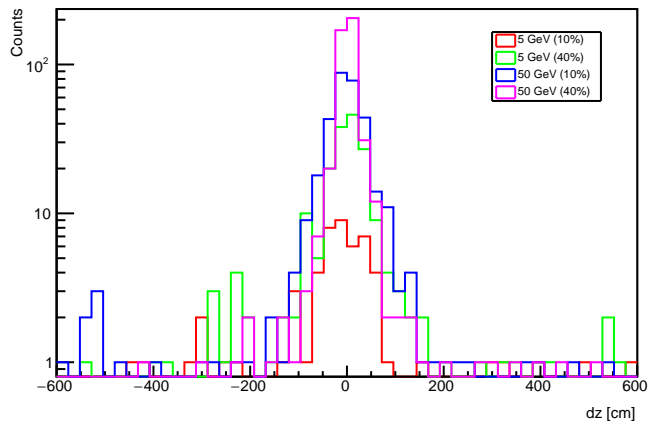
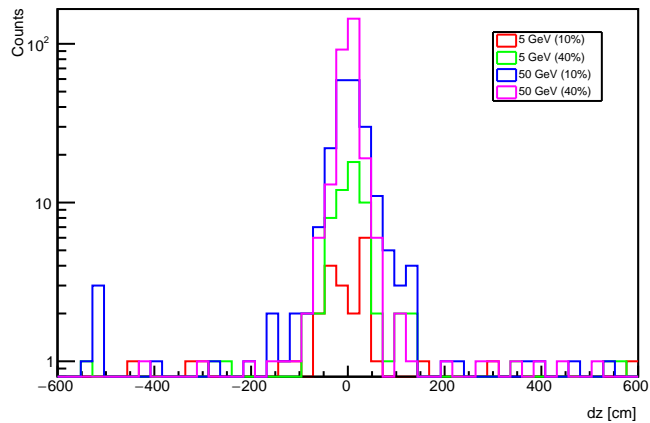
reco leading Mu vxy: no cuts

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

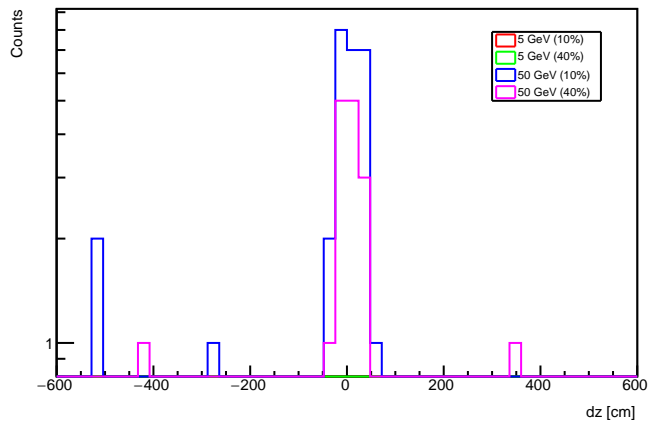
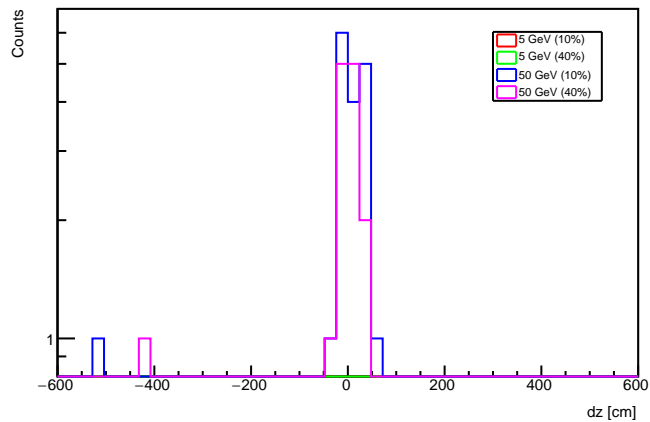
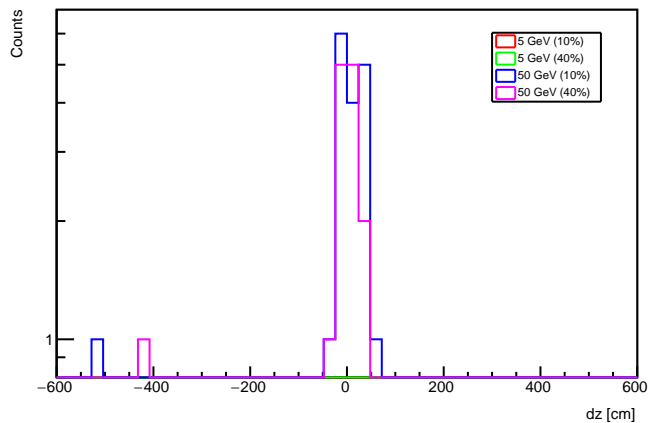
reco leading Mu vxy: MET &gt; 120 GeV

reco leading Mu vxy:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVreco leading Mu vxy: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$ 

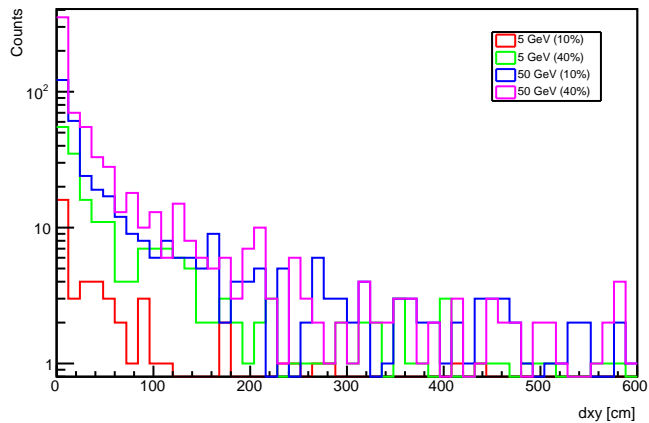
reco leading Mu vz: no cuts

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

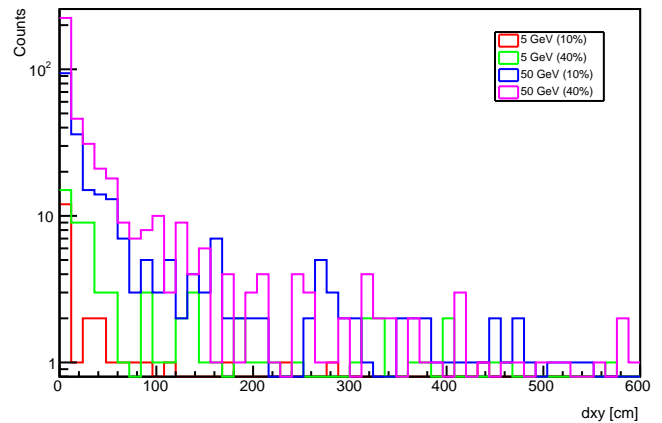
reco leading Mu vz: MET &gt; 120 GeV

reco leading Mu vz:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVreco leading Mu vz: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$ 

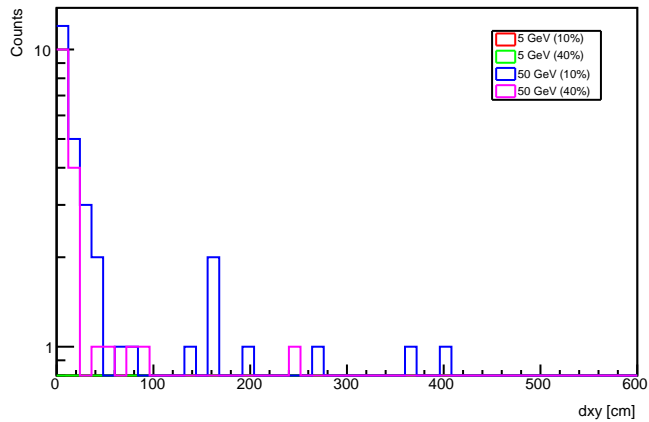
reco all Mu vxy: no cuts



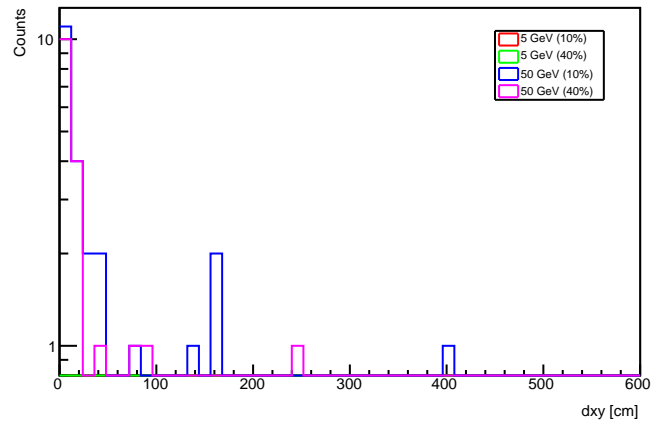
reco all Mu vxy: n\_jet &gt;=1, j1pt &gt; 30 GeV



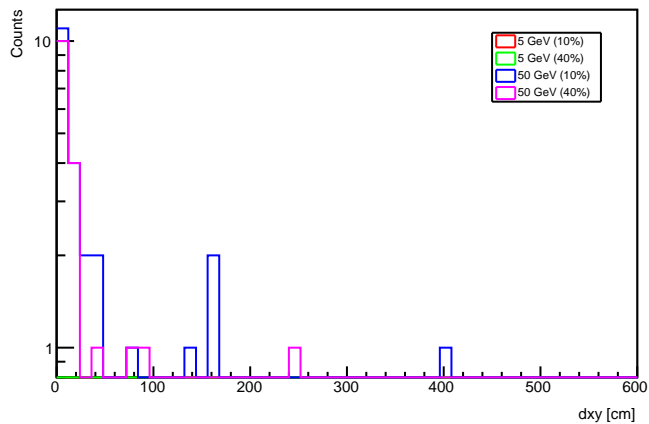
reco all Mu vxy: MET &gt; 120 GeV



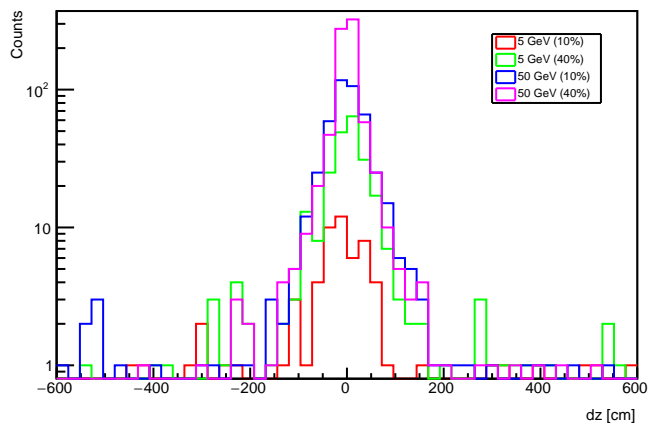
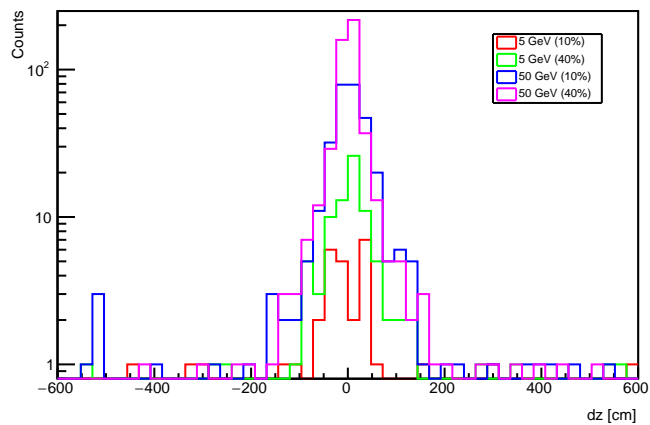
reco all Mu vxy: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



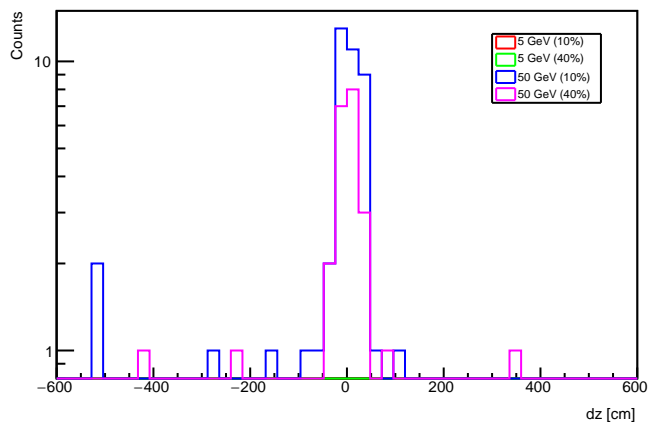
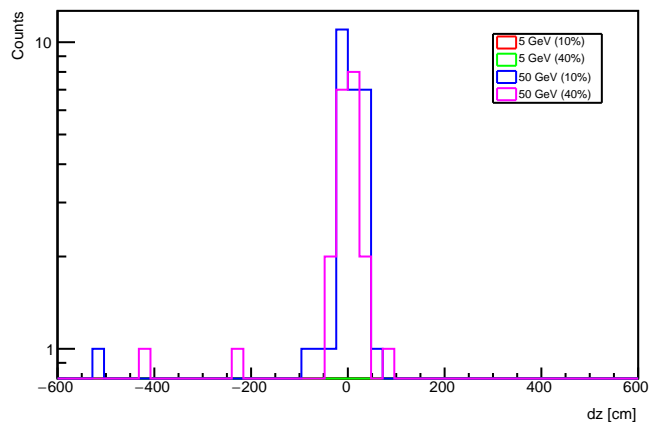
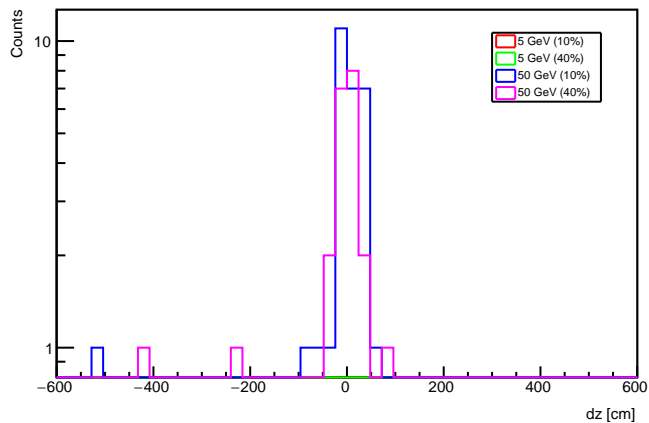
reco all Mu vxy: at least 2 mu w/ pt &gt; 2 GeV and eta &lt; 2.5



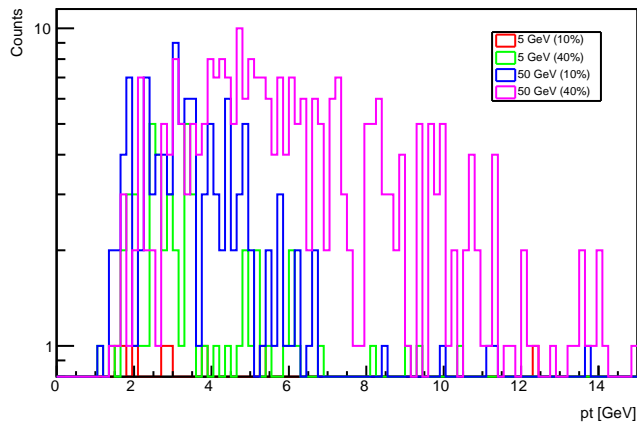
reco all Mu vz: no cuts

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

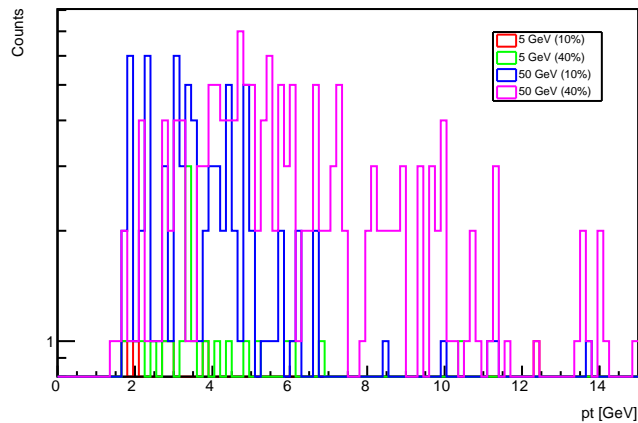
reco all Mu vz: MET &gt; 120 GeV

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/  $p_t > 2$  GeV and  $\eta < 2.5$ 

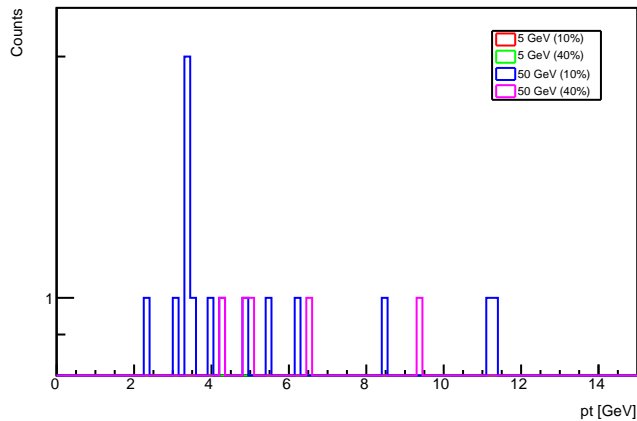
reco subleading Mu pt: no cuts



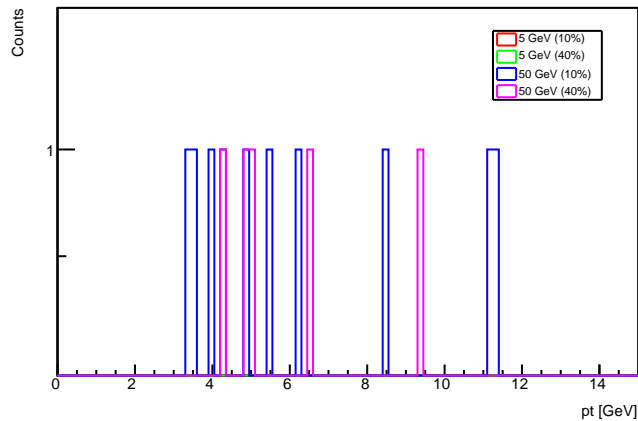
reco subleading Mu pt: n\_jet &gt;=1, j1pt &gt; 30 GeV



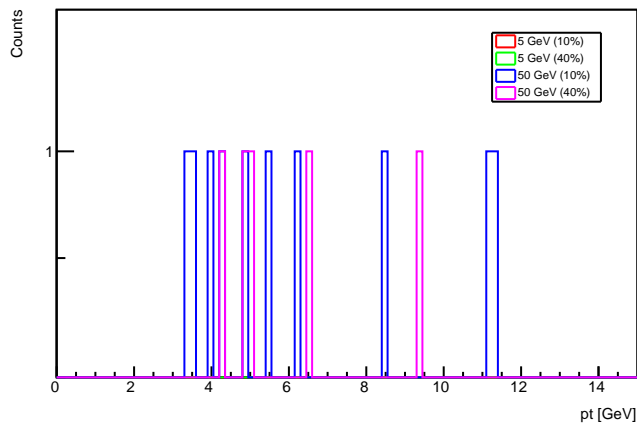
reco subleading Mu pt: MET &gt; 120 GeV



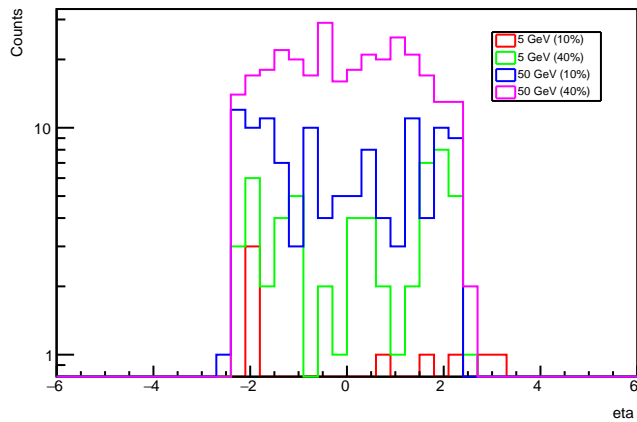
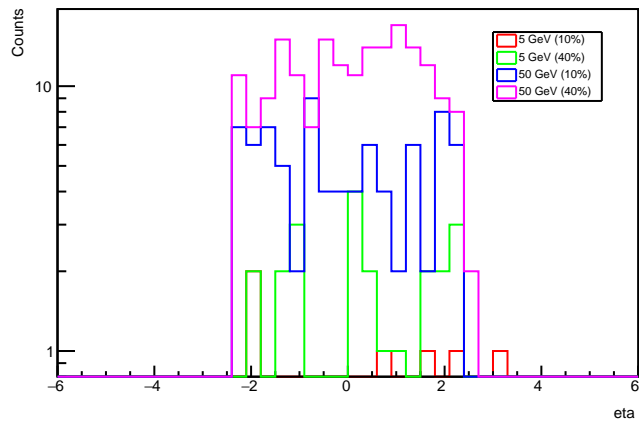
reco subleading Mu pt: j1pt &gt;120, at most 2 jets w/ pt &gt;30 GeV



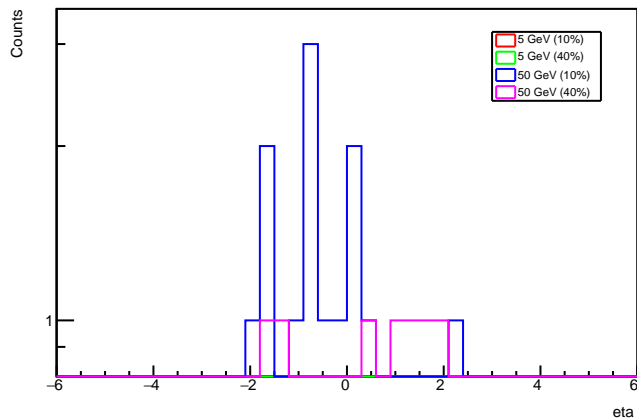
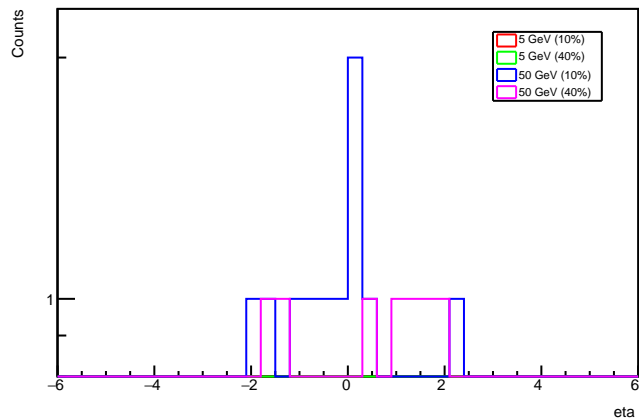
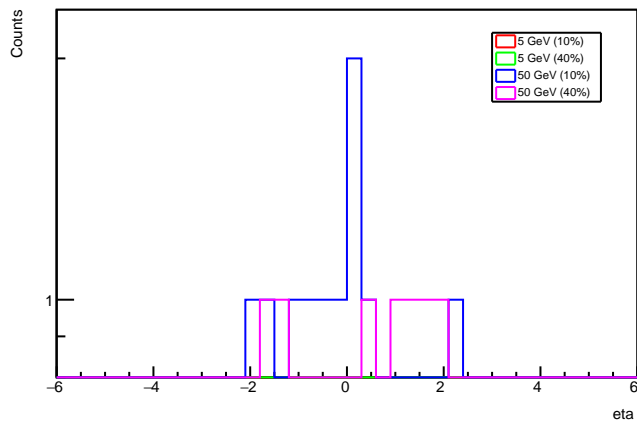
reco subleading Mu pt: at least 2 mu w/ pt &gt; 2 GeV and eta&lt;2.5



reco subleading Mu eta: no cuts

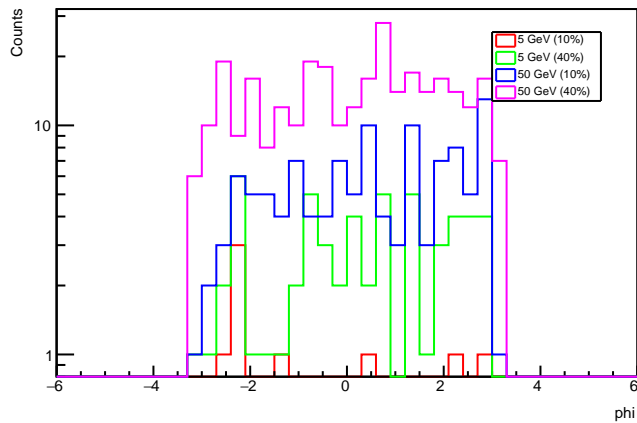
reco subleading Mu eta:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

reco subleading Mu eta: MET &gt; 120 GeV

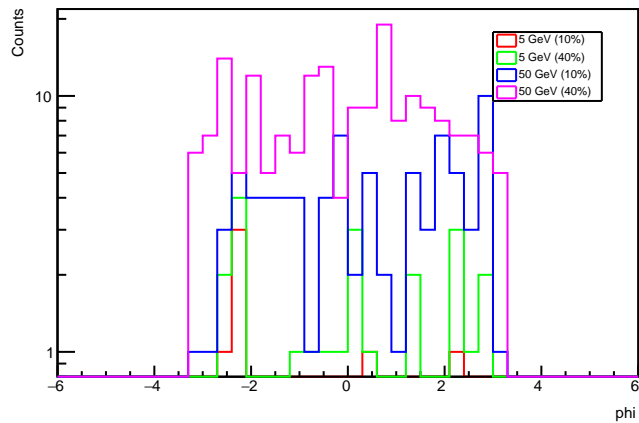
reco subleading Mu eta:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVreco subleading Mu eta: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$ 



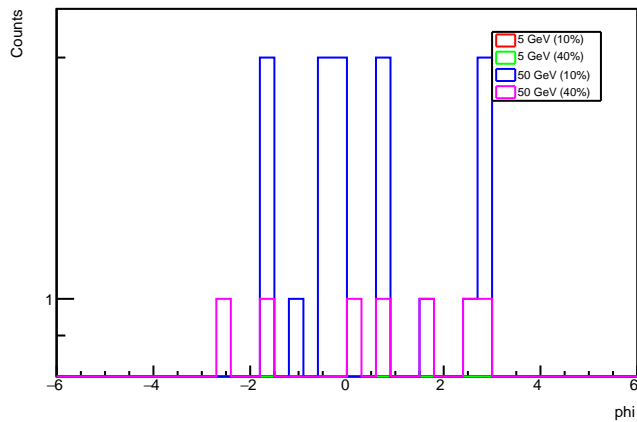
reco subleading Mu phi: no cuts



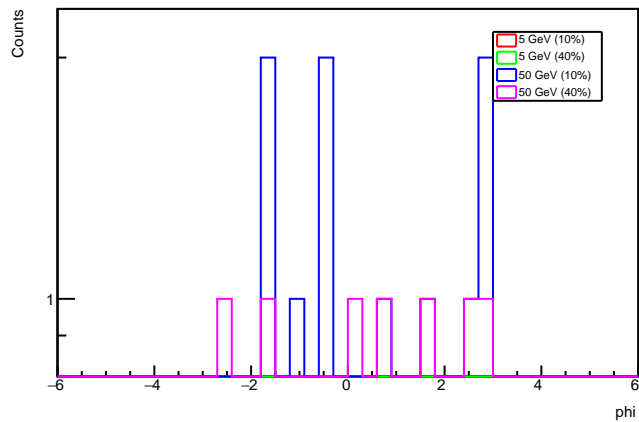
reco subleading Mu phi: n\_jet &gt;= 1, j1pt &gt; 30 GeV



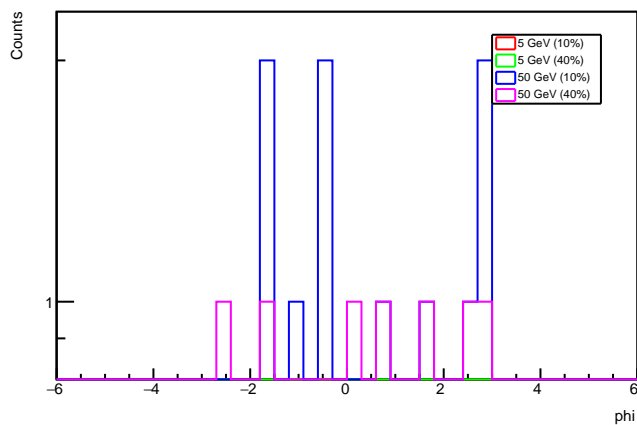
reco subleading Mu phi: MET &gt; 120 GeV



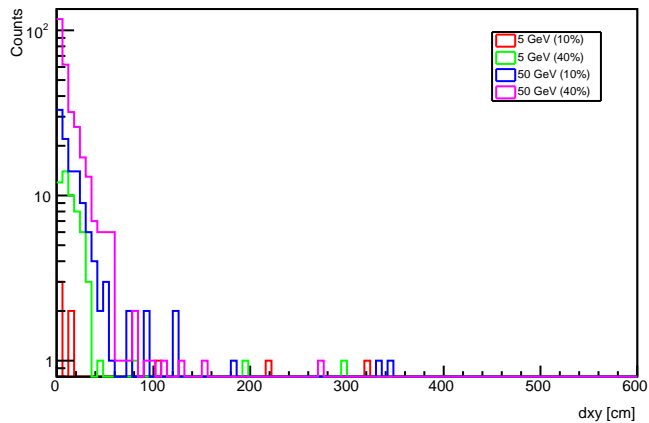
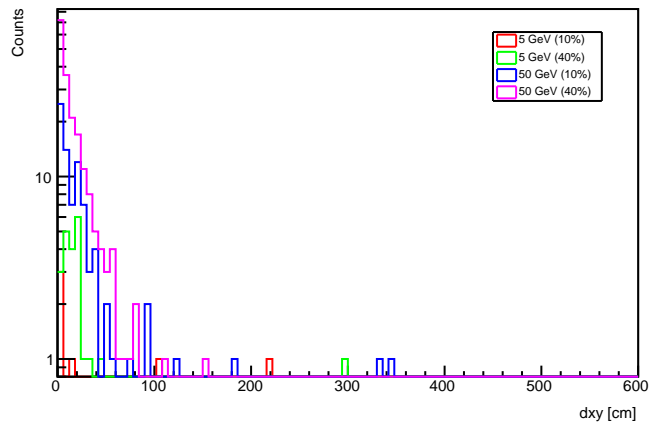
reco subleading Mu phi: j1pt &gt; 120, at most 2 jets w/ pt &gt; 30 GeV



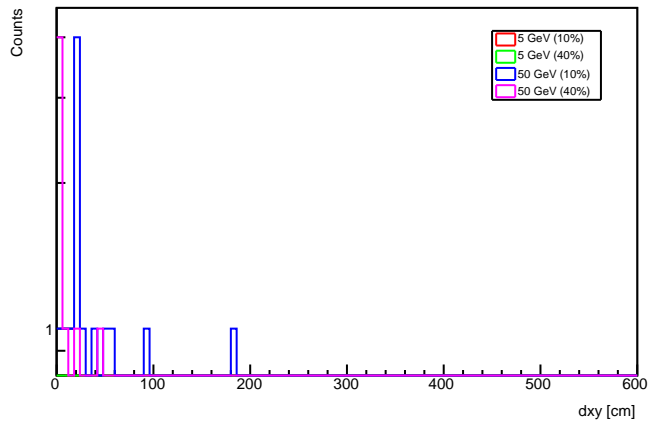
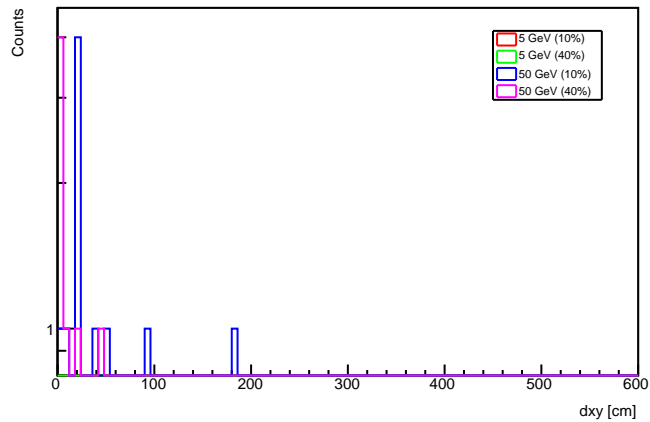
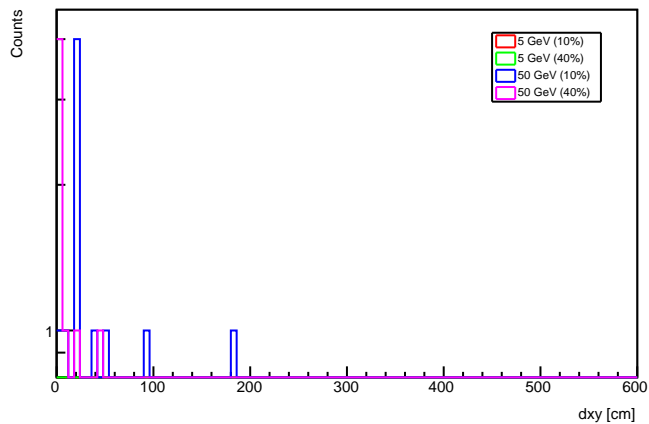
reco subleading Mu phi: at least 2 mu w/ pt &gt; 2 GeV and eta &lt; 2.5



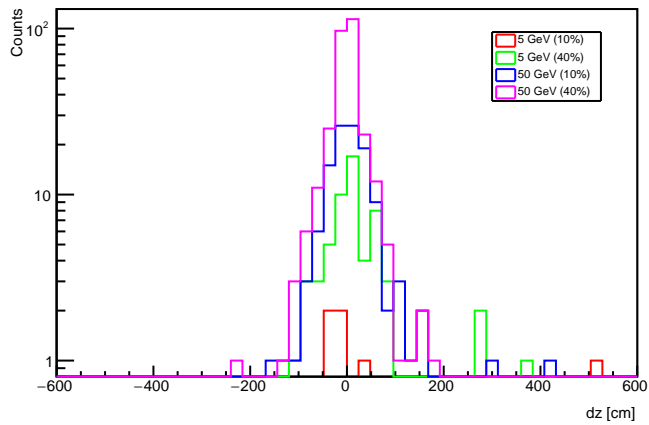
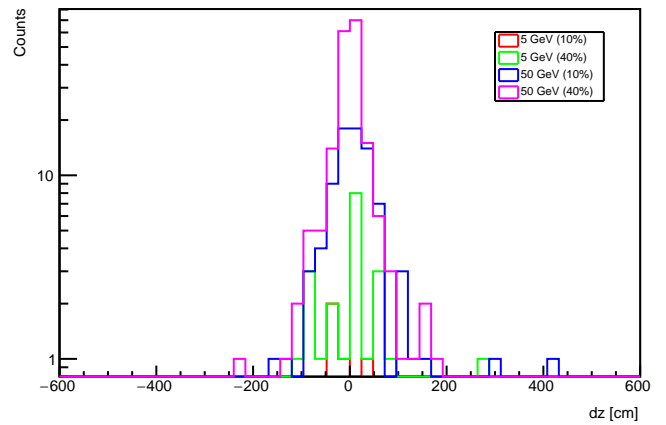
reco subleading Mu vxy: no cuts

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

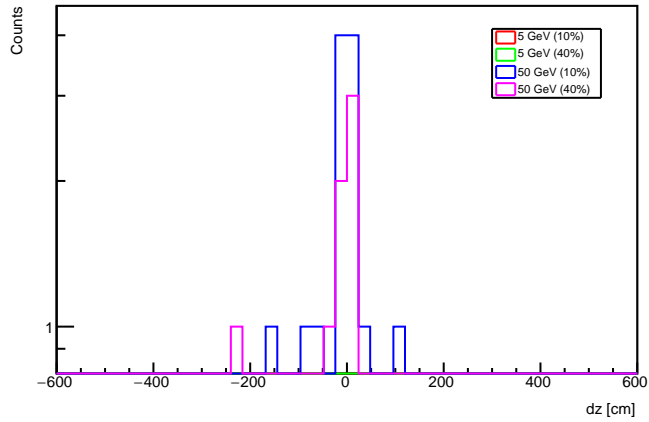
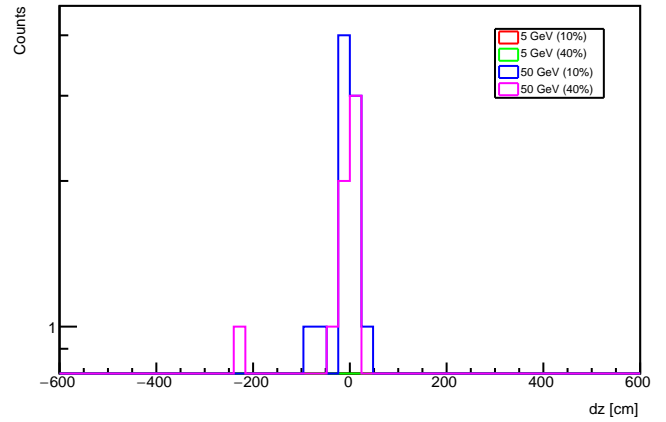
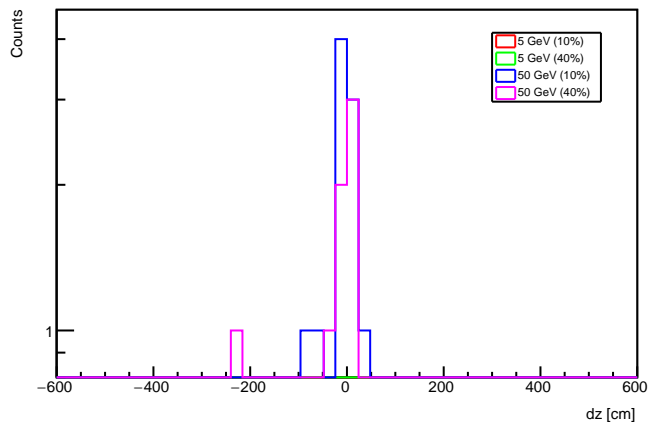
reco subleading Mu vxy: MET &gt; 120 GeV

reco subleading Mu vxy:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVreco subleading Mu vxy: at least 2 mu w/  $p_t > 2$  GeV and  $|\eta| < 2.5$ 

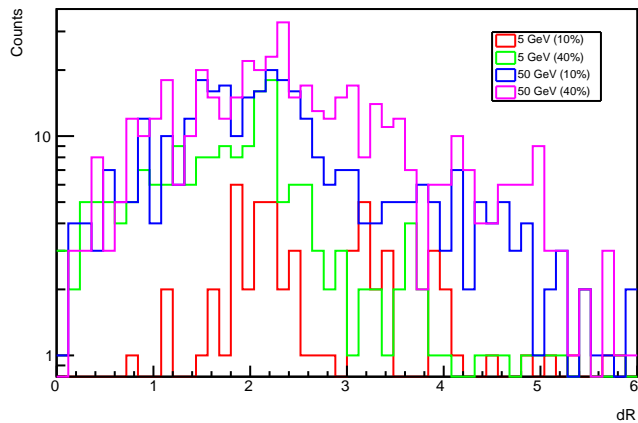
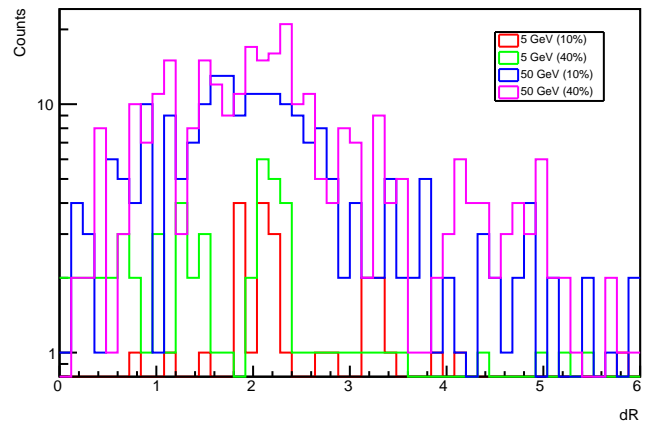
reco subleading Mu vz: no cuts

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

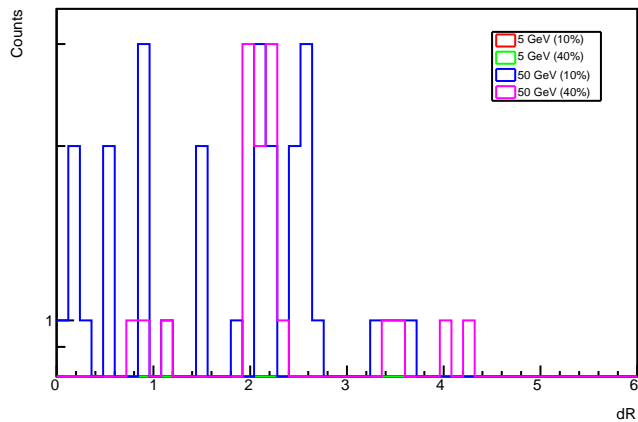
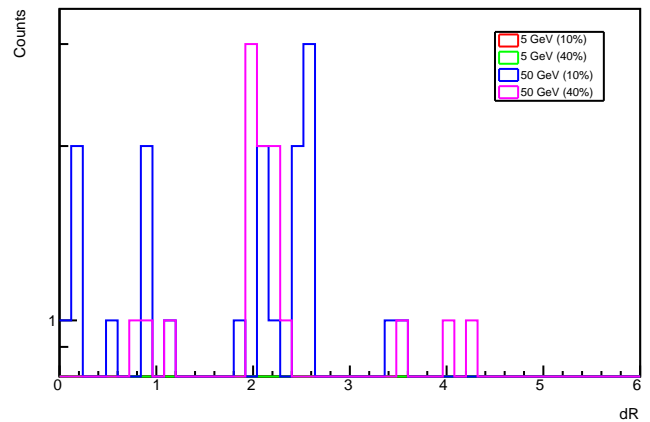
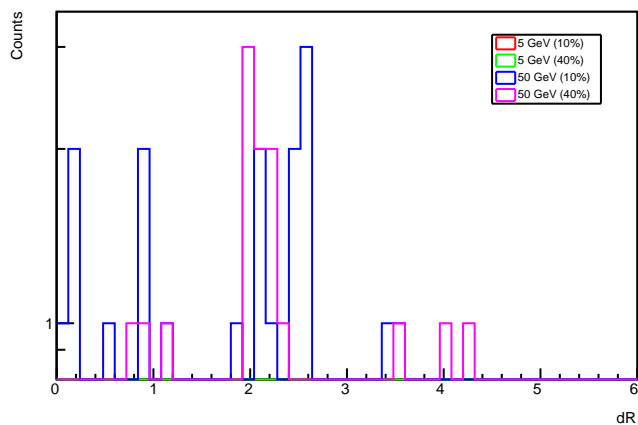
reco subleading Mu vz: MET &gt; 120 GeV

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/  $p_t > 2$  GeV and  $\eta < 2.5$ 

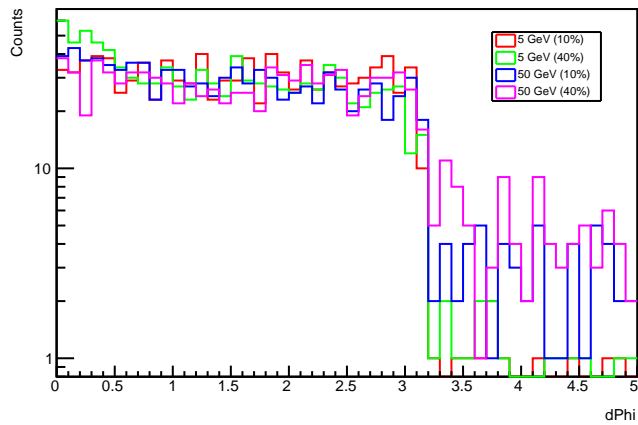
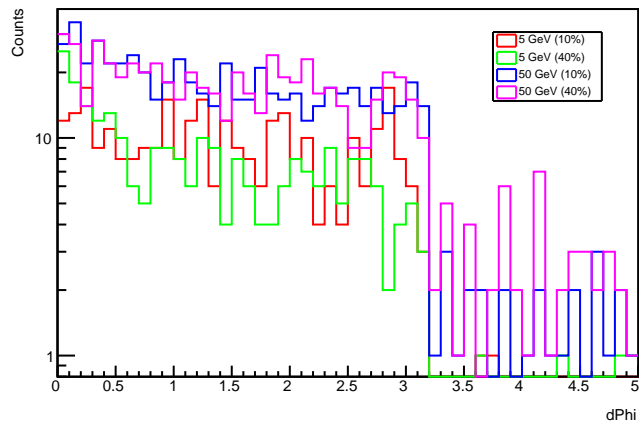
dR: reco leading mu and subleading mu: no cuts

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

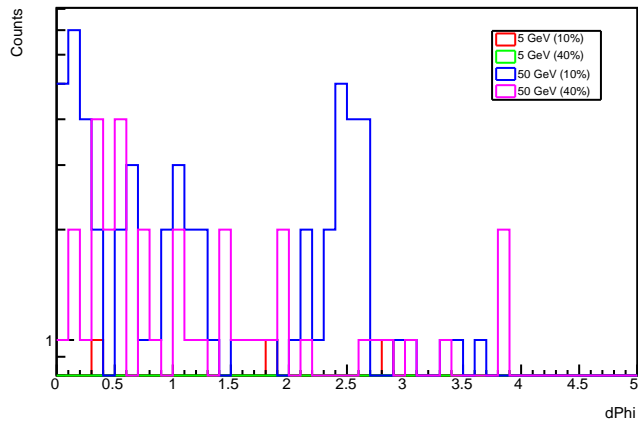
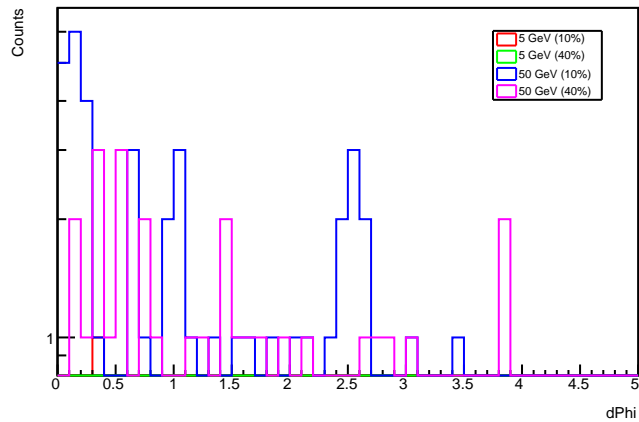
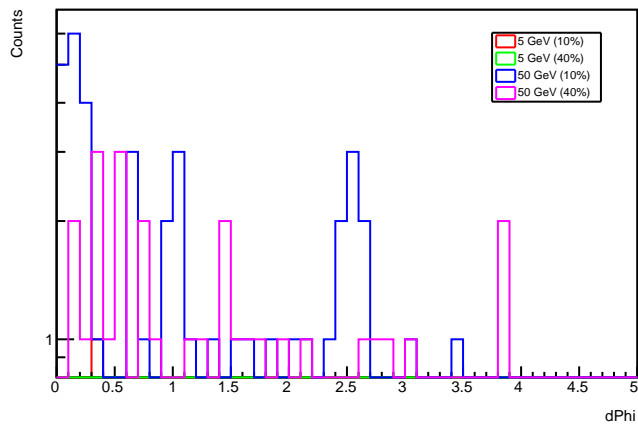
dR: reco leading mu and subleading mu: MET &gt; 120 GeV

dR: reco leading mu and subleading mu:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVdR: reco leading mu and subleading mu: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$ 

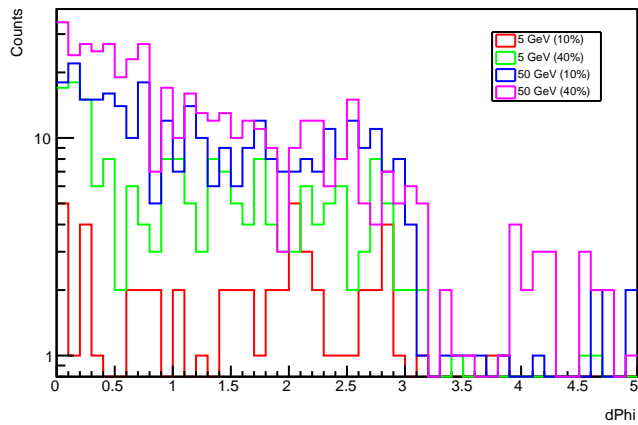
dPhi: reco MET and leading mu: no cuts

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

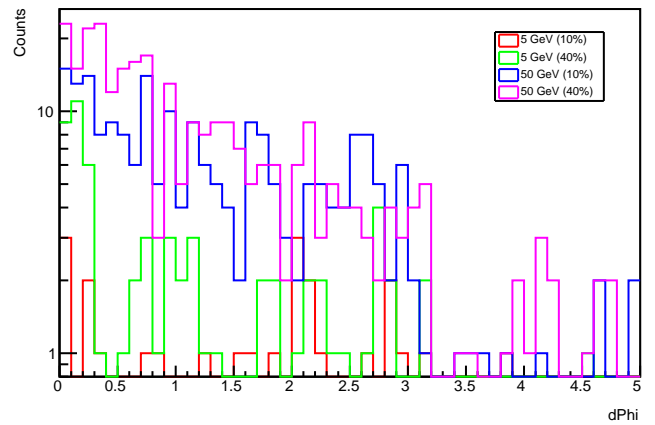
dPhi: reco MET and leading mu: MET &gt; 120 GeV

dPhi: reco MET and leading mu:  $j_{1\text{pt}} > 120, \text{ at most 2 jets w/ } p_t > 30 \text{ GeV}$ dPhi: reco MET and leading mu: at least 2 mu w/  $p_t > 2 \text{ GeV}$  and  $\eta < 2.5$ 

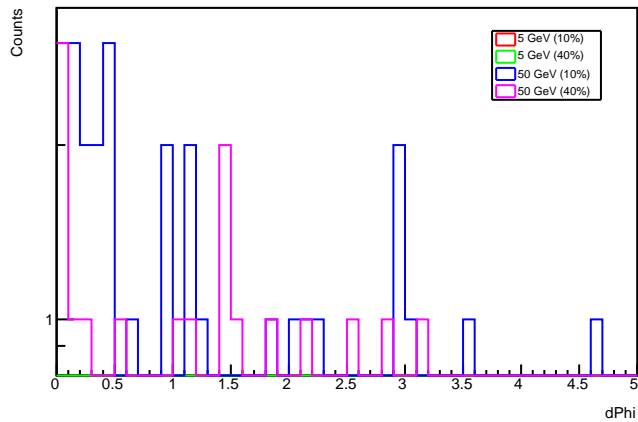
dPhi: reco leading mu and subleading mu: no cuts



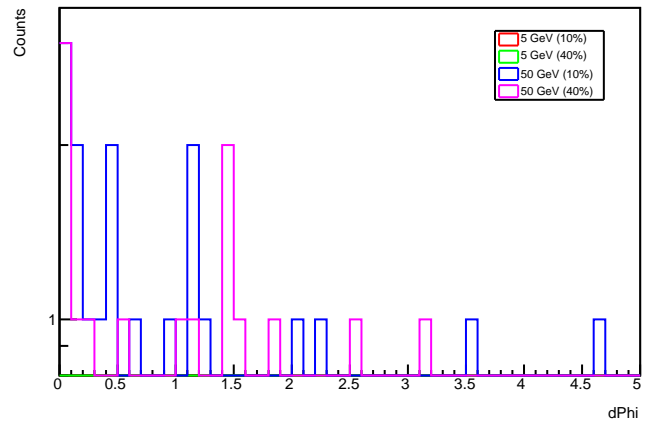
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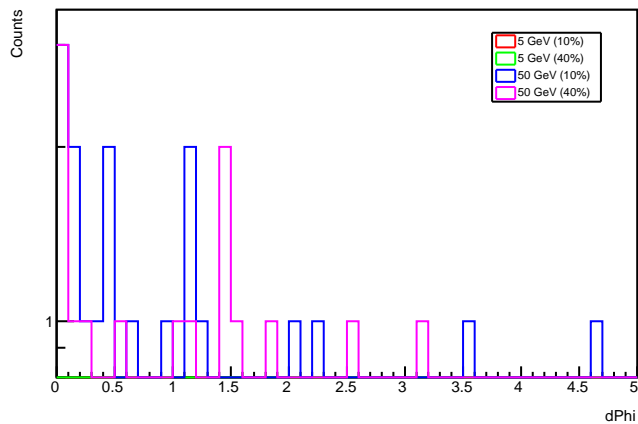
dPhi: reco leading mu and subleading mu: MET > 120 GeV



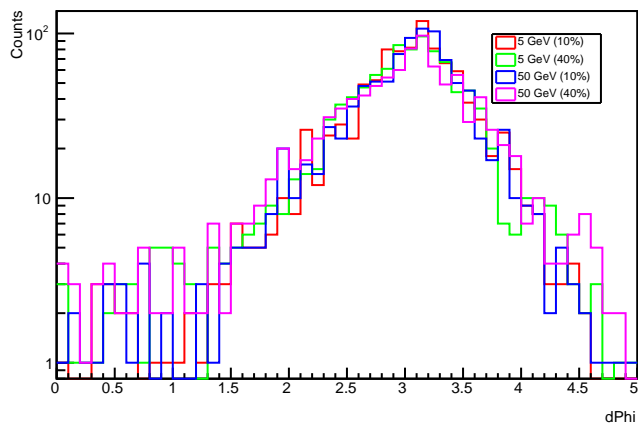
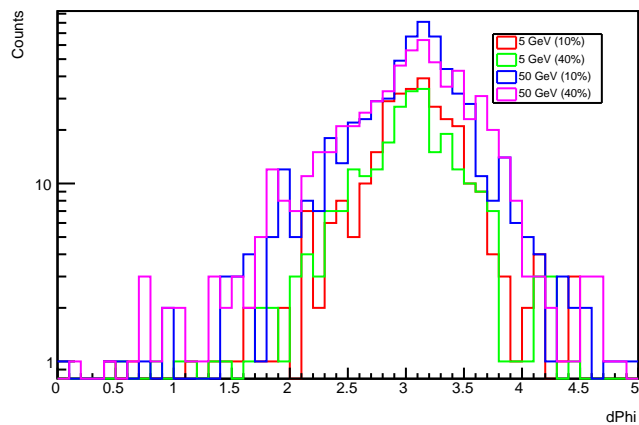
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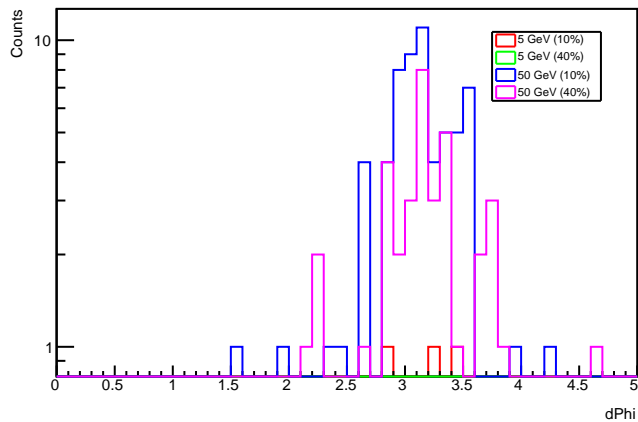
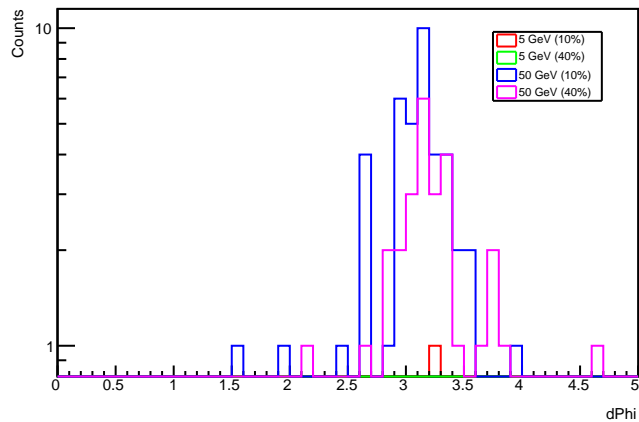
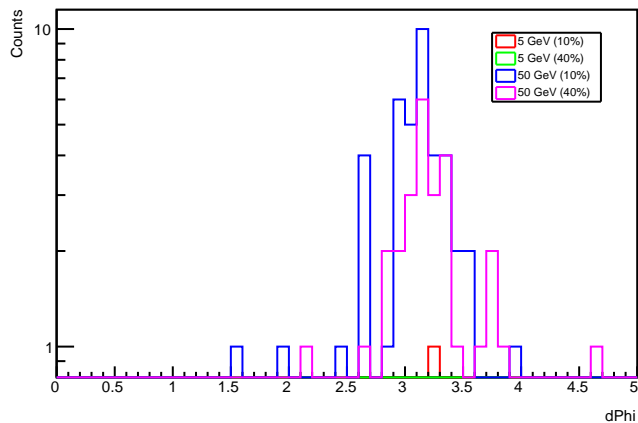
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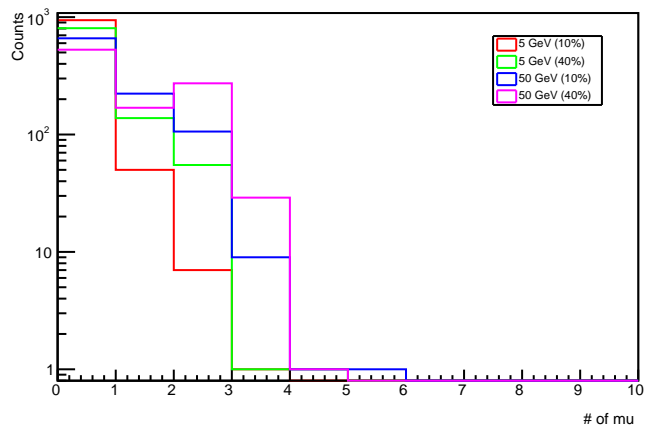
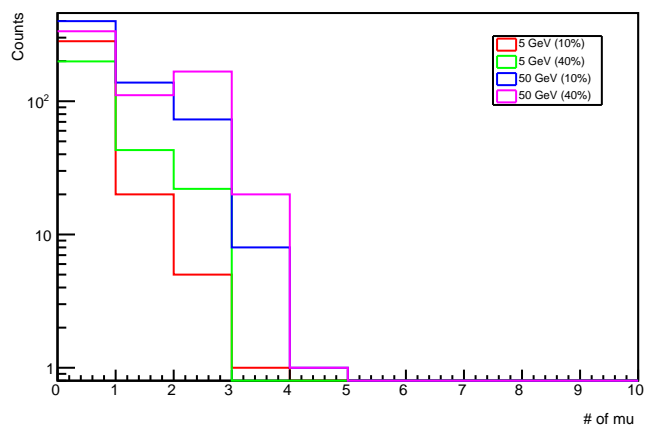
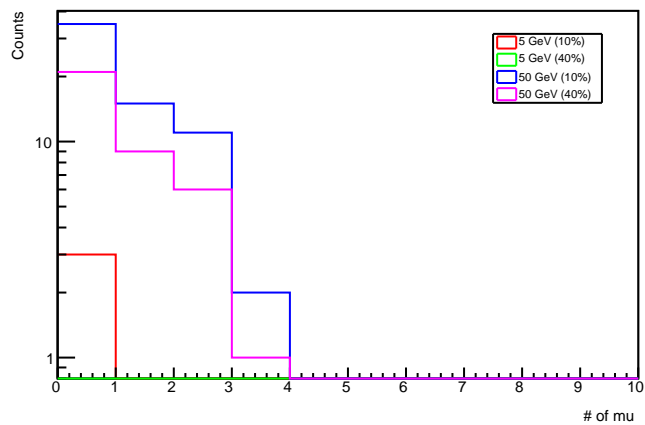
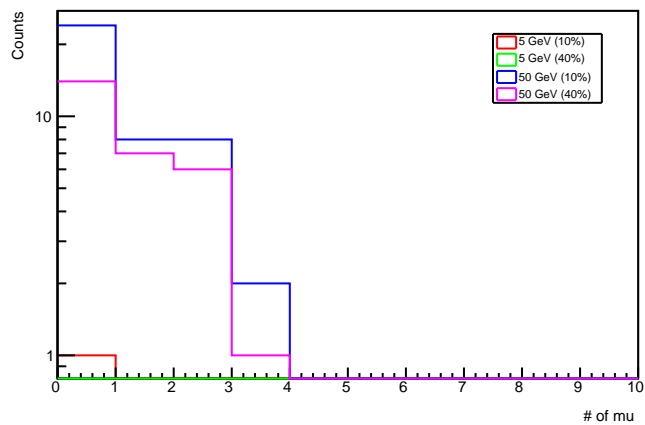
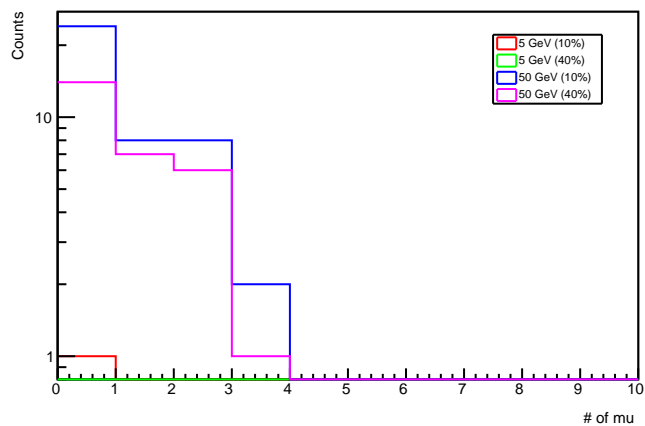
dPhi: reco MET and leading jet: no cuts

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

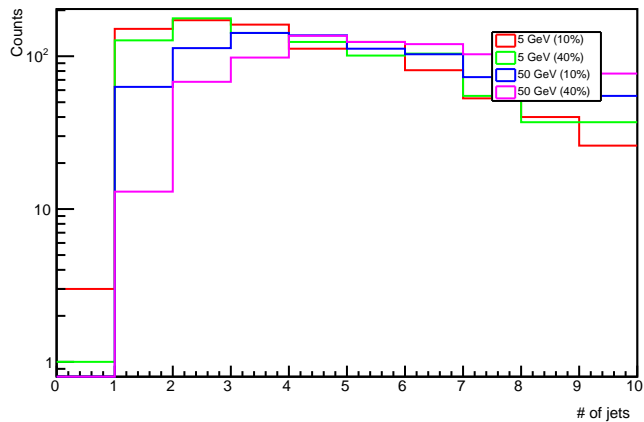
dPhi: reco MET and leading jet:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeVdPhi: reco MET and leading jet: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$ 

reco number of mu: no cuts

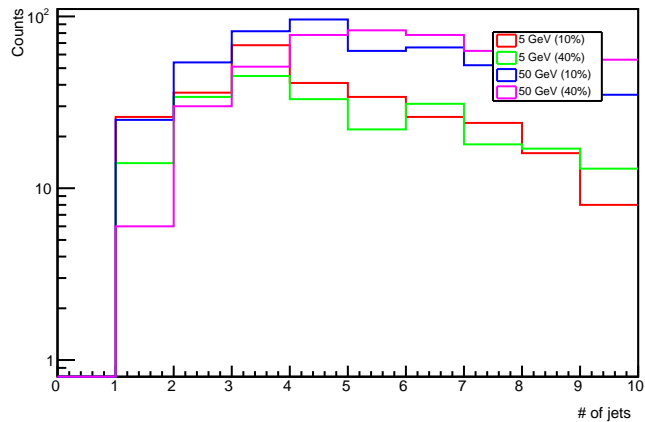
reco number of mu:  $n_{\text{jet}} \geq 1, j_{1\text{pt}} > 30 \text{ GeV}$ reco number of mu:  $\text{MET} > 120 \text{ GeV}$ reco number of mu:  $j_{1\text{pt}} > 120, \text{ at most 2 jets w/ } p_t > 30 \text{ GeV}$ reco number of mu: at least 2 mu w/  $p_t > 2 \text{ GeV}$  and  $\eta < 2.5$ 



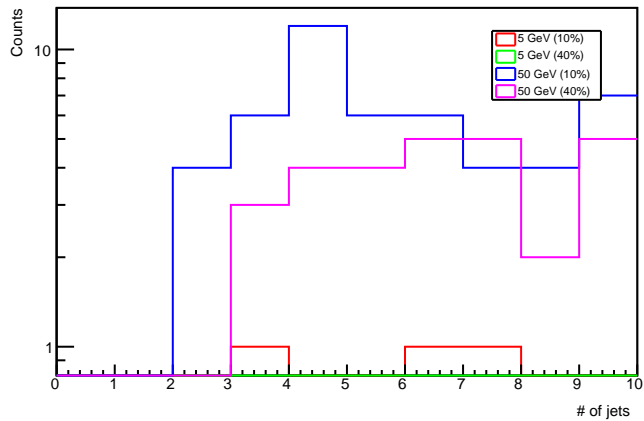
reco number of jets: no cuts



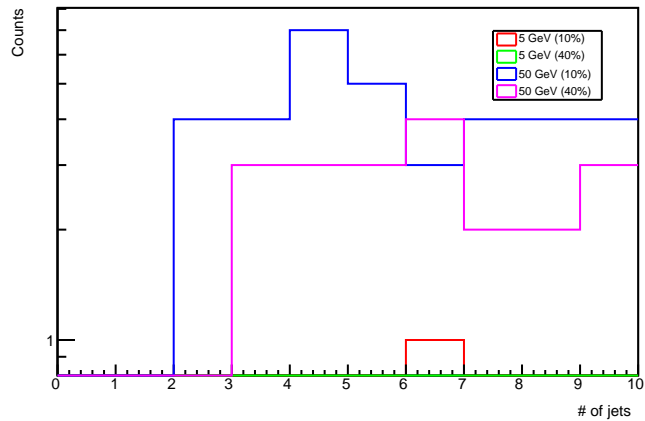
reco number of jets:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV



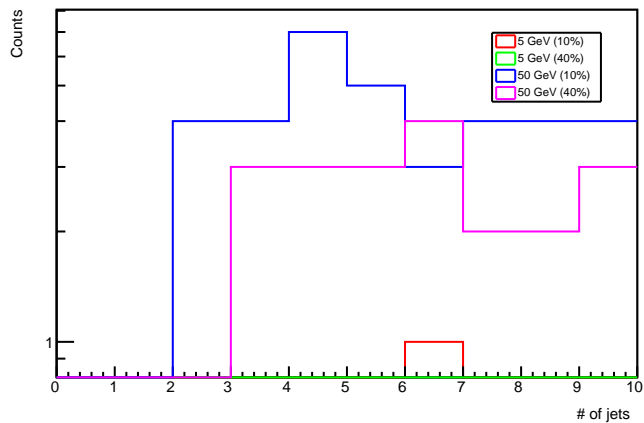
reco number of jets: MET > 120 GeV



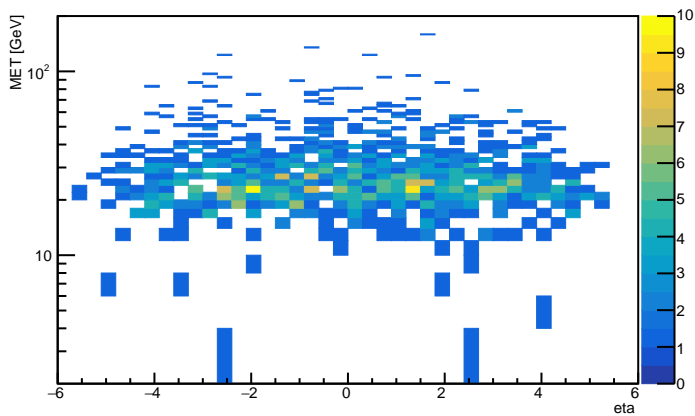
reco number of jets:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_t > 30$  GeV



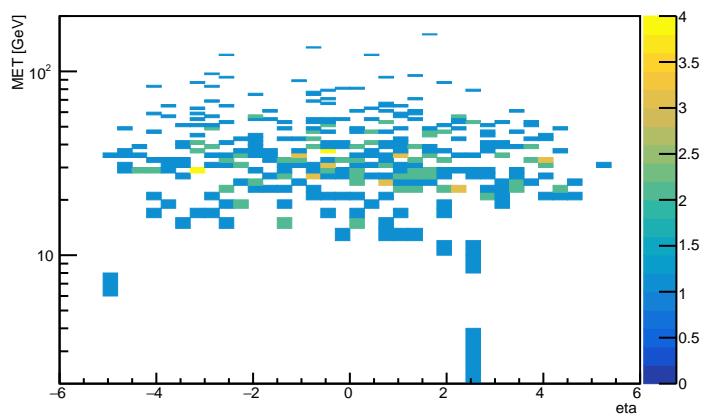
reco number of jets: at least 2 mu w/  $p_t > 2$  GeV and  $\eta < 2.5$



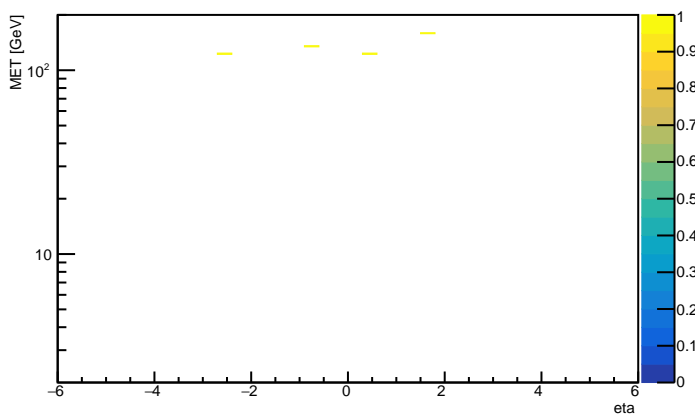
5 GeV (10%) ctau 1cm gen leading Met eta vs pt: no cuts



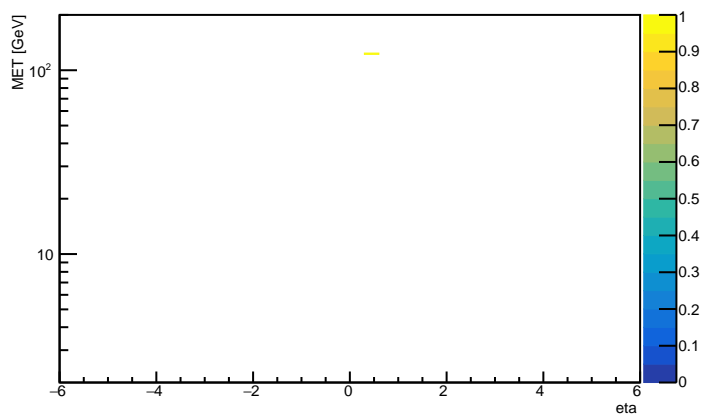
5 GeV (10%) ctau 1cm gen leading Met eta vs pt:  $n_{\text{jet}} \geq 1$ ,  $j1pt > 30$  GeV



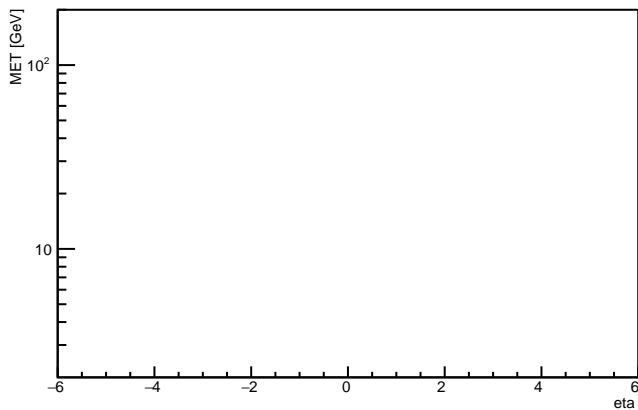
5 GeV (10%) ctau 1cm gen leading Met eta vs pt: MET > 120 GeV



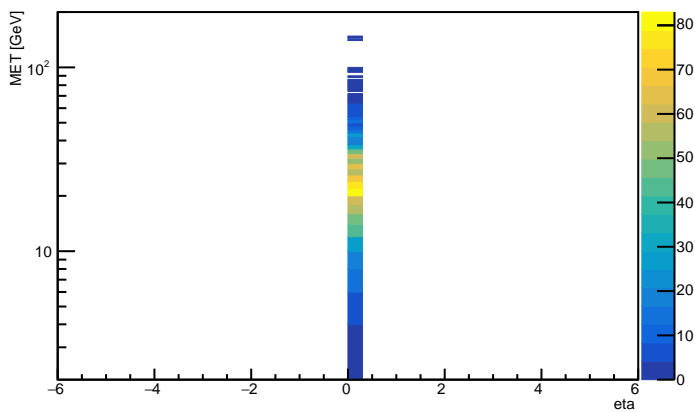
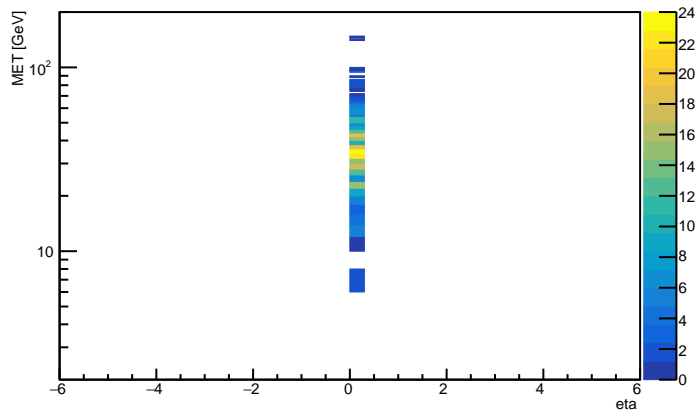
5 GeV (10%) ctau 1cm gen leading Met eta vs pt:  $j1pt > 120$ , at most 2 jets w/  $pt > 30$  GeV



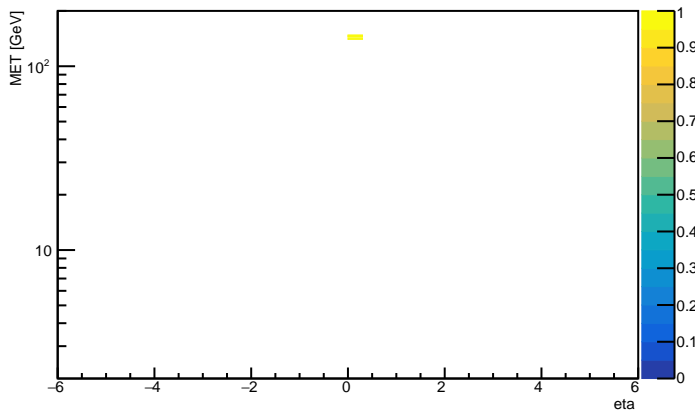
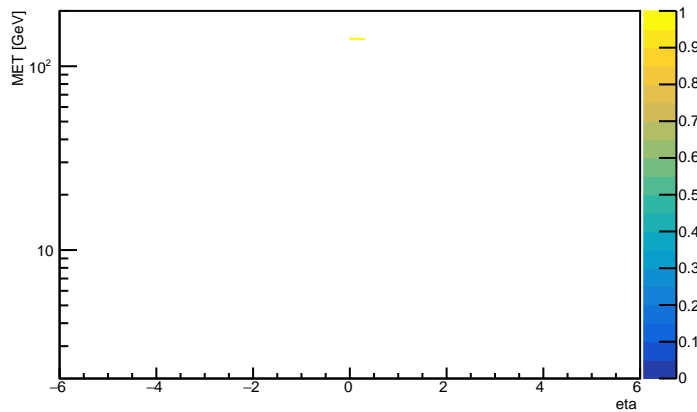
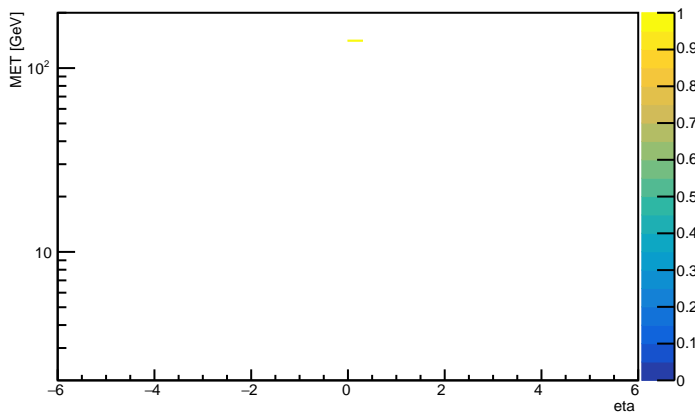
5 GeV (10%) ctau 1cm gen leading Met eta vs pt: at least 2 mu w/  $pt > 2$  GeV and  $eta < 2.5$



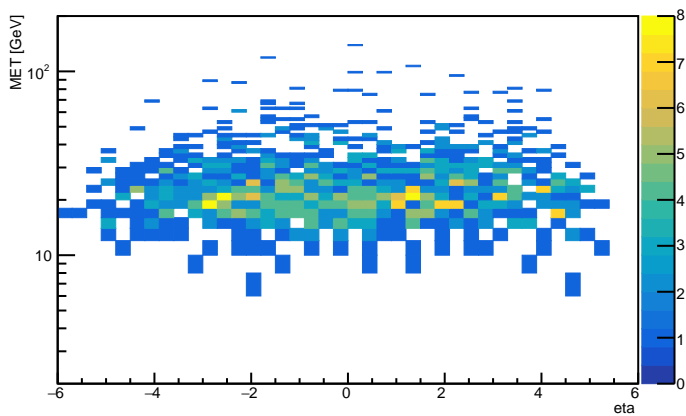
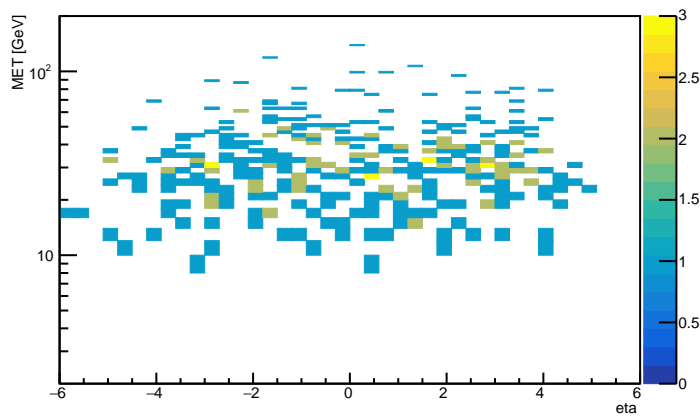
5 GeV (10%) ctau 1cm reco leading Met eta vs pt: no cuts

5 GeV (10%) ctau 1cm reco leading Met eta vs pt:  $n_{\text{jet}} \geq 1$ ,  $j_{1\text{pt}} > 30$  GeV

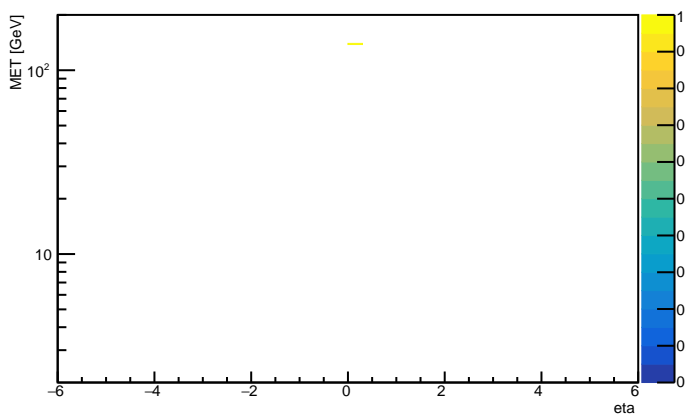
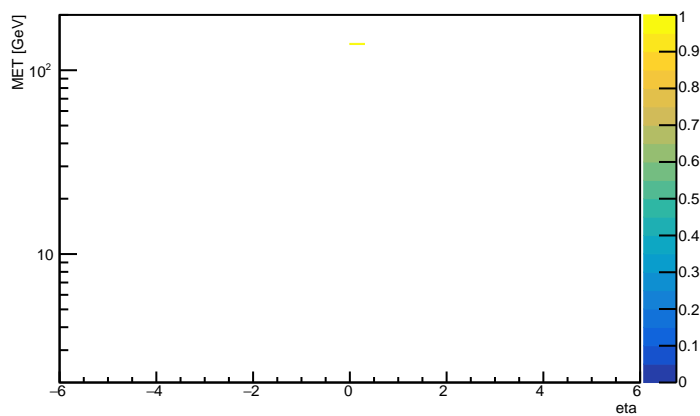
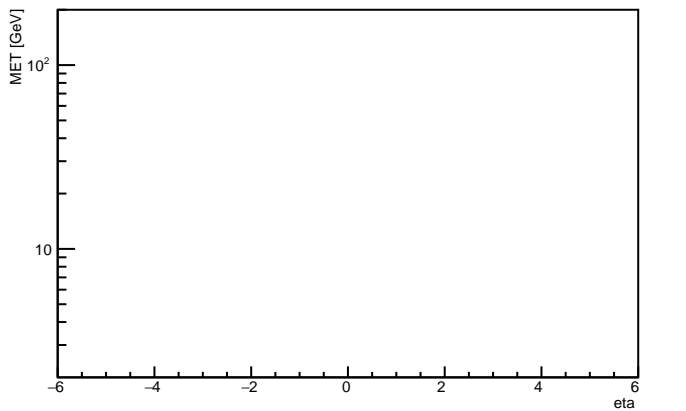
5 GeV (10%) ctau 1cm reco leading Met eta vs pt: MET &gt; 120 GeV

5 GeV (10%) ctau 1cm reco leading Met eta vs pt:  $j_{1\text{pt}} > 120$ , at most 2 jets w/  $p_{\text{T}} > 30$  GeV5 GeV (10%) ctau 1cm reco leading Met eta vs pt: at least 2 mu w/  $p_{\text{T}} > 2$  GeV and  $|\eta| < 2.5$ 

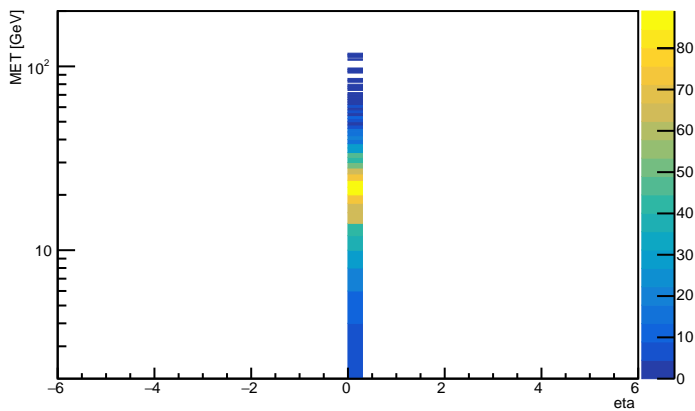
5 GeV (40%) ctau 1cm gen leading Met eta vs pt: no cuts

5 GeV (40%) ctau 1cm gen leading Met eta vs pt:  $n_{\text{jet}} \geq 1$ ,  $j1pt > 30$  GeV

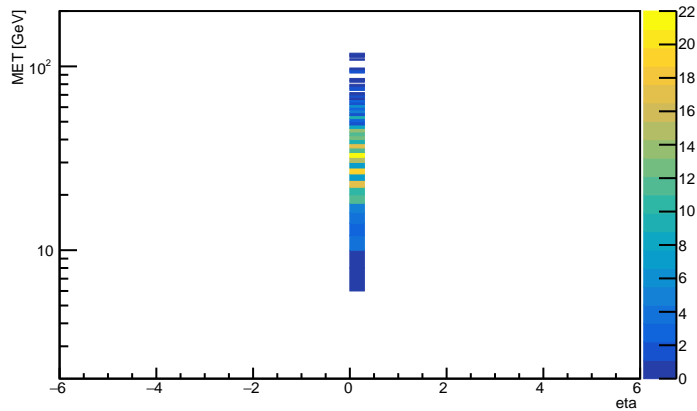
5 GeV (40%) ctau 1cm gen leading Met eta vs pt: MET &gt; 120 GeV

5 GeV (40%) ctau 1cm gen leading Met eta vs pt:  $j1pt > 120$ , at most 2 jets w/  $pt > 30$  GeV5 GeV (40%) ctau 1cm gen leading Met eta vs pt: at least 2 mu w/  $pt > 2$  GeV and  $eta < 2.5$ 

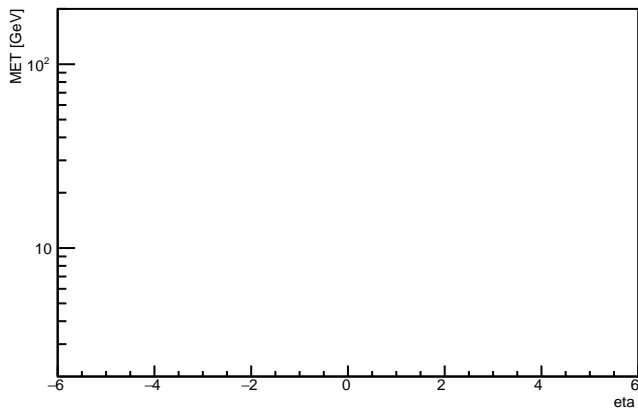
5 GeV (40%) ctau 1cm reco leading Met eta vs pt: no cuts



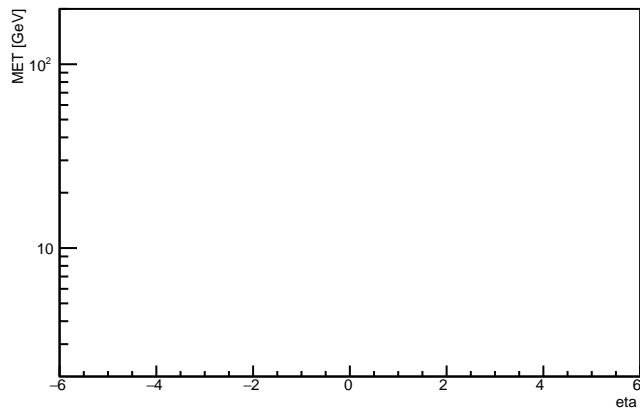
5 GeV (40%) ctau 1cm reco leading Met eta vs pt: n\_jet &gt;= 1, j1pt &gt; 30 GeV



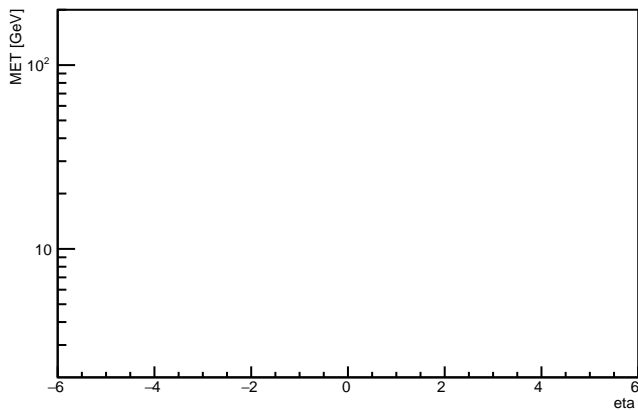
5 GeV (40%) ctau 1cm reco leading Met eta vs pt: MET &gt; 120 GeV



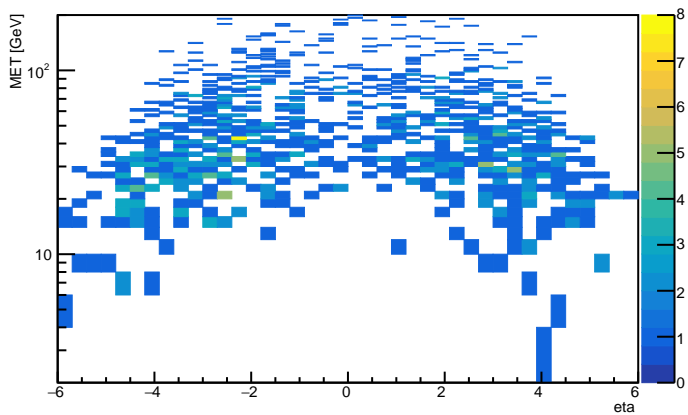
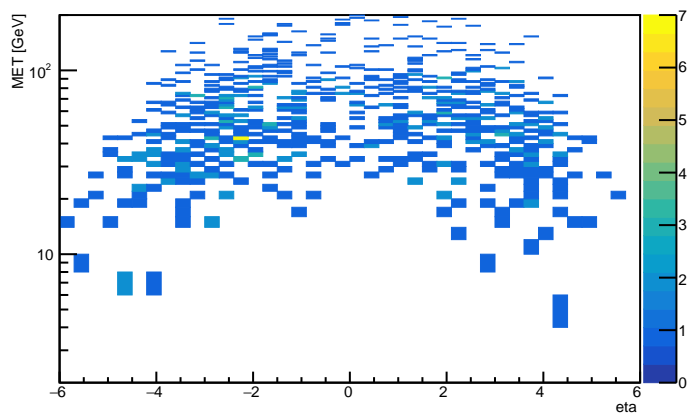
5 GeV (40%) ctau 1cm reco leading Met eta vs pt: j1pt &gt; 120, at most 2 jets w/ pt &gt; 30 GeV



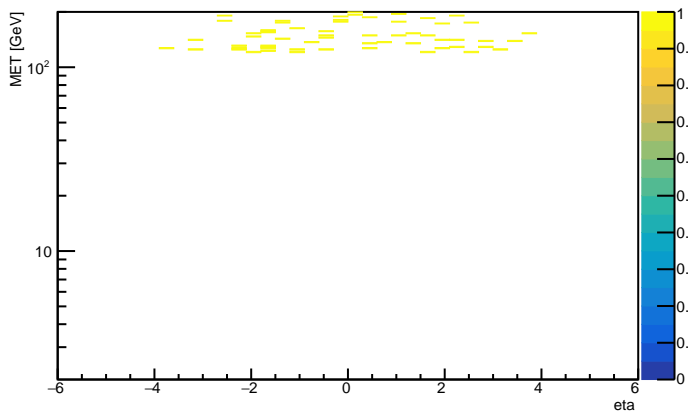
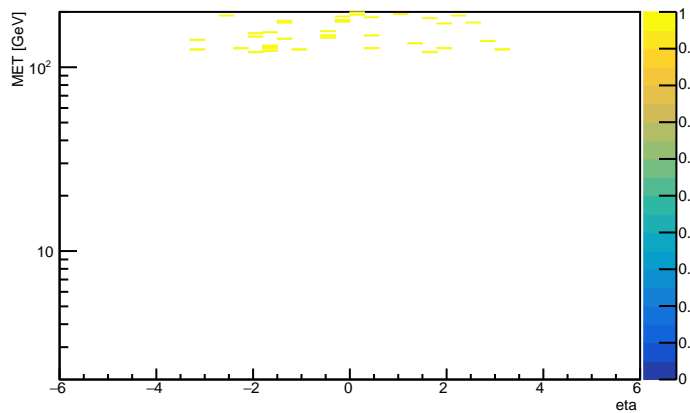
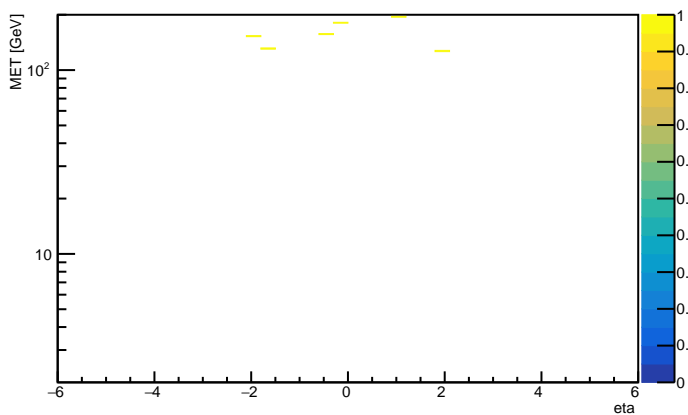
5 GeV (40%) ctau 1cm reco leading Met eta vs pt: at least 2 mu w/ pt &gt; 2 GeV and eta &lt; 2.5



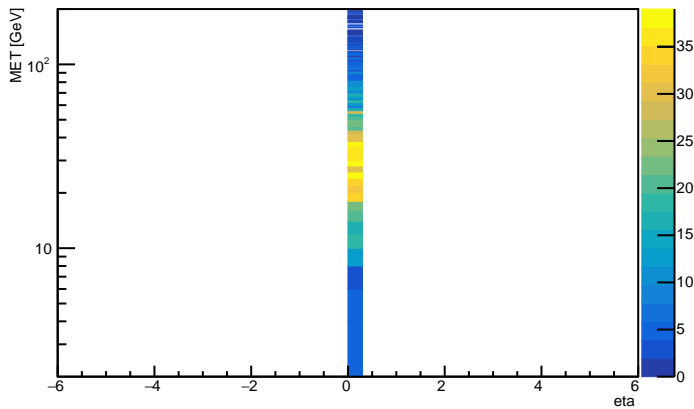
50 GeV (10%) ctau 1cm gen leading Met eta vs pt: no cuts

50 GeV (10%) ctau 1cm gen leading Met eta vs pt:  $n_{\text{jet}} \geq 1$ ,  $j_1 \text{ pt} > 30 \text{ GeV}$ 

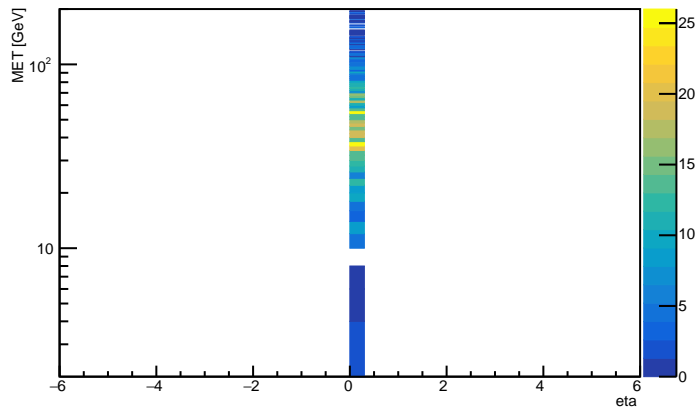
50 GeV (10%) ctau 1cm gen leading Met eta vs pt: MET &gt; 120 GeV

50 GeV (10%) ctau 1cm gen leading Met eta vs pt:  $j_1 \text{ pt} > 120$ , at most 2 jets w/  $\text{pt} > 30 \text{ GeV}$ 50 GeV (10%) ctau 1cm gen leading Met eta vs pt: at least 2 mu w/  $\text{pt} > 2 \text{ GeV}$  and  $\text{eta} < 2.5$ 

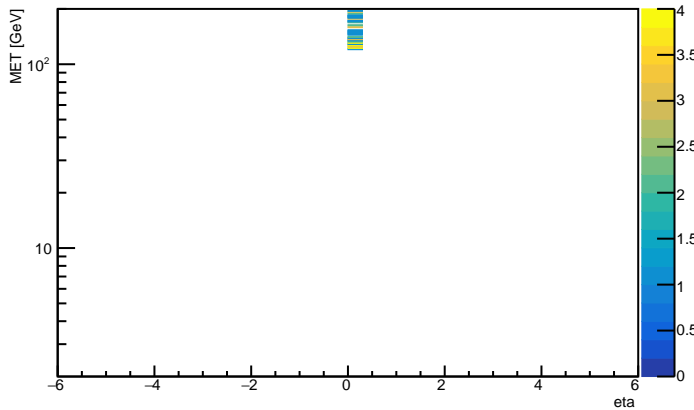
50 GeV (10%) ctau 1cm reco leading Met eta vs pt: no cuts



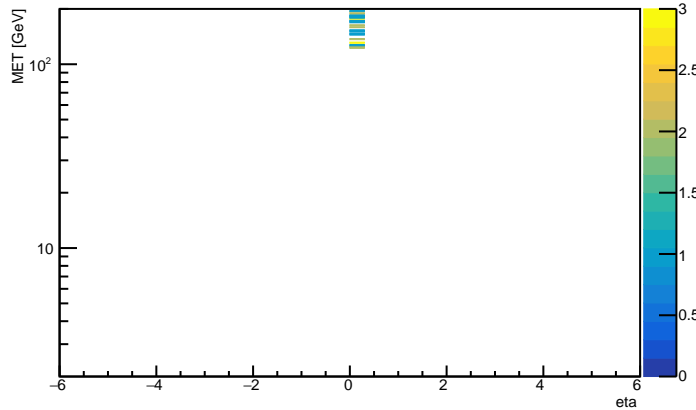
50 GeV (10%) ctau 1cm reco leading Met eta vs pt: n\_jet &gt;= 1, j1pt &gt; 30 GeV



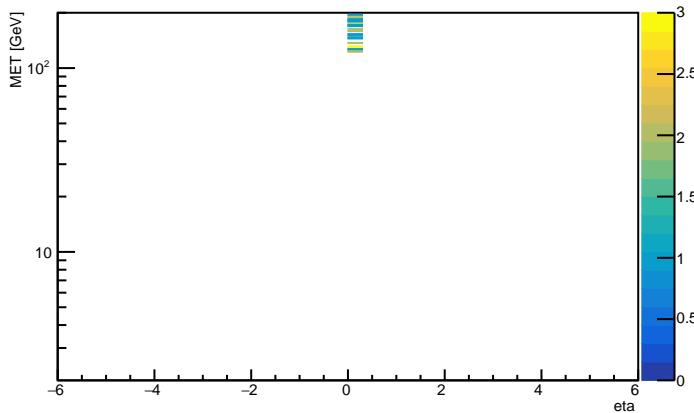
50 GeV (10%) ctau 1cm reco leading Met eta vs pt: MET &gt; 120 GeV



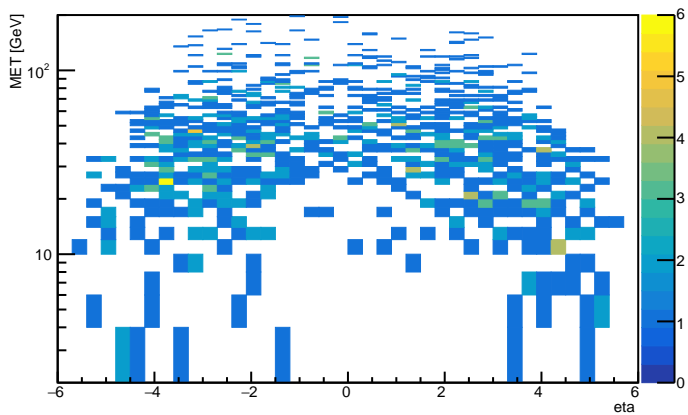
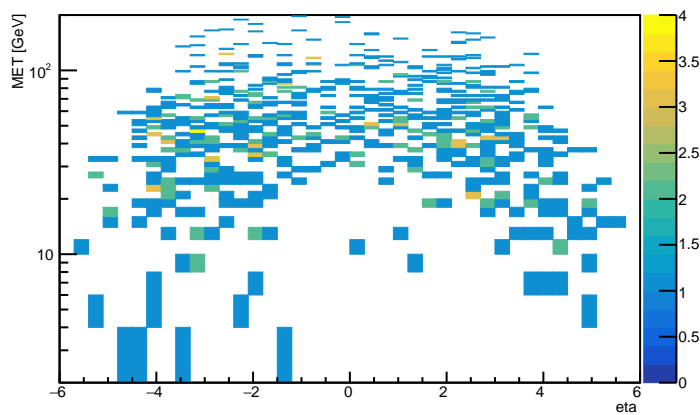
50 GeV (10%) ctau 1cm reco leading Met eta vs pt: j1pt &gt; 120, at most 2 jets w/ pt &gt; 30 GeV



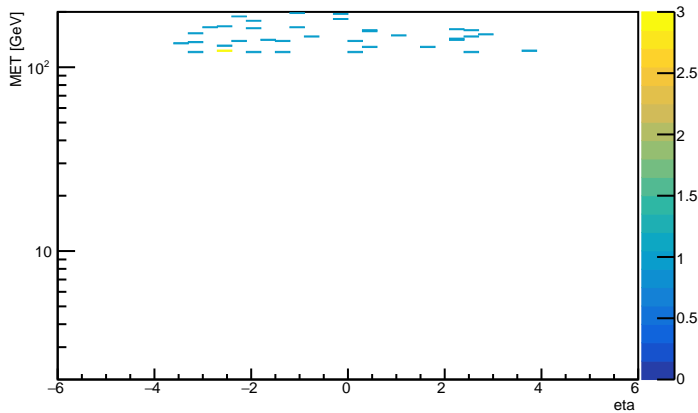
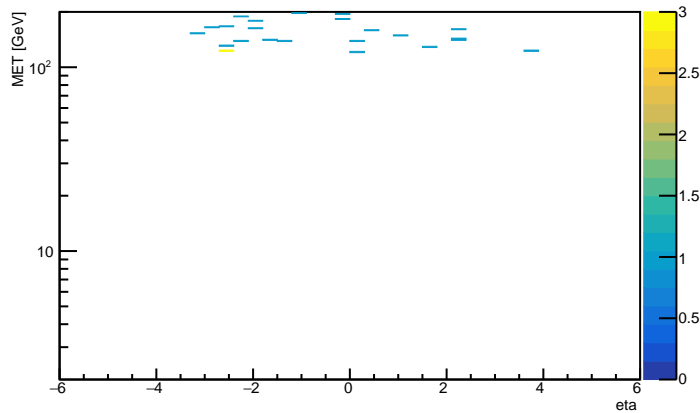
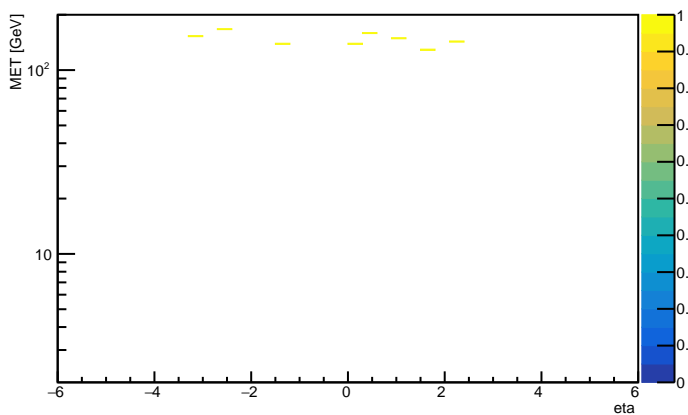
50 GeV (10%) ctau 1cm reco leading Met eta vs pt: at least 2 mu w/ pt &gt; 2 GeV and eta &lt; 2.5



50 GeV (40%) ctau 1cm gen leading Met eta vs pt: no cuts

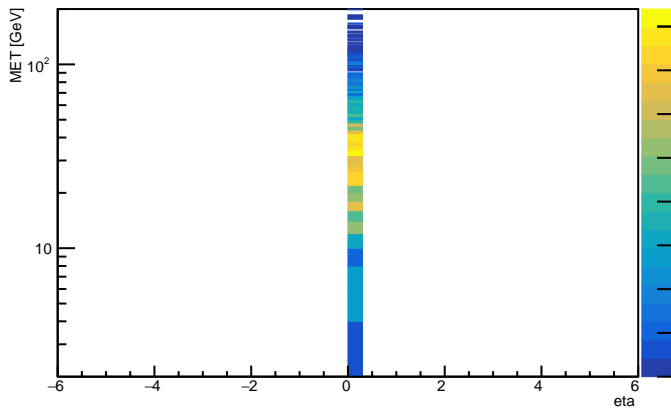
50 GeV (40%) ctau 1cm gen leading Met eta vs pt:  $n_{\text{jet}} \geq 1$ ,  $j_1 \text{ pt} > 30 \text{ GeV}$ 

50 GeV (40%) ctau 1cm gen leading Met eta vs pt: MET &gt; 120 GeV

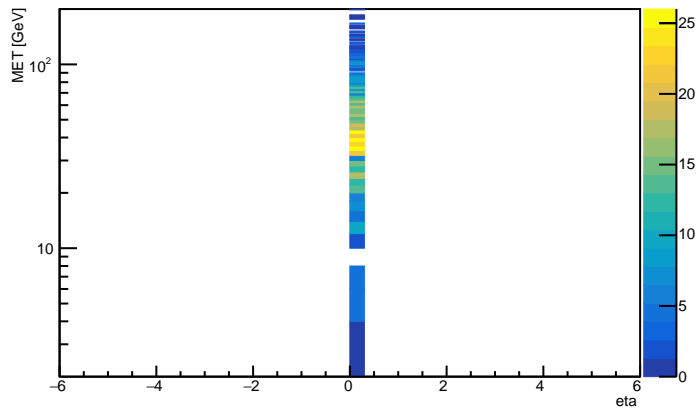
50 GeV (40%) ctau 1cm gen leading Met eta vs pt:  $j_1 \text{ pt} > 120$ , at most 2 jets w/  $\text{pt} > 30 \text{ GeV}$ 50 GeV (40%) ctau 1cm gen leading Met eta vs pt: at least 2 mu w/  $\text{pt} > 2 \text{ GeV}$  and  $\text{eta} < 2.5$ 



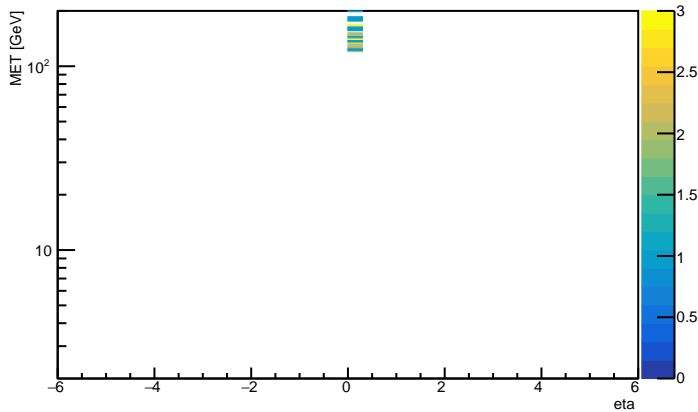
50 GeV (40%) ctau 1cm reco leading Met eta vs pt: no cuts



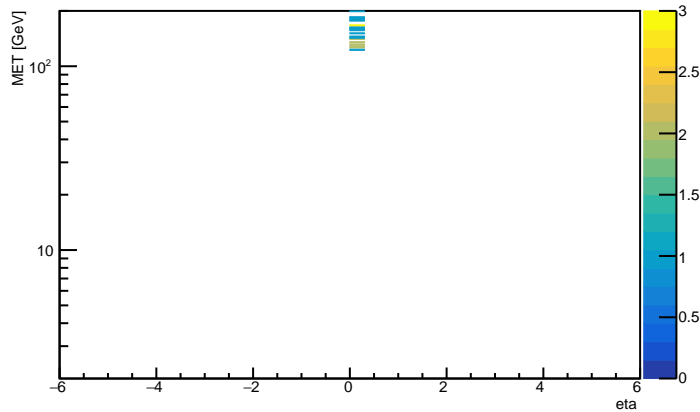
50 GeV (40%) ctau 1cm reco leading Met eta vs pt: n\_jet &gt;= 1, j1pt &gt; 30 GeV



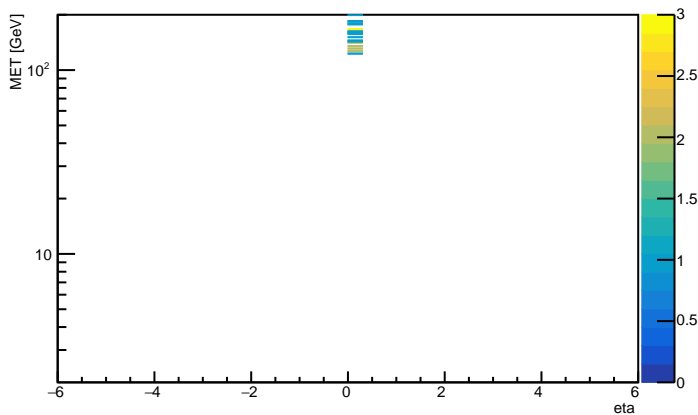
50 GeV (40%) ctau 1cm reco leading Met eta vs pt: MET &gt; 120 GeV



50 GeV (40%) ctau 1cm reco leading Met eta vs pt: j1pt &gt; 120, at most 2 jets w/ pt &gt; 30 GeV

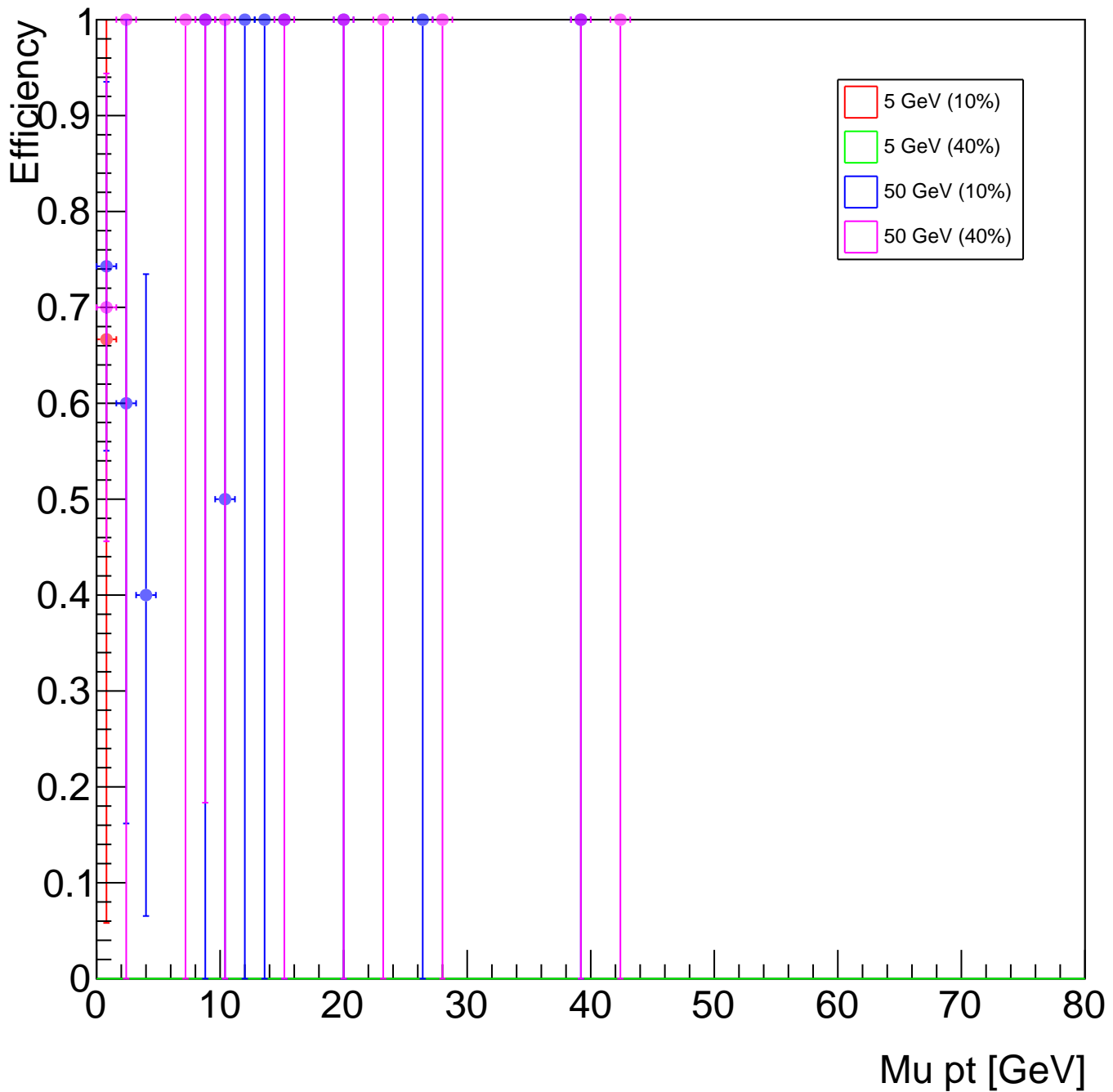


50 GeV (40%) ctau 1cm reco leading Met eta vs pt: at least 2 mu w/ pt &gt; 2 GeV and eta &lt; 2.5

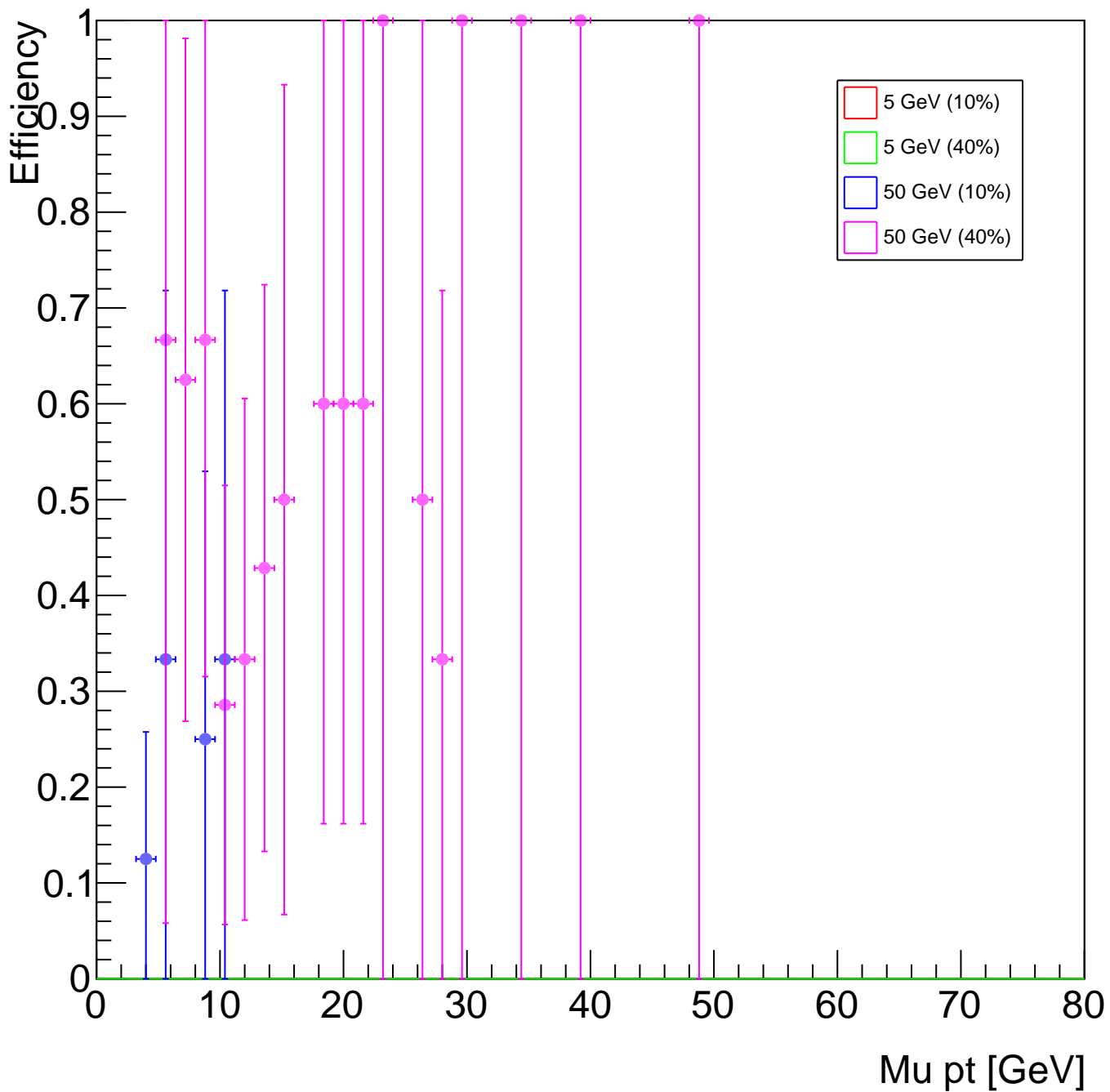


**efficiencies**

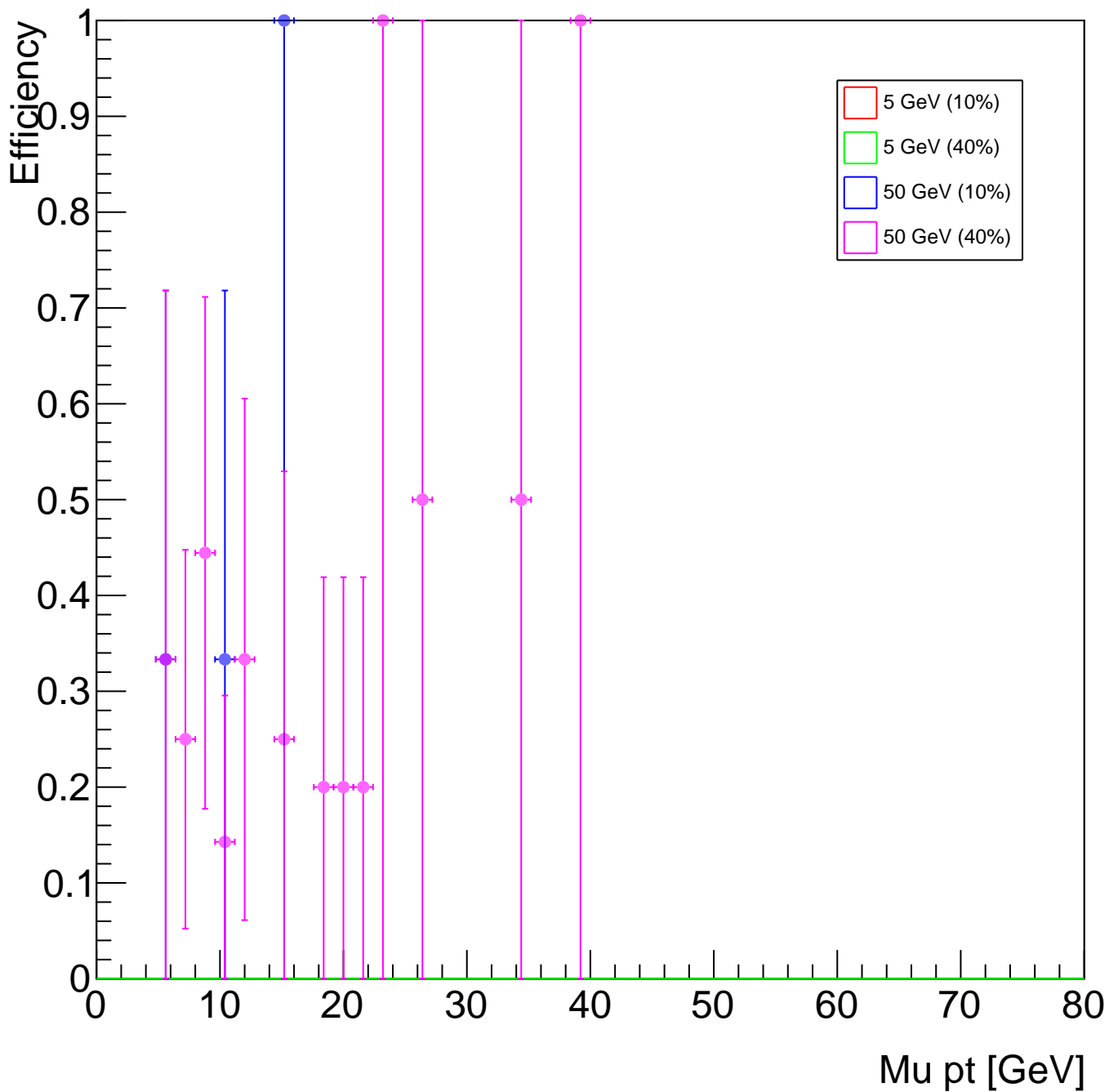
# trigefficiency HLT\_PFMET120\_PFMHT120



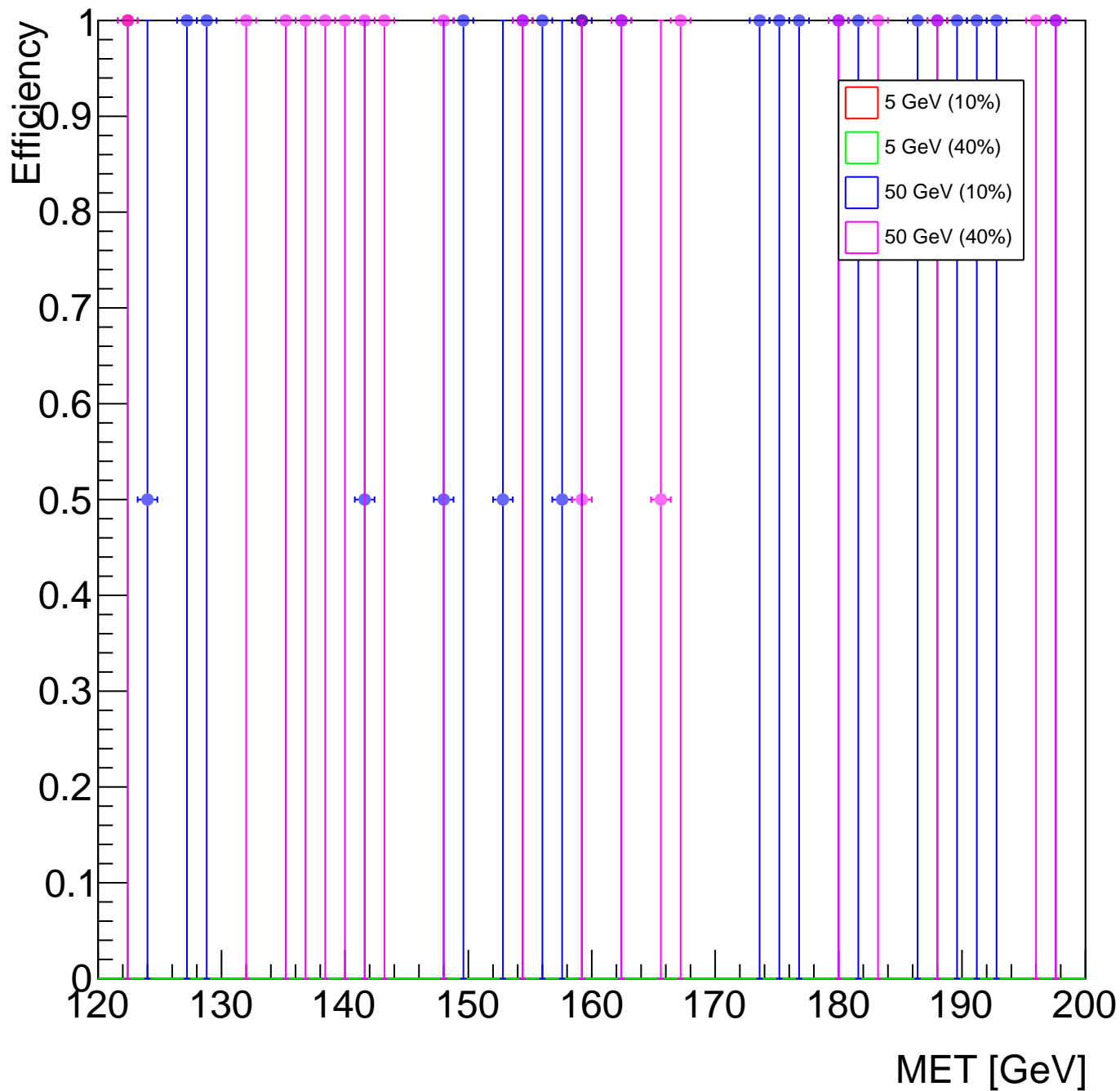
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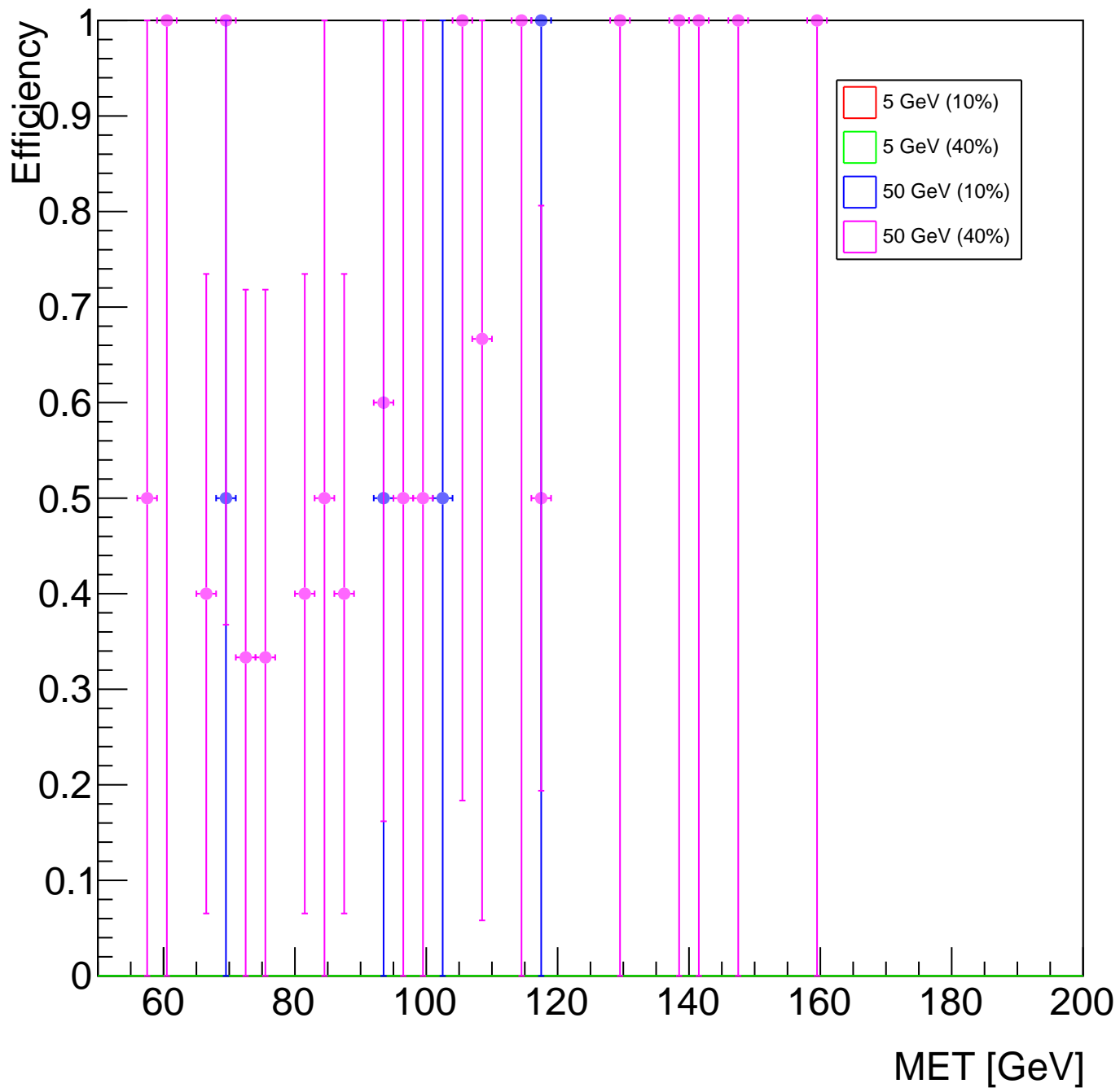
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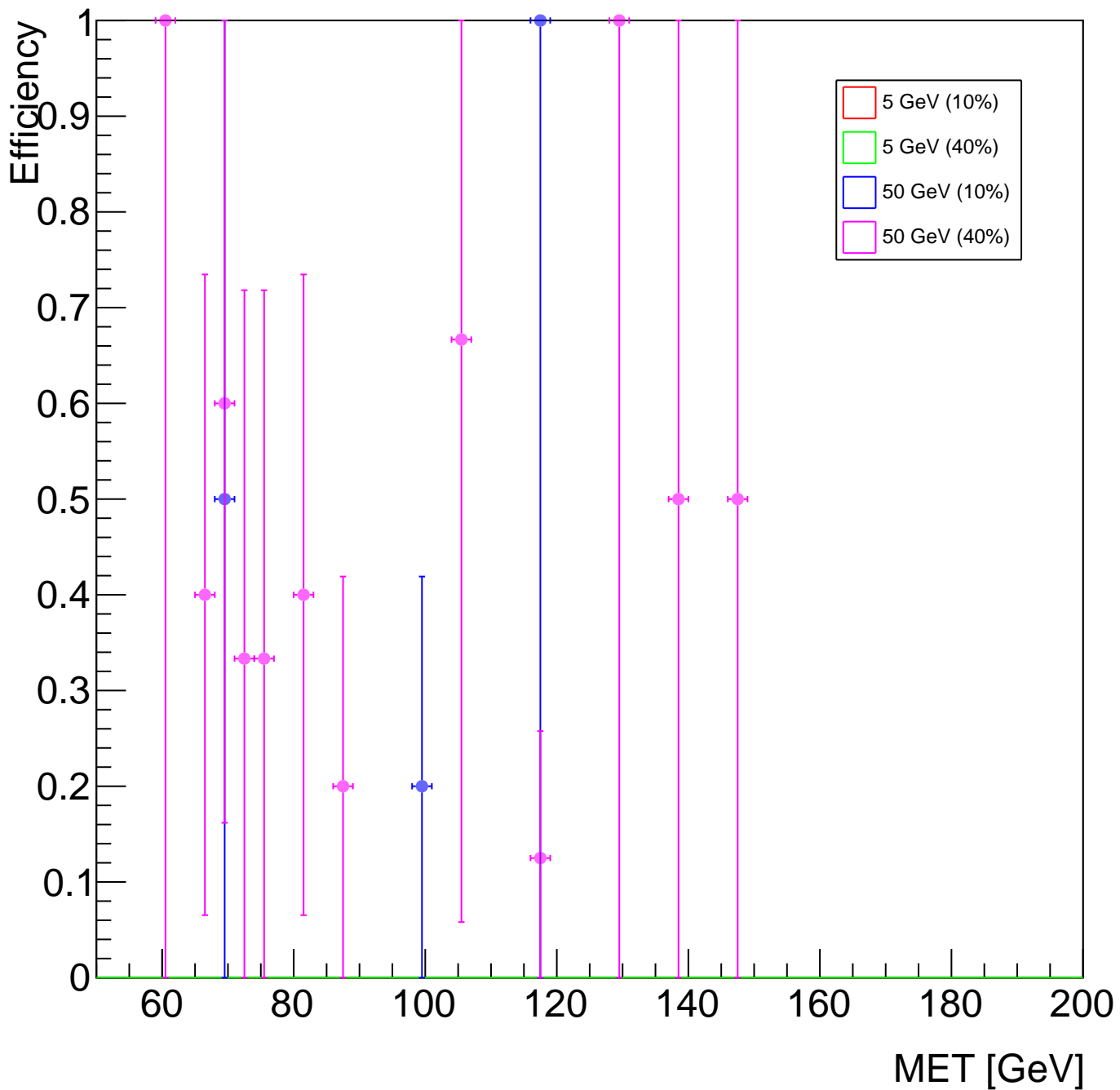
# trigefficiency HLT\_PFMET120\_PFMHT120



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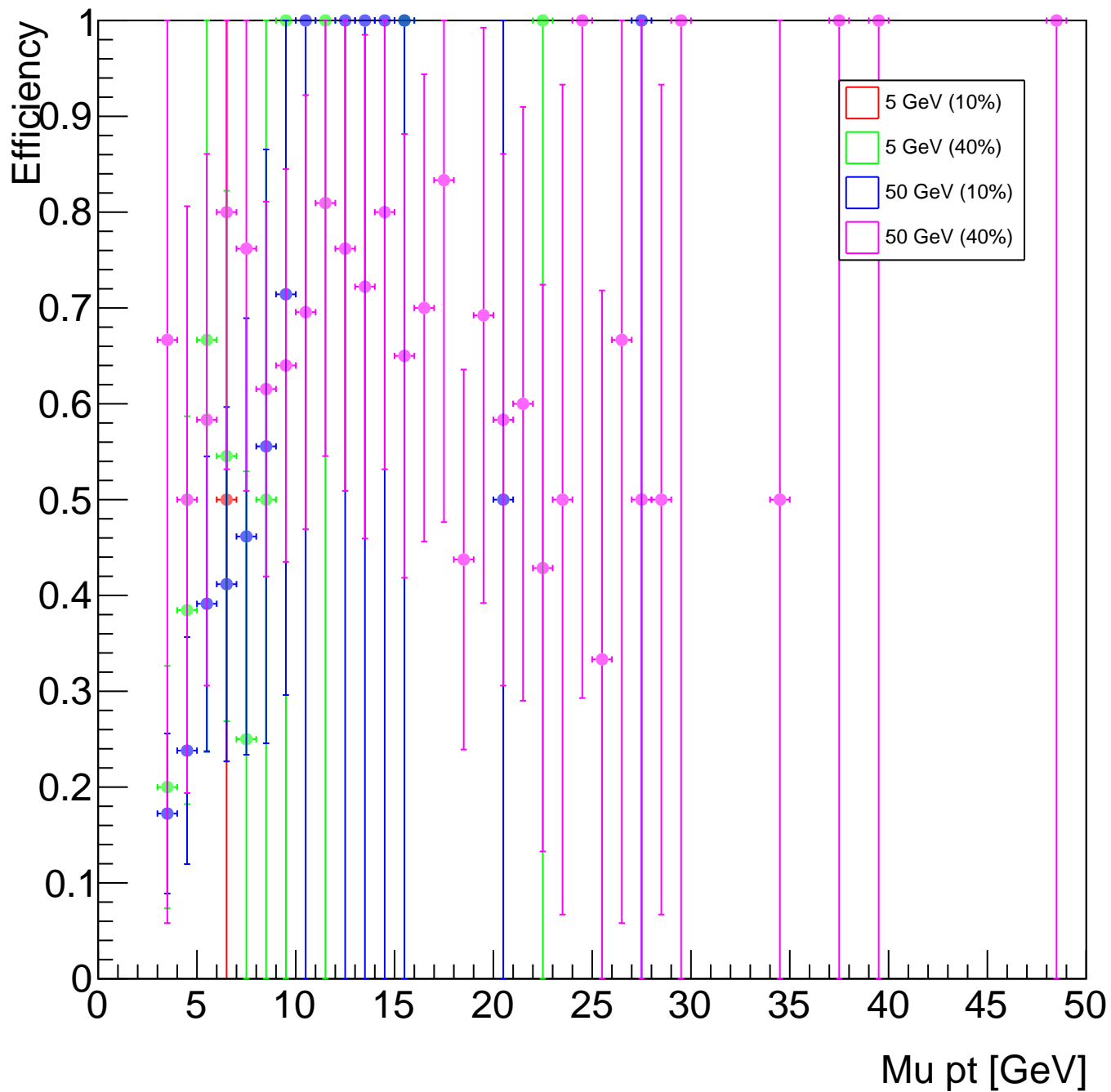


trigefficiency HLT\_DoubleMu3\_DZ\_PFMET50\_PFMHT60

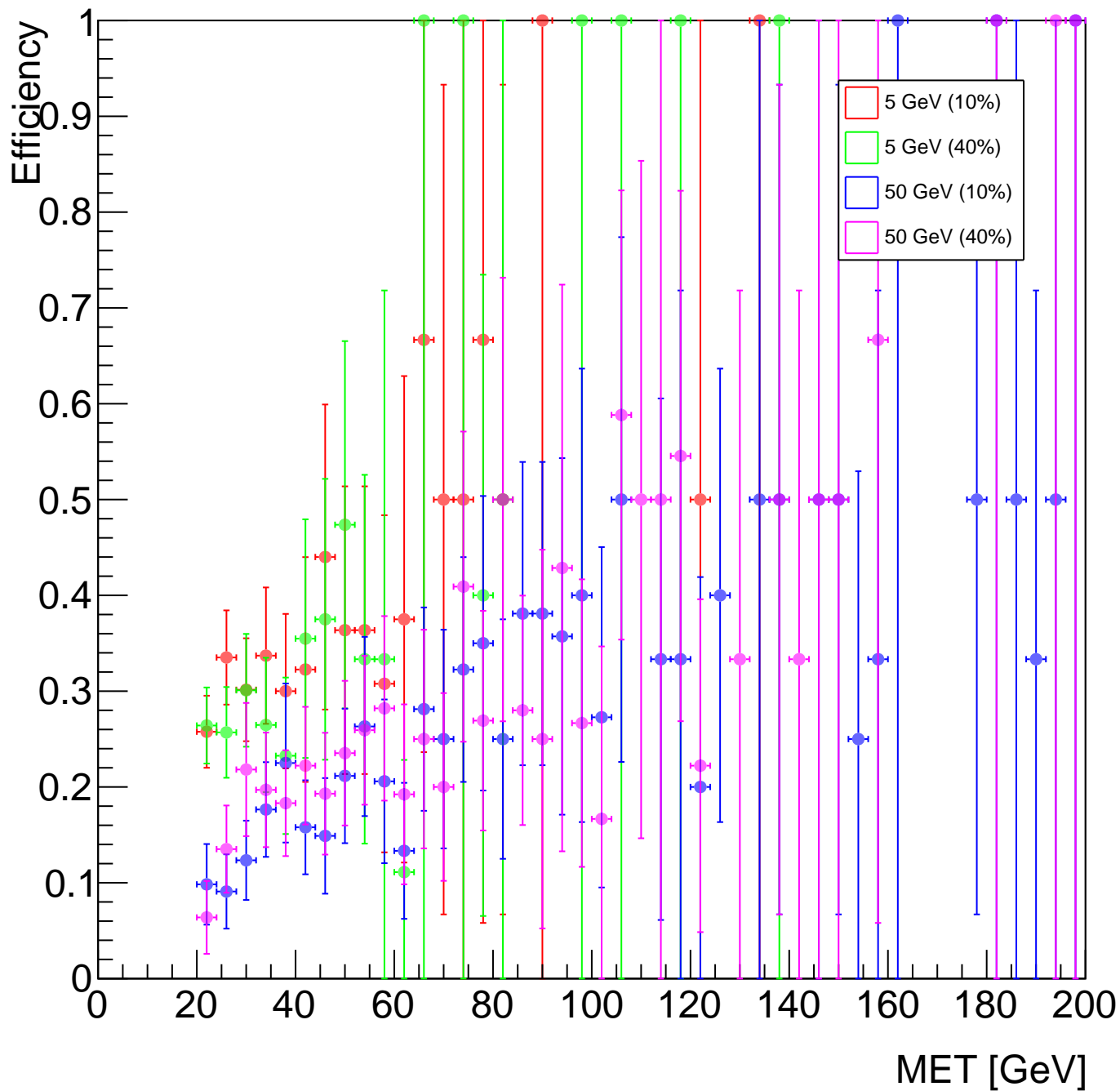




# recoefficiency mu



# recoefficiency met



# recoefficiency met

