

Status Report :- CERN Summer Project 2015

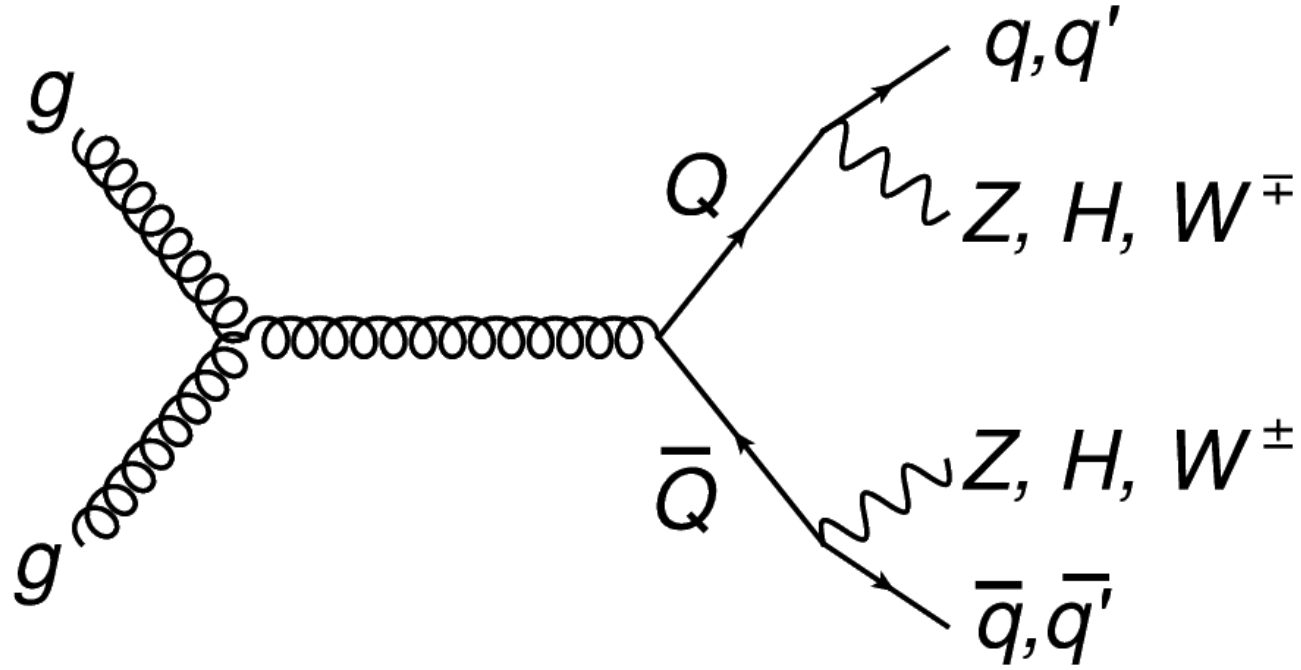
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16 July 2015

Introduction

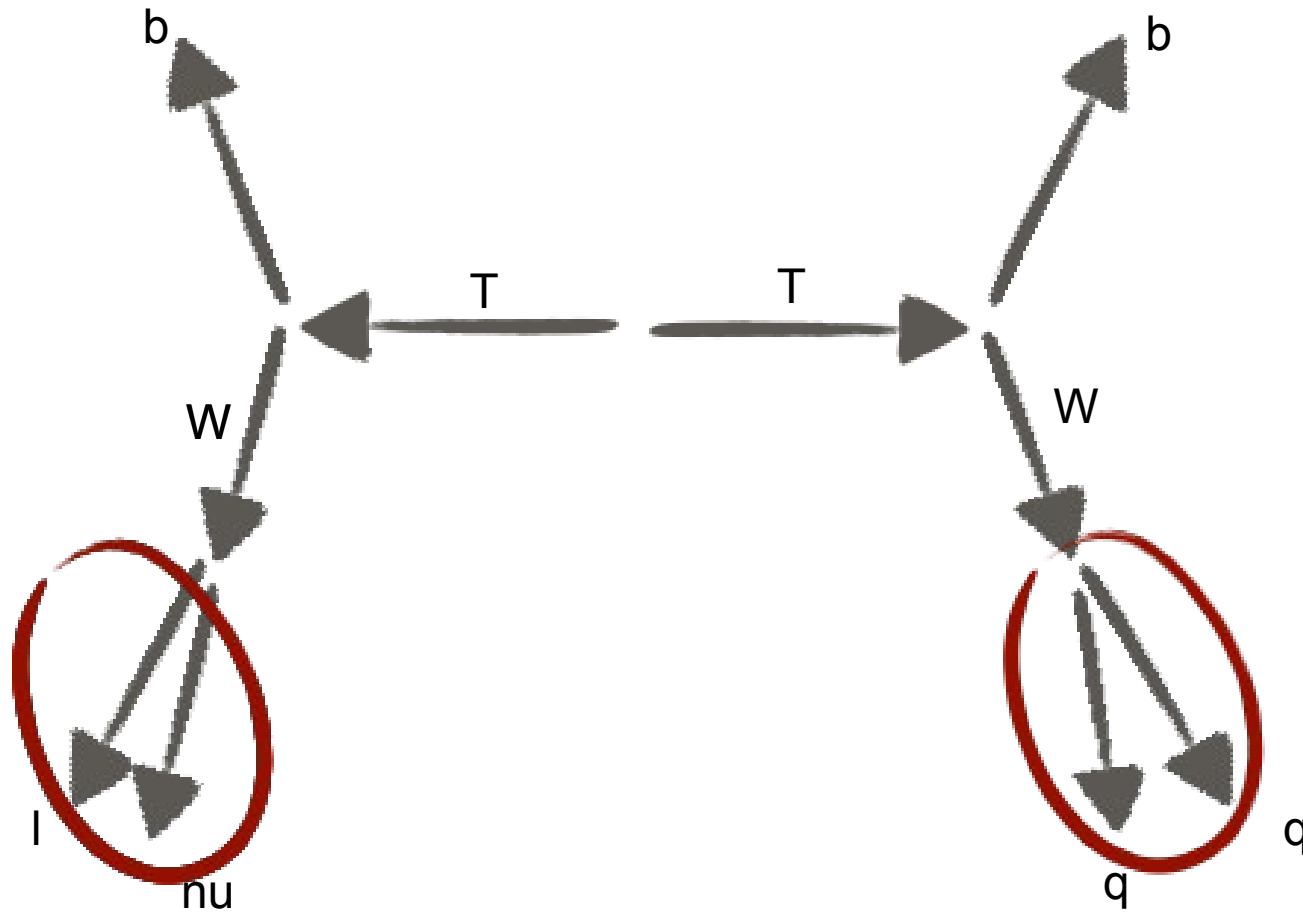
- We have two n-tuples :- one for ttbar system and another for vector like top quark system.
- In the montecarlo the mass of top is taken around 172.5 Gev and that for vector top is taken as 1100 Gev.
- The decay of vector top is pretty similar as standard model top quark.
- The best discriminant factor for top and vector like top quark is mass.
- By applying different cuts we collect the signal(vector top) vs background(standard

Final State Signature

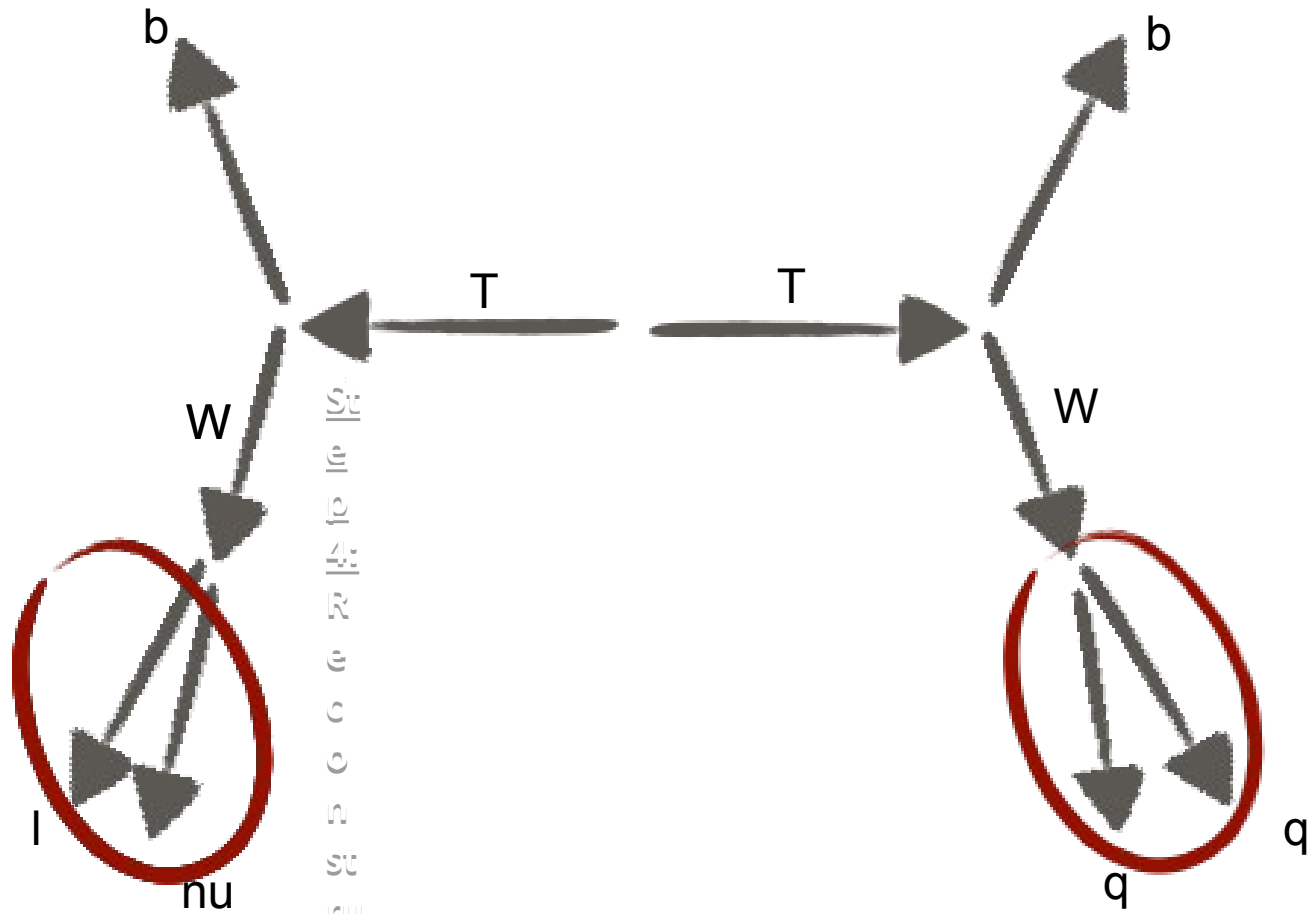


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"Boosted" Analysis Strategy



Define Discriminant M_{reco}



Step 3: Define the 2-body jets' candidate structure

Step 2:

Selections/Cuts

Cut_1-> No. of jets greater than 3

Cut_2-> Whadcandidate_mass < 105Gev and >65 Gev

Cut_3-> Jet1-Pt > 200Gev

Cut4-> Jet2-Pt >80 Gev

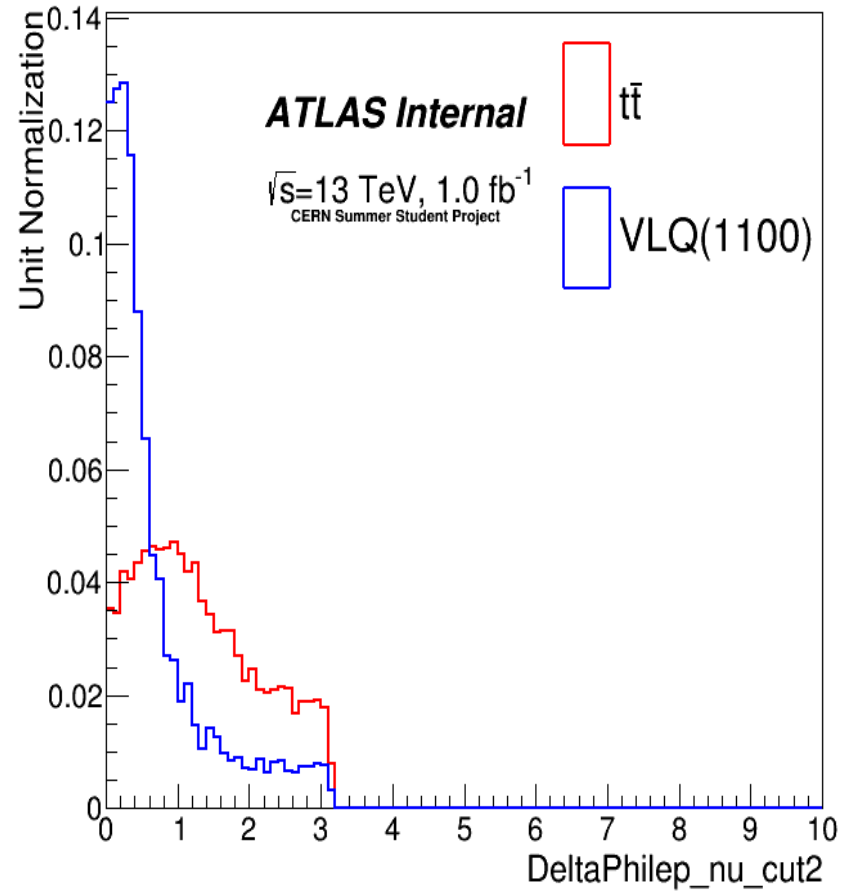
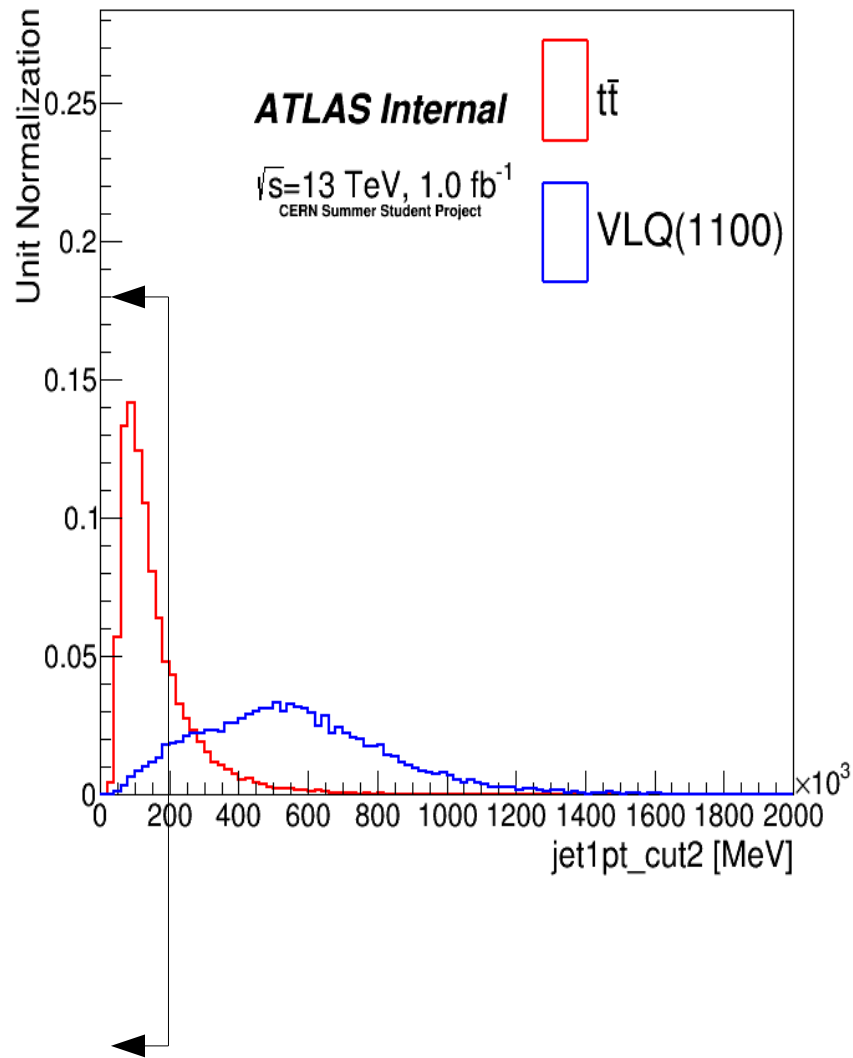
Cut5-> HT(total sum of pt) > 800Gev

Cut6-> DeltaR(lep_nu) < 1.0

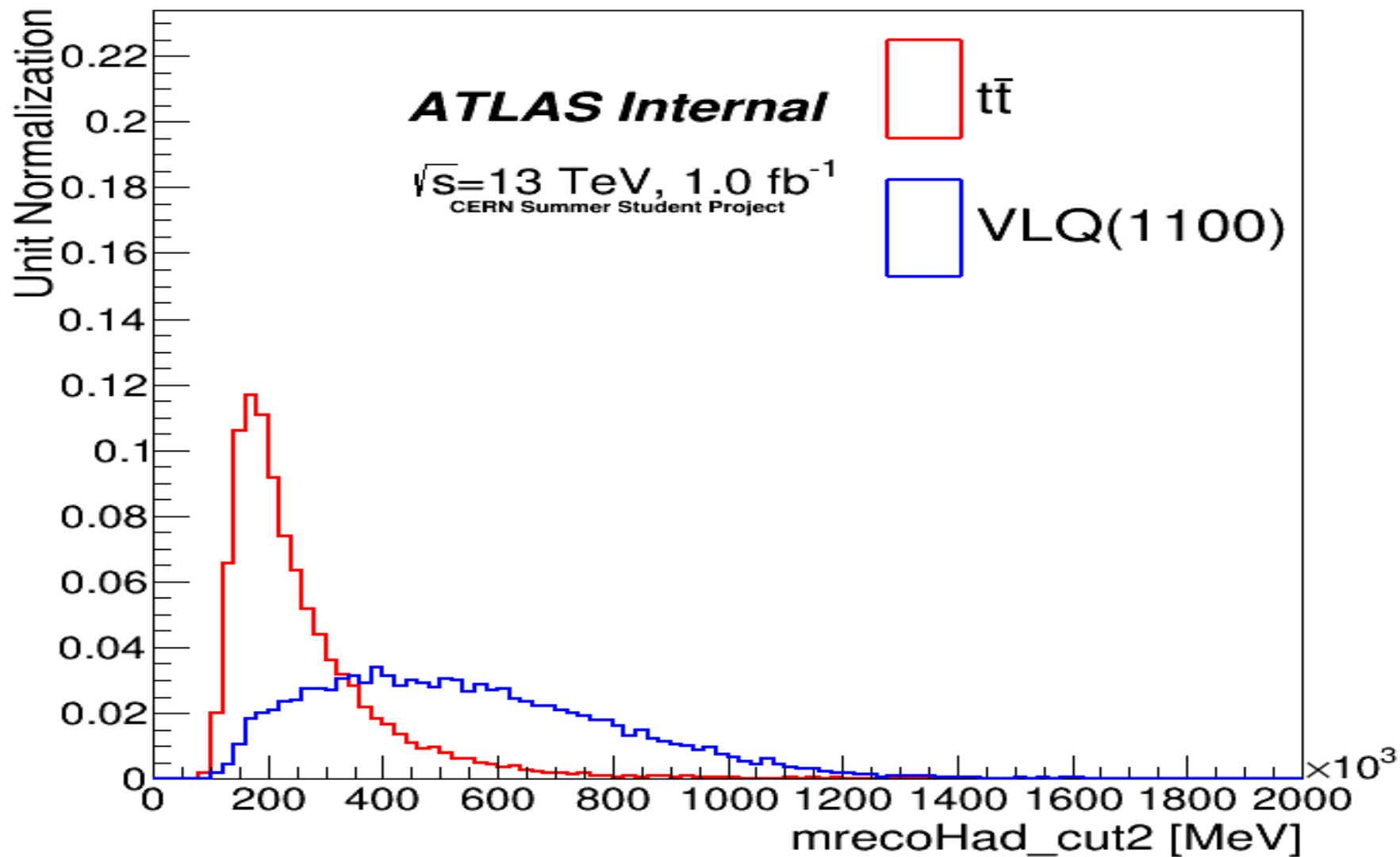
Cut7-> DeltaR(jet3_jet4) < 1.0

Cut8-> WhadCand_pt > 200 Gev

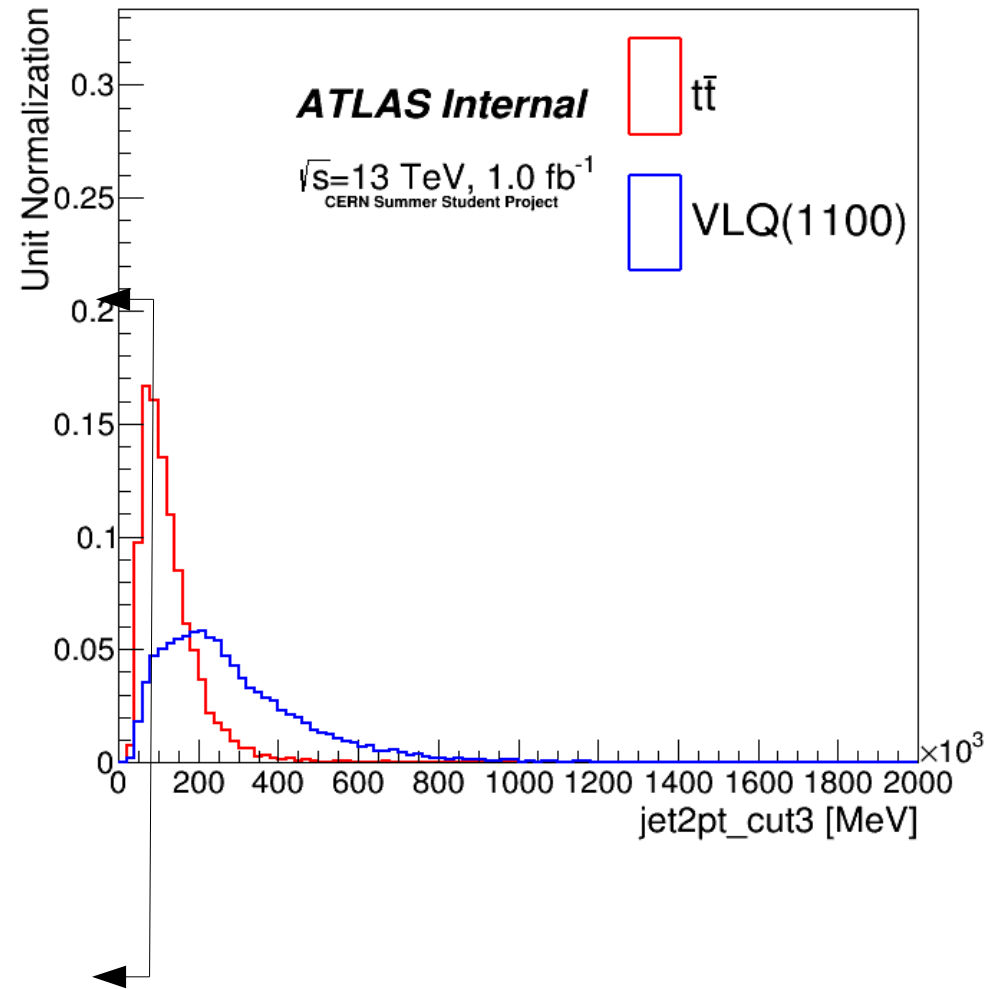
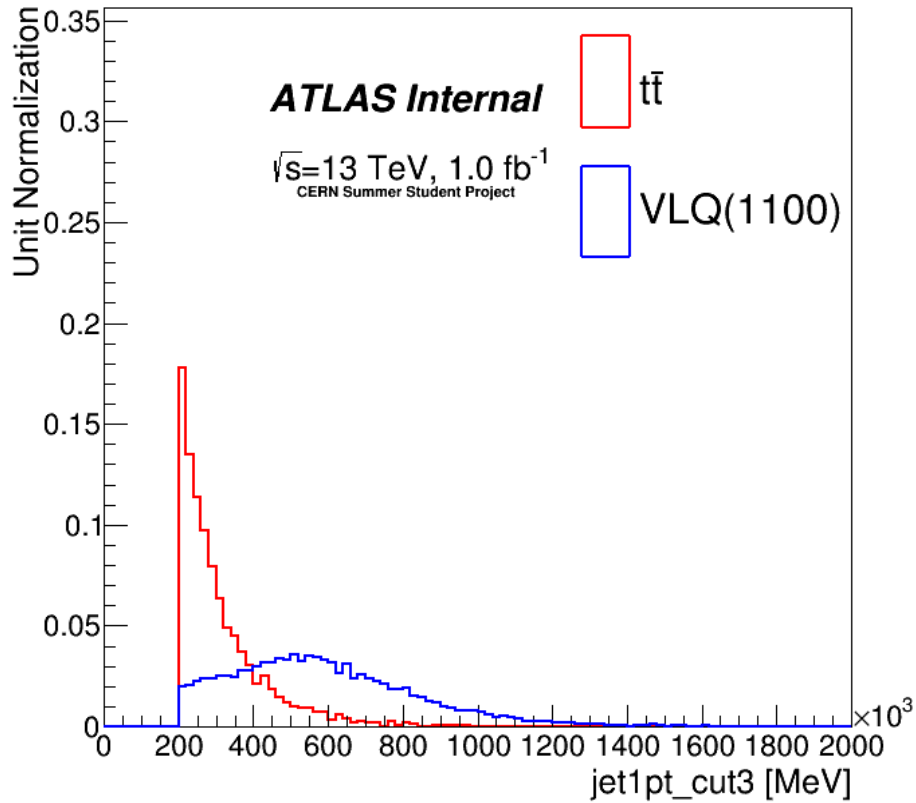
Plots after cut2(constrained Whadcand mass)



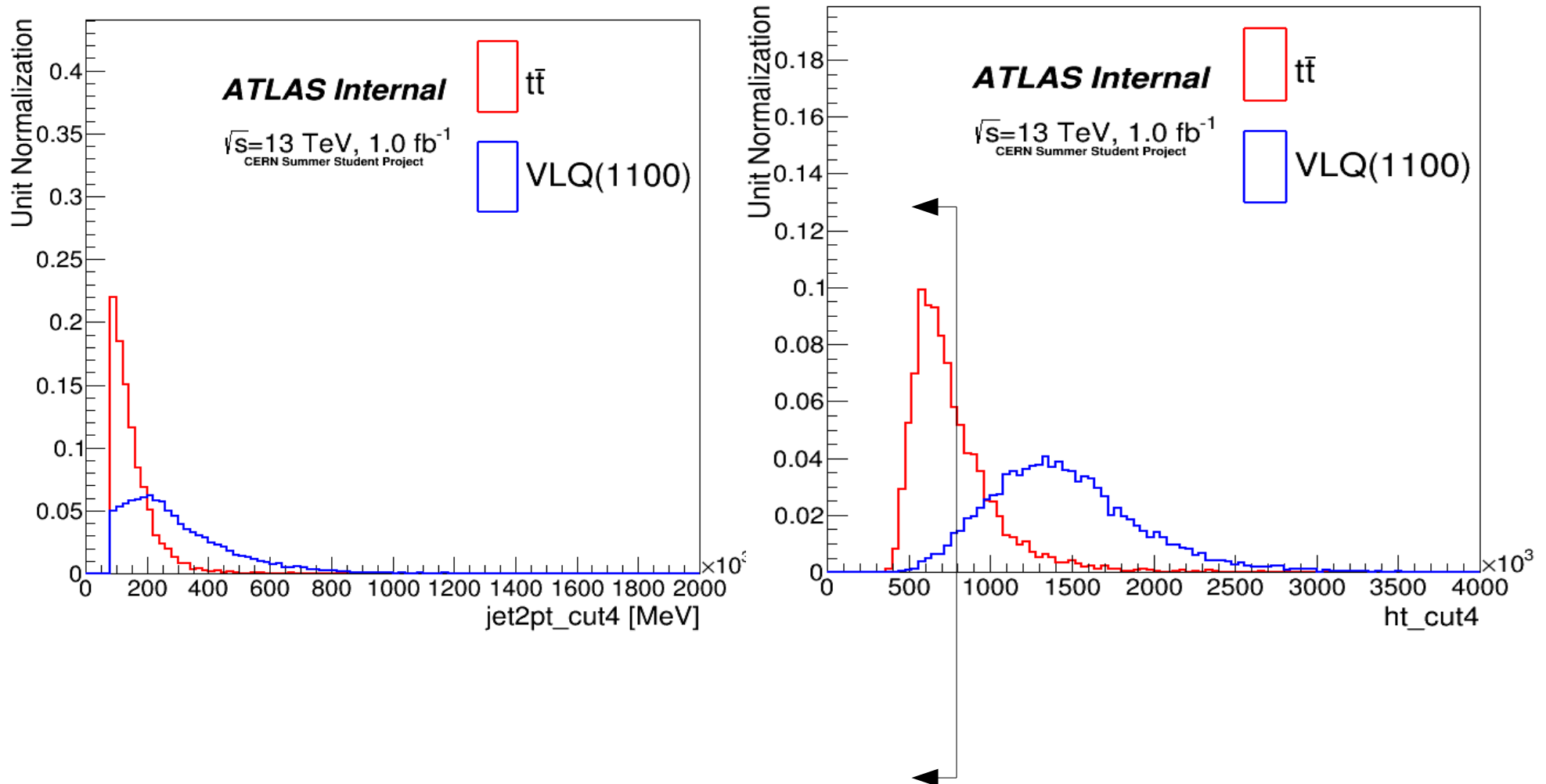
Mreco after cut2



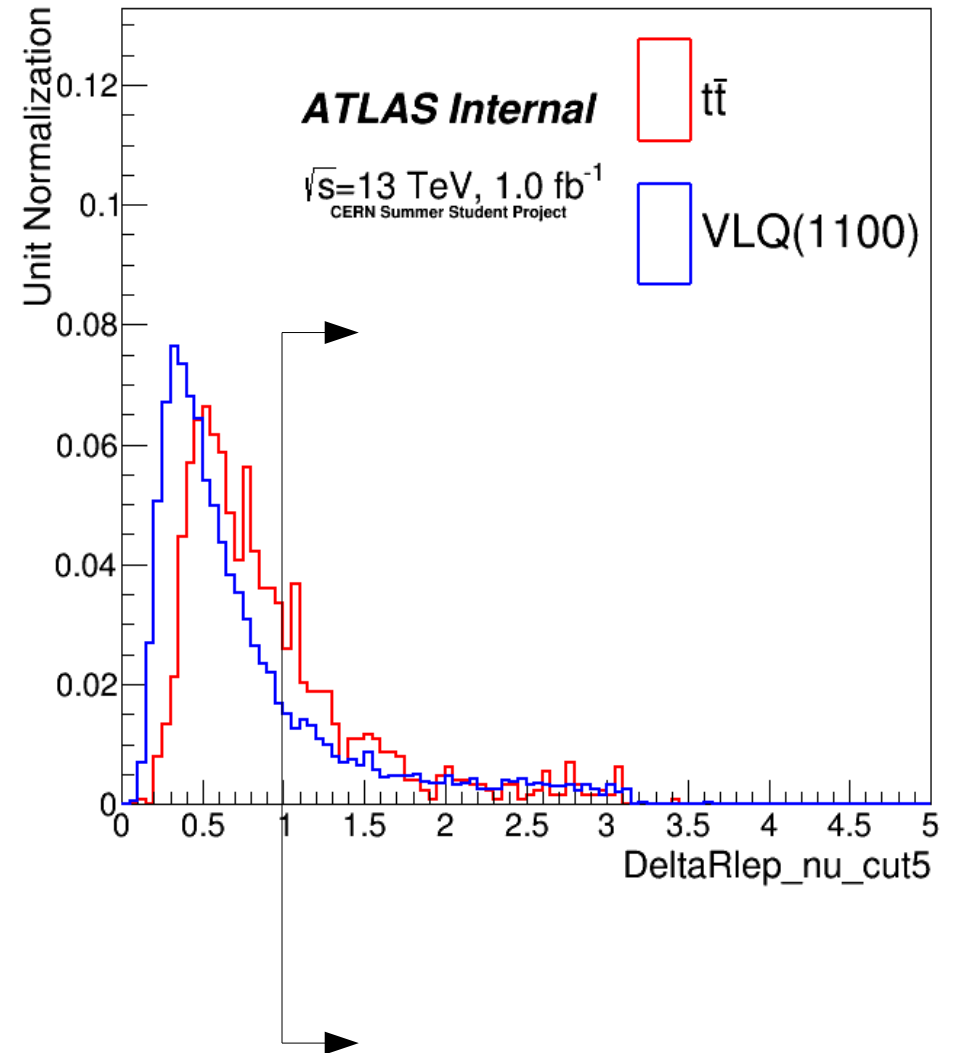
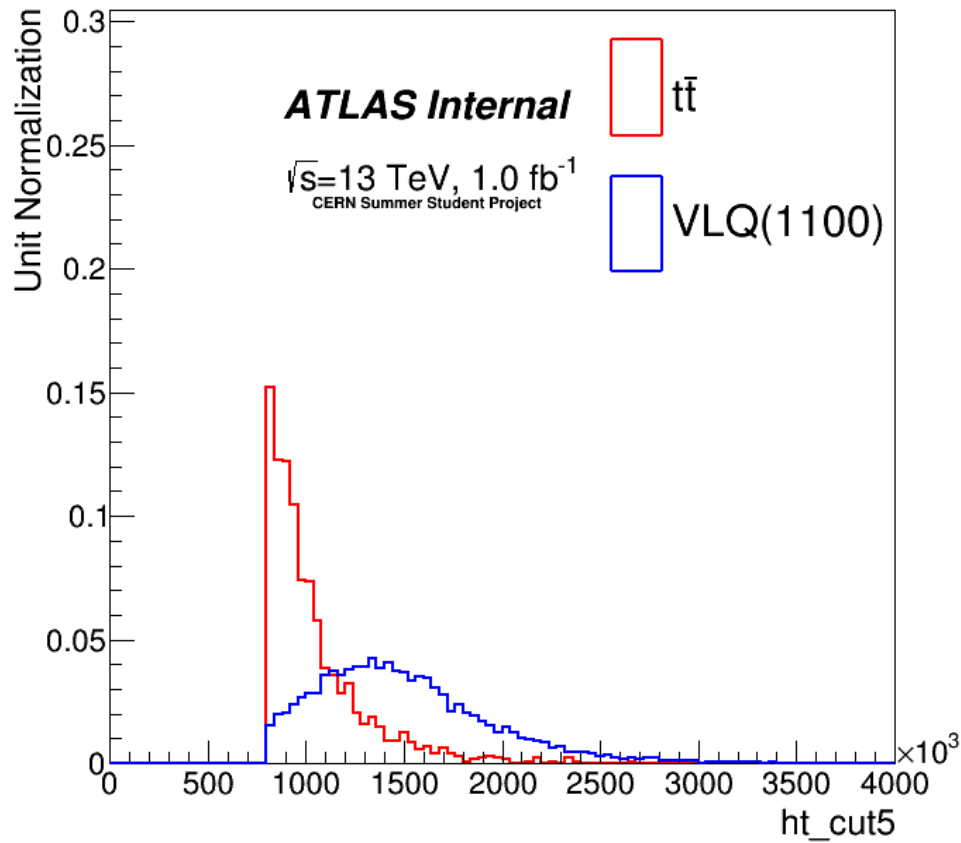
Plots after cut3(jet1pt > 200Gev)



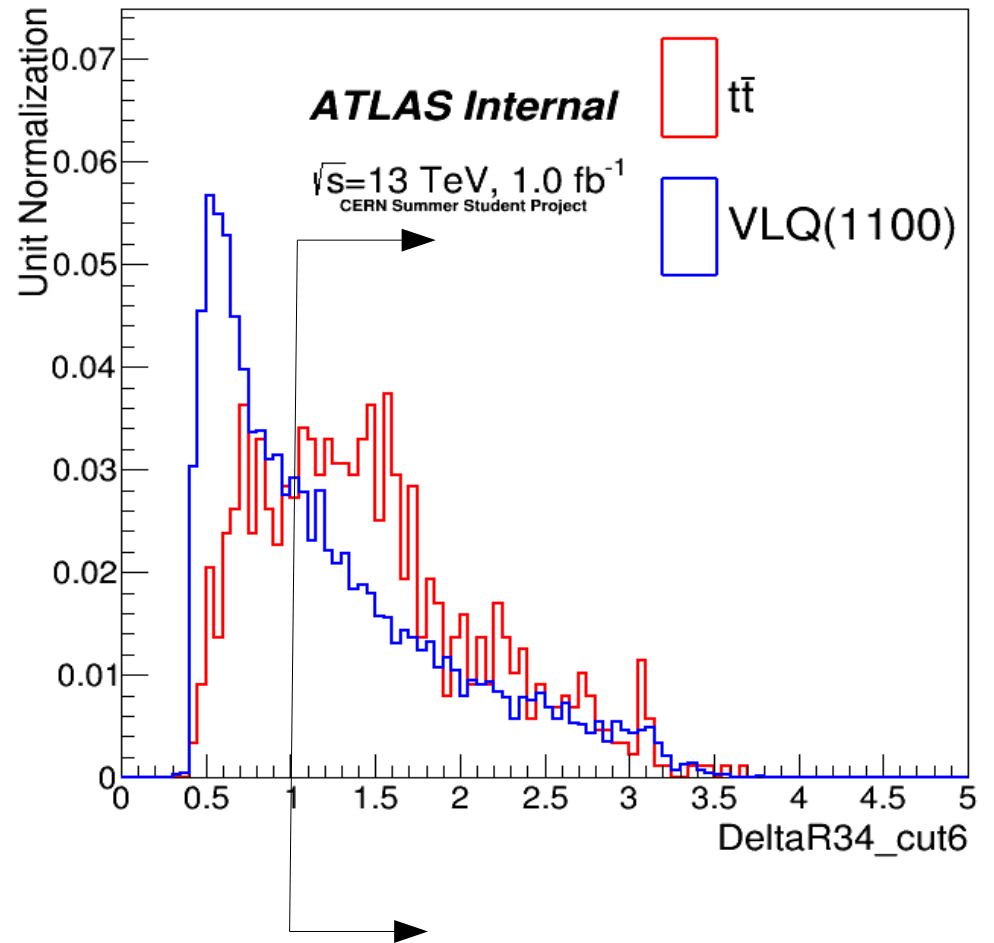
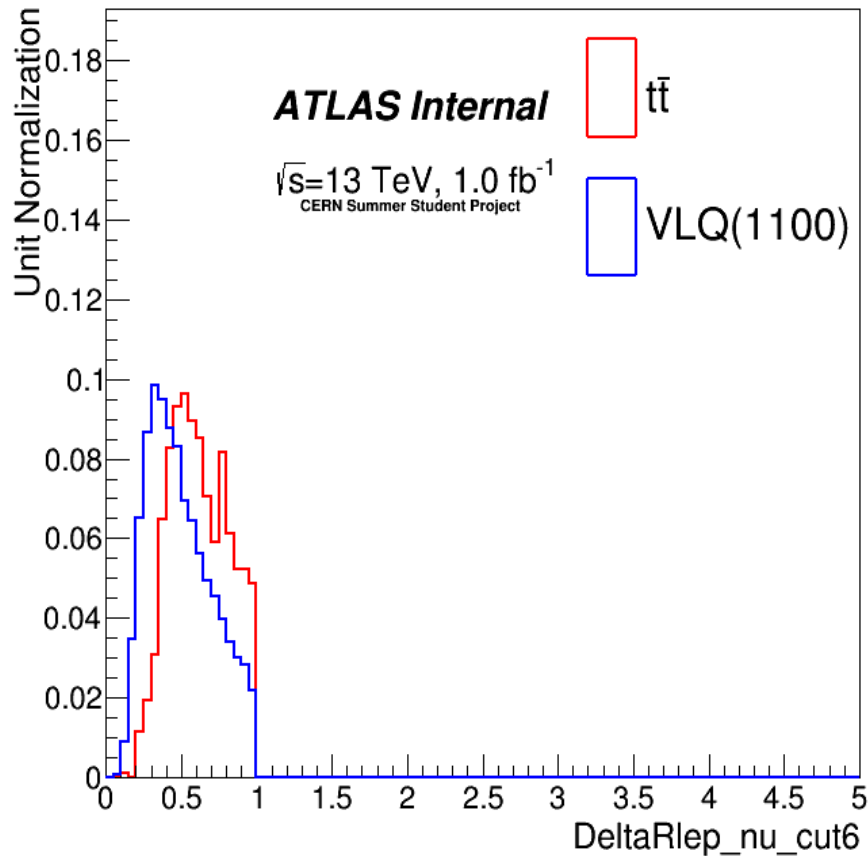
Plots after cut4(jet2pt > 80Gev)



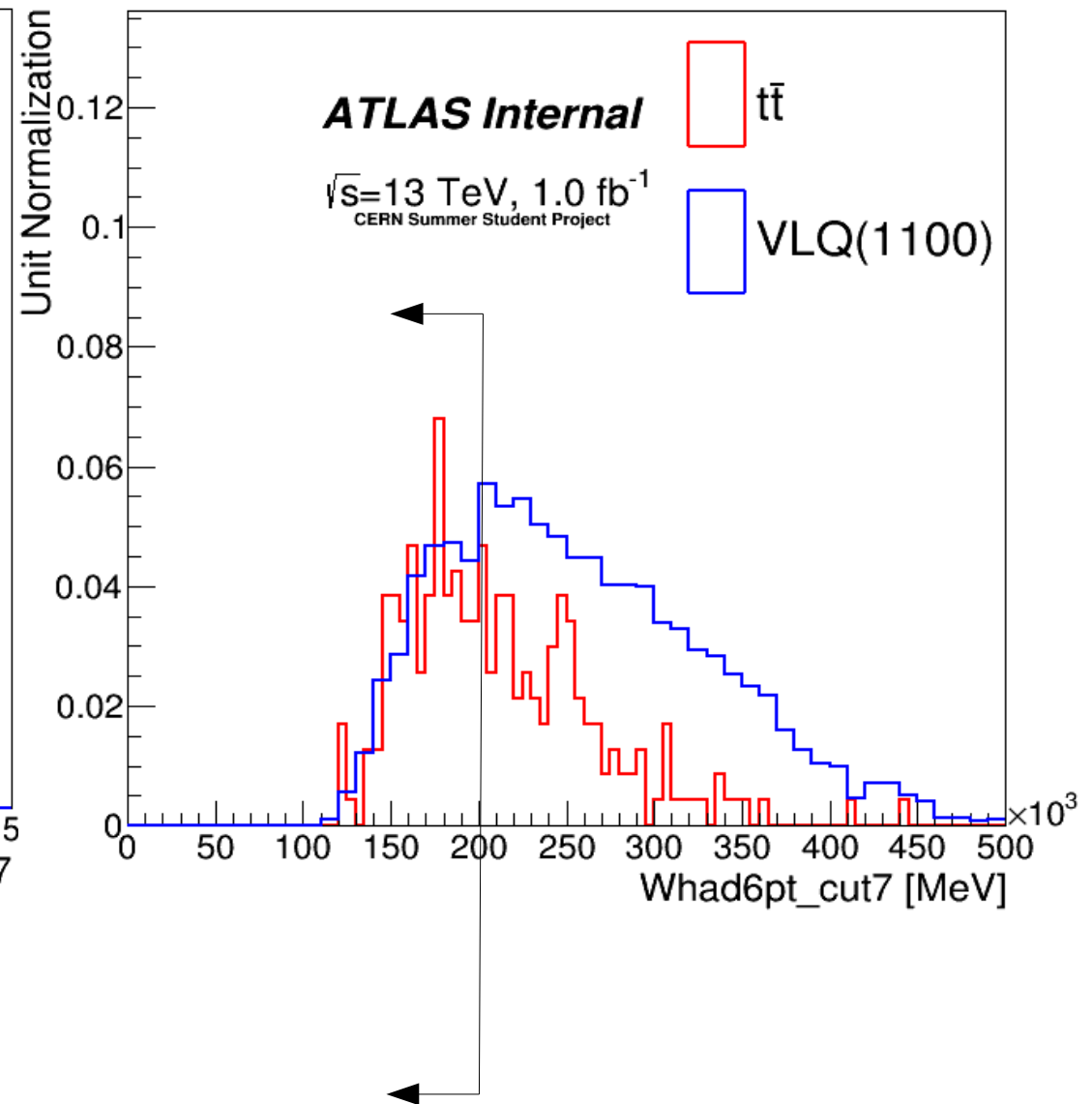
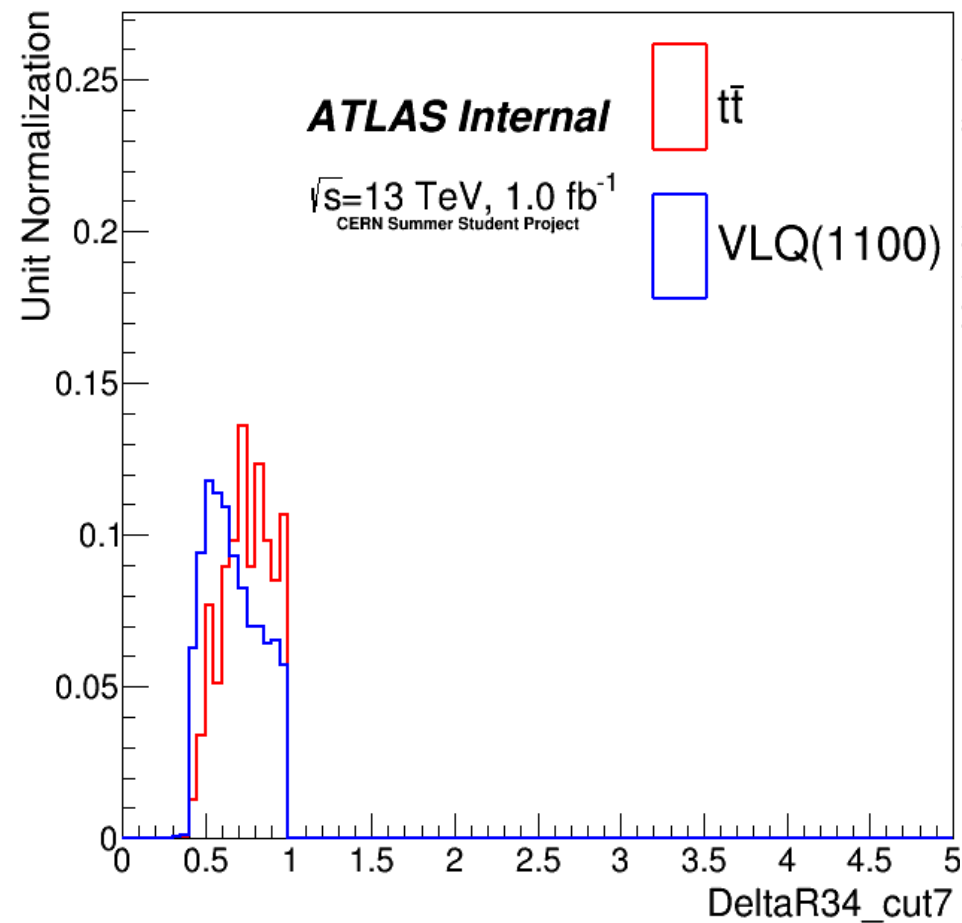
Plots after cut5($H_t > 800\text{GeV}$)



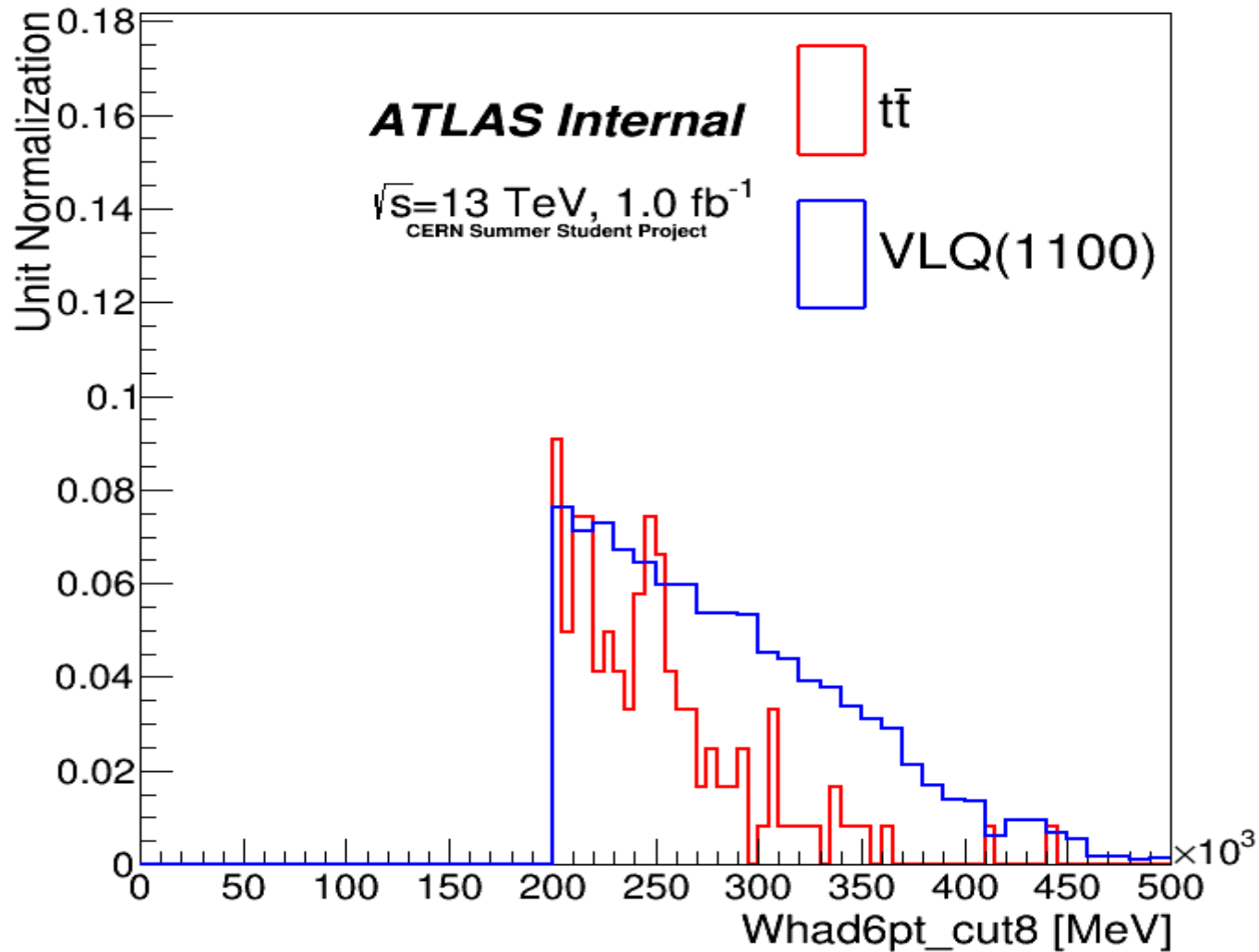
Plots after cut6($\Delta R_{lep_nu} < 1.0$)



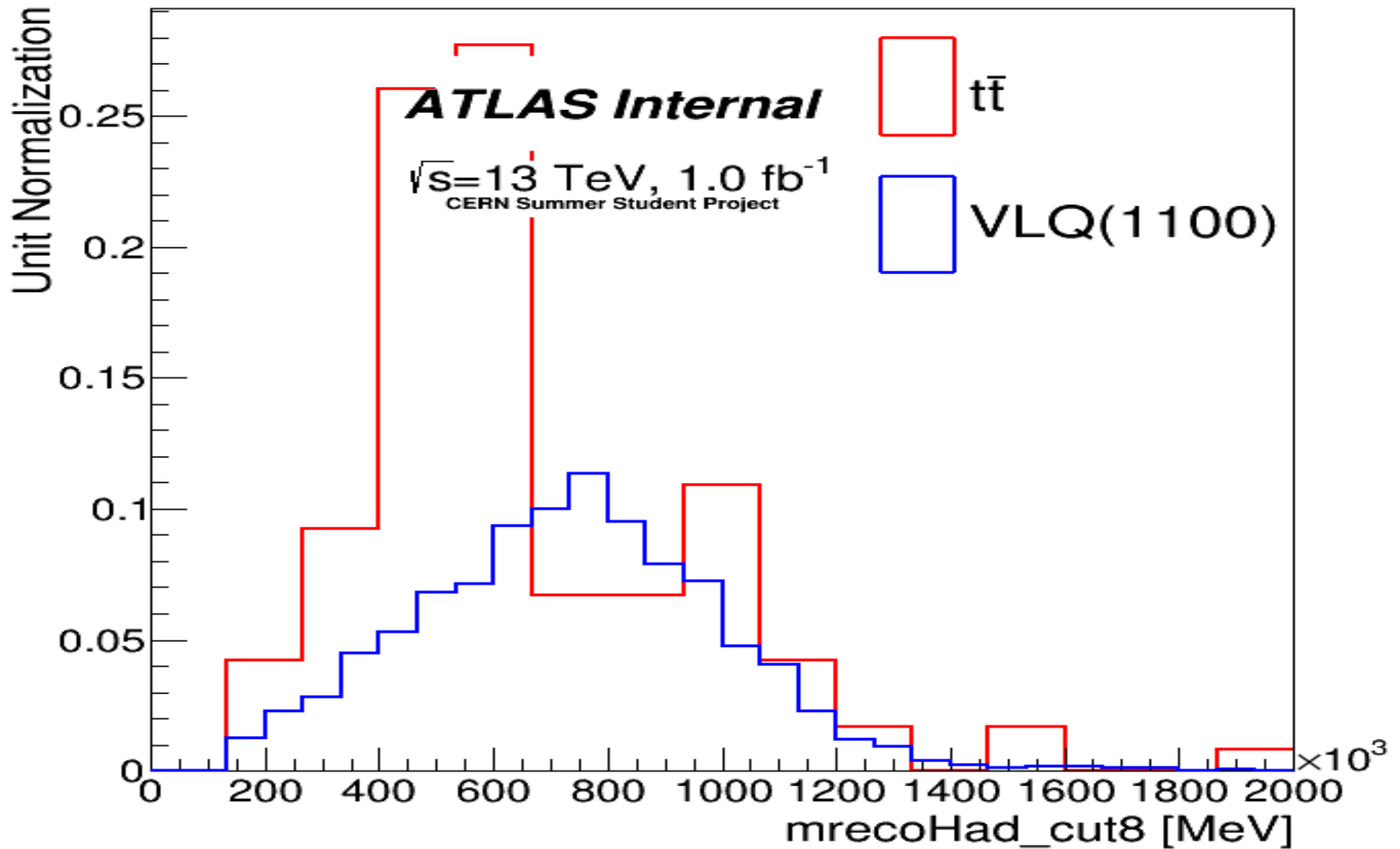
Plots after cut7(DeltaR(jet3_jet4) < 1.0)



Plots after cut8(WhadcandPT > 200Gev)



Mreco after cut8 (Not looking good!)



The Signal Vs Background Ratio

cut	ttbar	TTS	S/B
2	21434	13757	0.6418307362
3	5178	12770	2.4662031672
4	3772	12066	3.1988335101
5	1280	11514	8.9953125
6	881	8921	10.12599319
7	235	4306	18.323404255
8	121	3226	26.661157025

Conclusion

- In this way we got the final signal versus background ratio (about 26).
- The Mreco is not good as it has been predicted.
- The problem in Mreco may be by the mixture of final states in the n-tuples.

I.e $T \rightarrow Wb$

$T \rightarrow Zt$

$T \rightarrow Ht$

- But we account only $T \rightarrow Wb$ event.

THANK YOU