

# Software Review: Update

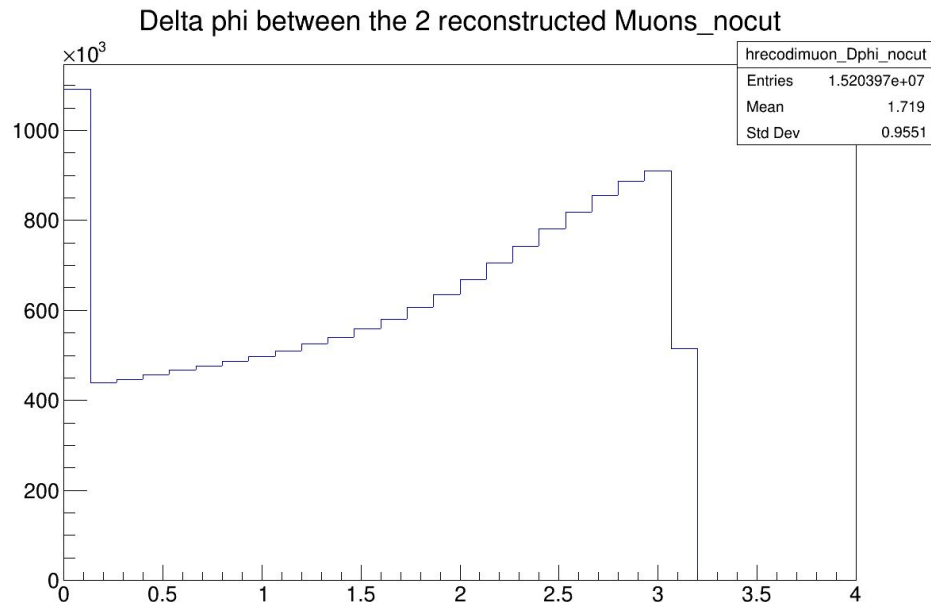
4 March 2022  
Benjamin Blancon

(Really) basic selection: 2 Muons with  $P_t > 20 \text{ GeV}$  and  $|\eta| < 2.4$  and SS charge.

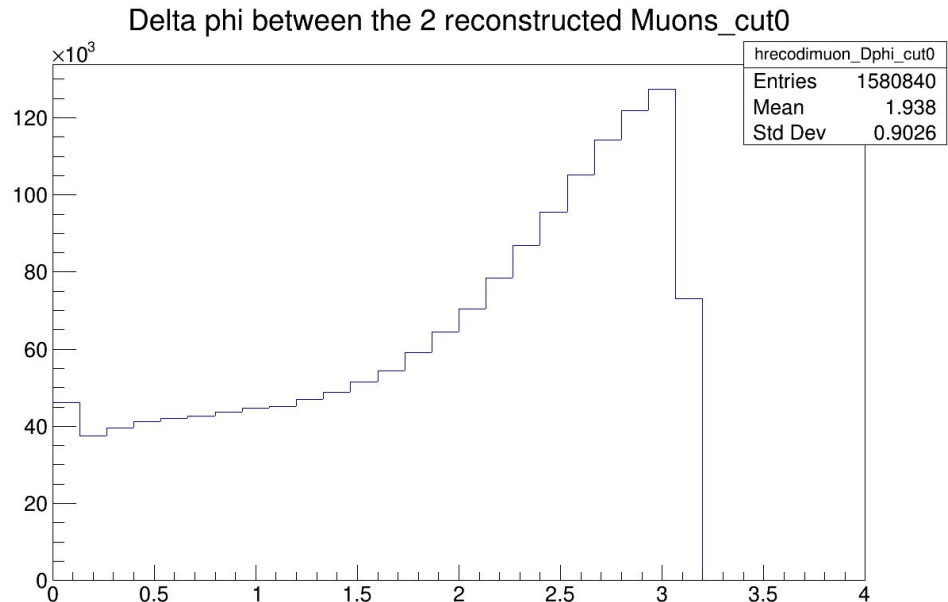
## Dataset:

/TTTo2L2Nu\_TuneCP5\_13TeV-powheg-pythia8/RunIISummer20UL18MiniAODv2-106X\_upgrade2018\_realistic\_v16\_L1v1-v1/MINIAODSIM: ttbar (146,010,000 Events).  
/TprimeBToTH\_M-700\_LH\_TuneCP5\_PWeights\_13TeV-madgraph\_pythia8/RunIISummer19UL18MiniAODv2-106X\_upgrade2018\_realistic\_v16\_L1v1-v1/MINIAODSIM: signal (389,500 events).

# $\Delta\phi$ between the 2 muons (ttbar)



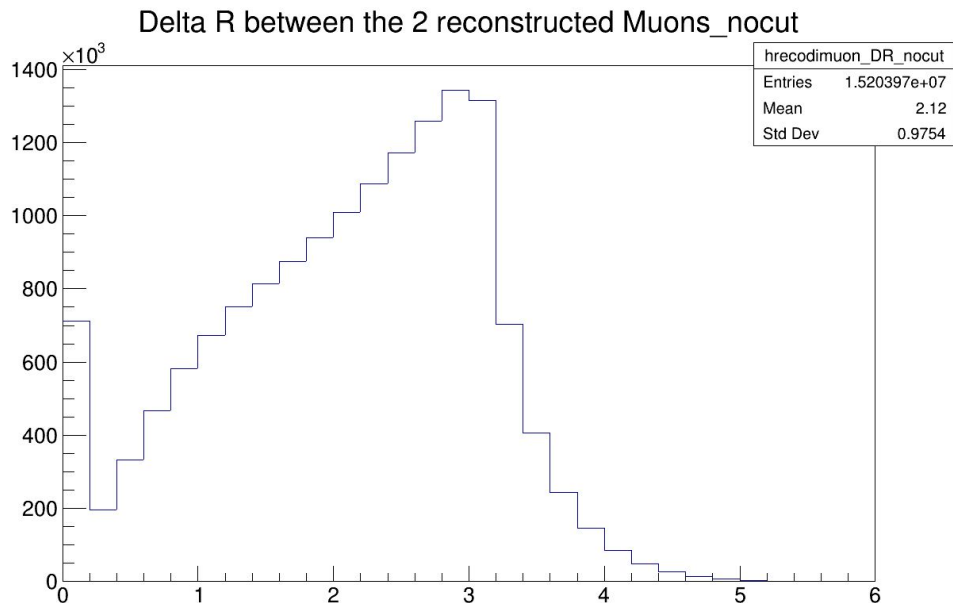
Before the cut



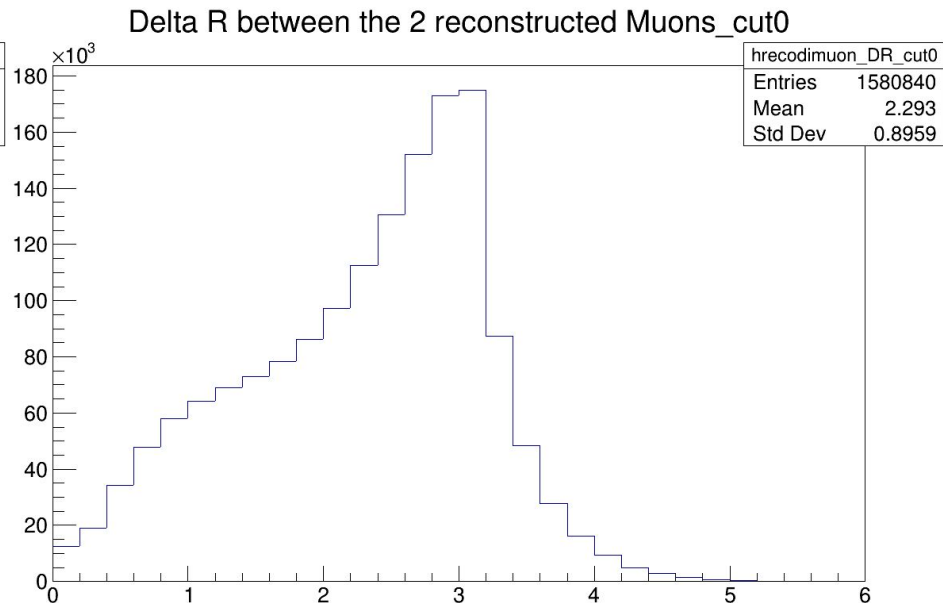
After the cut

The majority of events have the muons back to back as expected.

# $\Delta R$ between the 2 muons (ttbar)



Before the cut



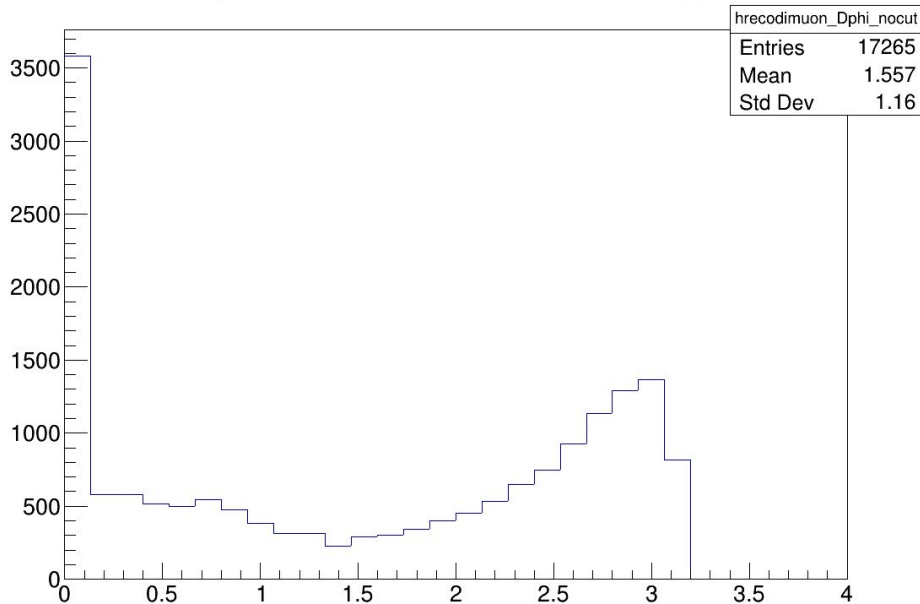
After the cut

No problem for the  $\Delta R$ .

Time spent for the code: 2m45s for ~150 millions events. → Good!

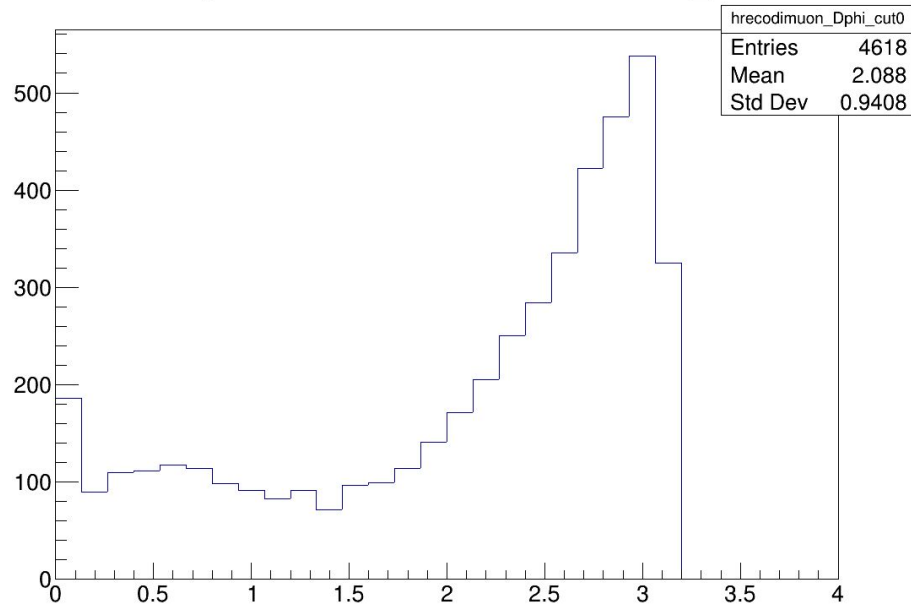
# $\Delta\phi$ between the 2 muons (signal)

Delta phi between the 2 reconstructed Muons\_nocut



Before the cut

Delta phi between the 2 reconstructed Muons\_cut0

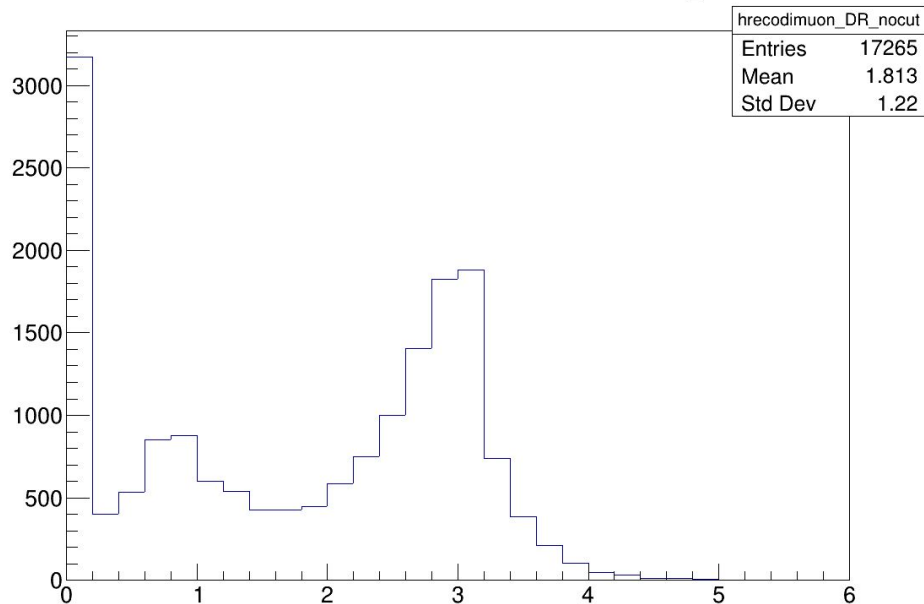


After the cut

The majority of events have the muons back to back as expected.

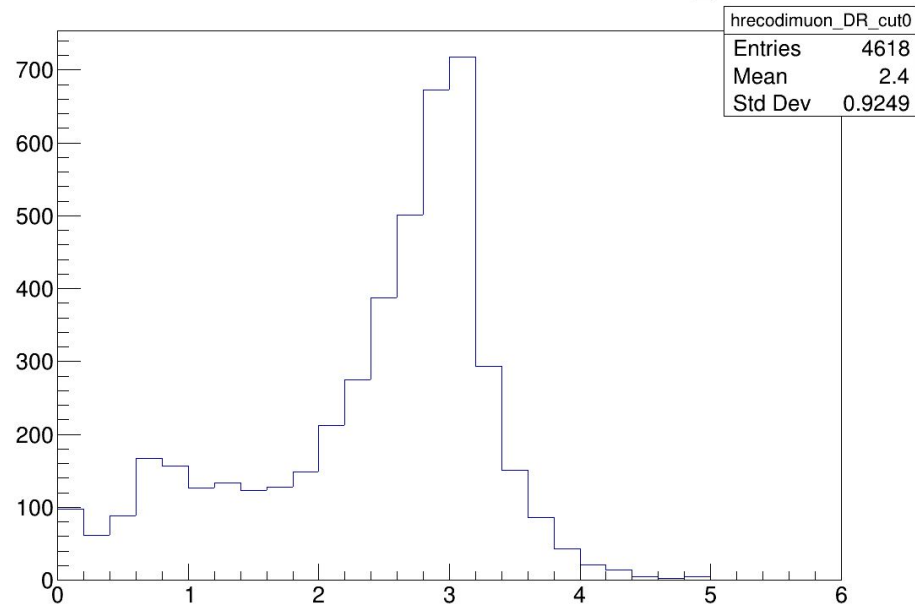
# $\Delta R$ between the 2 muons (signal)

Delta R between the 2 reconstructed Muons\_nocut



Before the cut

Delta R between the 2 reconstructed Muons\_cut0



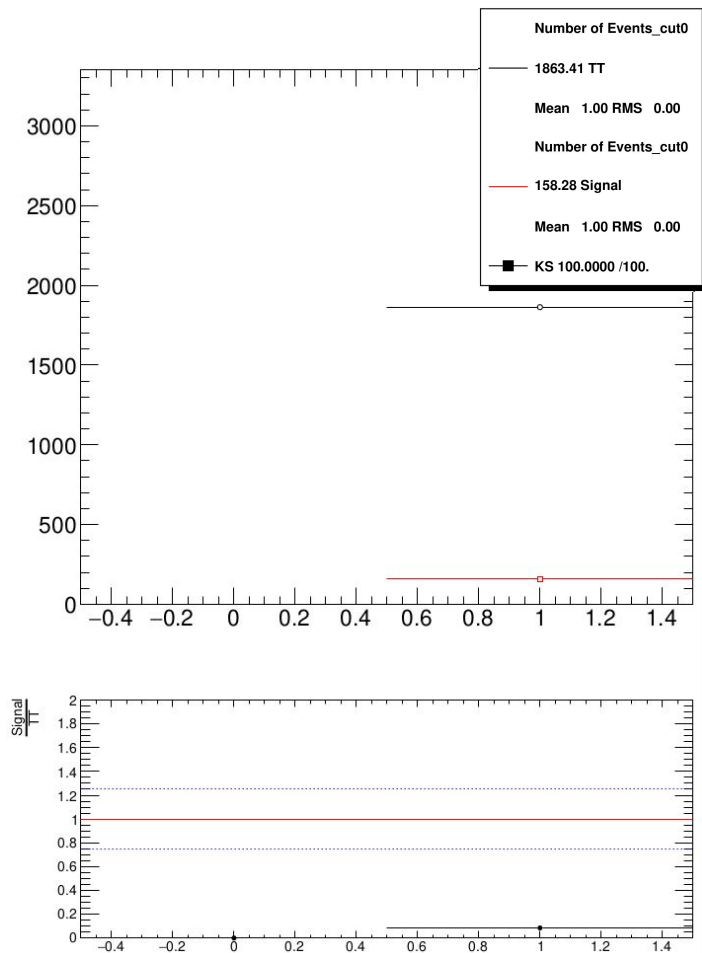
After the cut

No problem for the  $\Delta R$ .

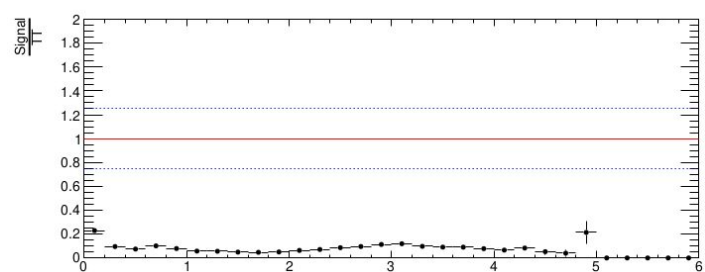
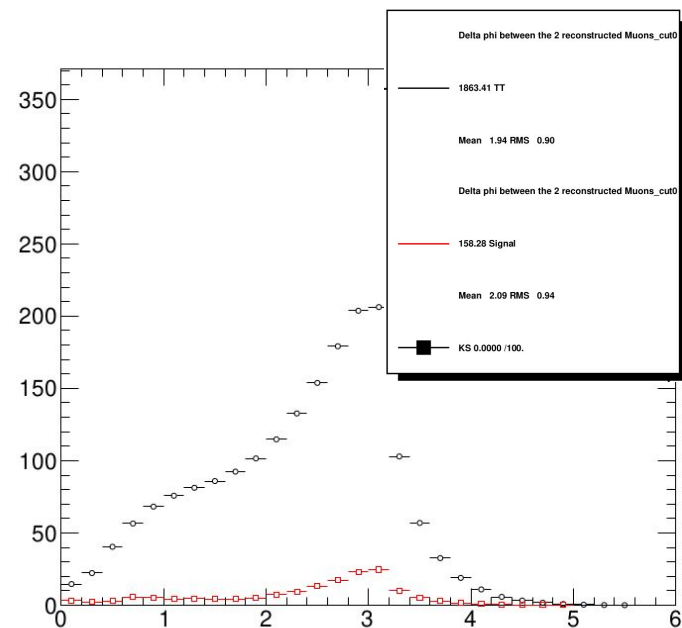
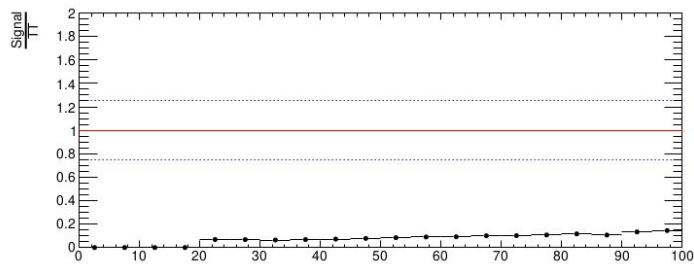
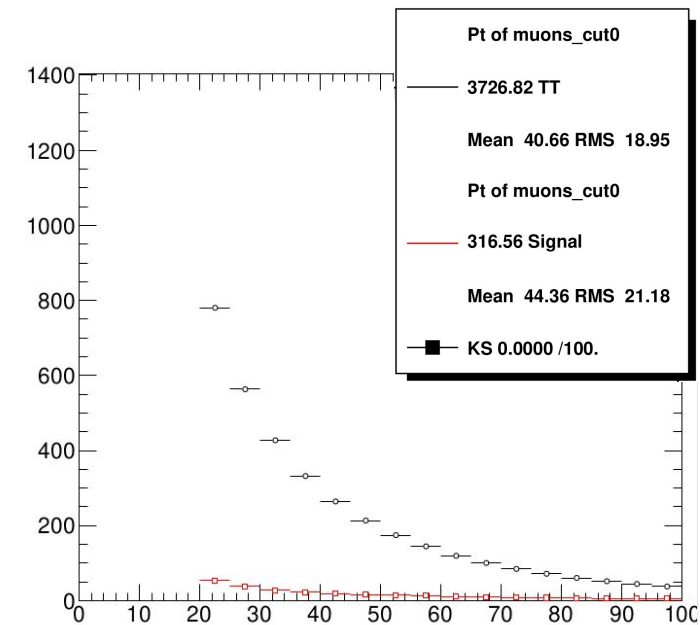
Time spent for the code: 15s for ~400k events.  $\rightarrow$  Good!

## Number of events: signal vs ttbar

~1,900 ttbar events and ~160 signal events are selected. → OK? **SCALING TO BE CHECKED.**



# Pt and $\Delta R$ : signal vs ttbar

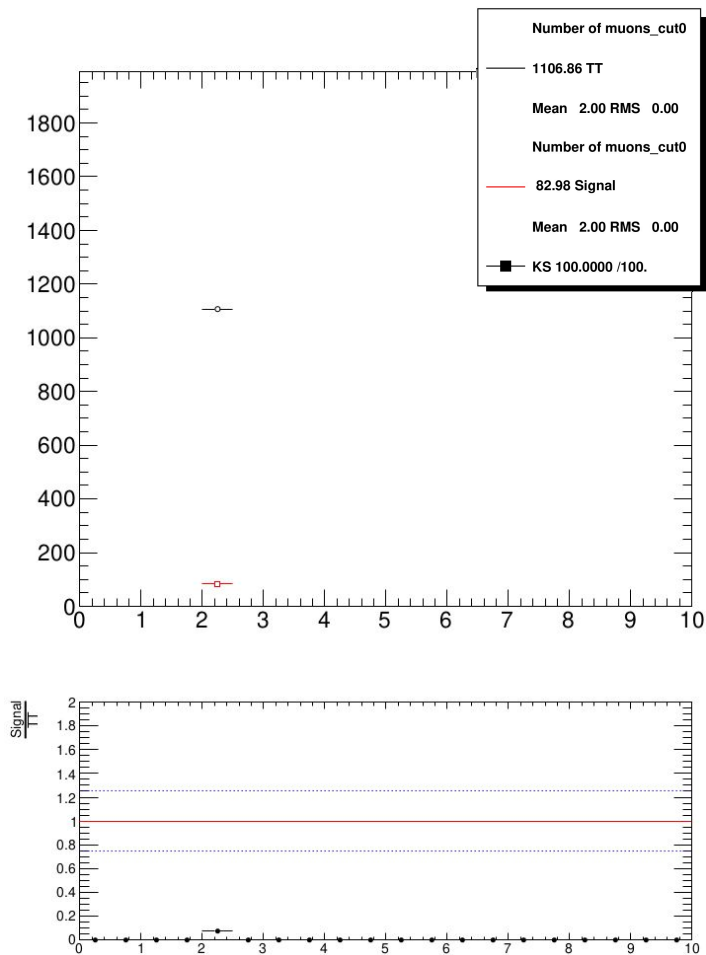




**ISSUE:** not sure that the selection is done correctly. An event with 3 muons and 2 muons out of the 3 that pass the selection on the variables passes currently the selection on the events (and save only the 2 muons that pass the selection on the variables). → **RESOLVED.** **GOOD WAY TO DO IT?**

## Number of events: signal vs ttbar (with correction)

~1,100 ttbar events and ~80 signal events are selected (50% less events). → **OK?**



# Pt and $\Delta R$ : signal vs ttbar (with correction)

