TTH/TTBar Study (Top –xaod analysis framework)

atlasphys-hsg8

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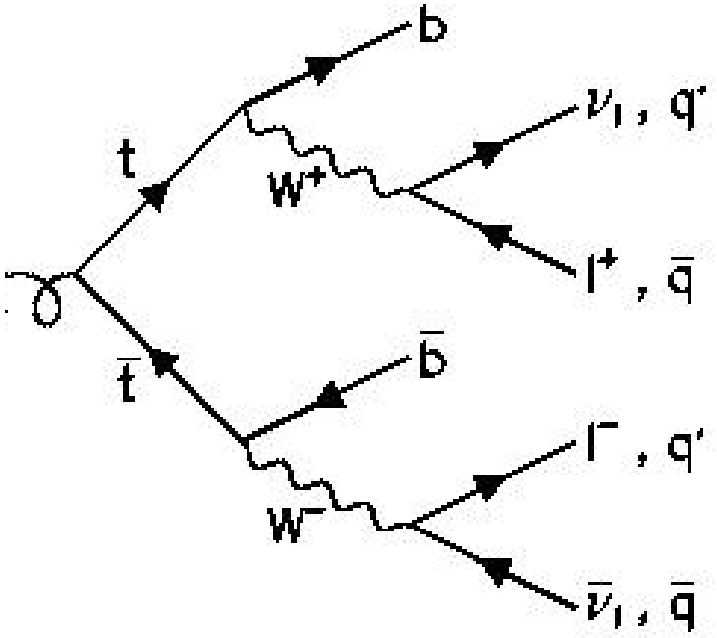
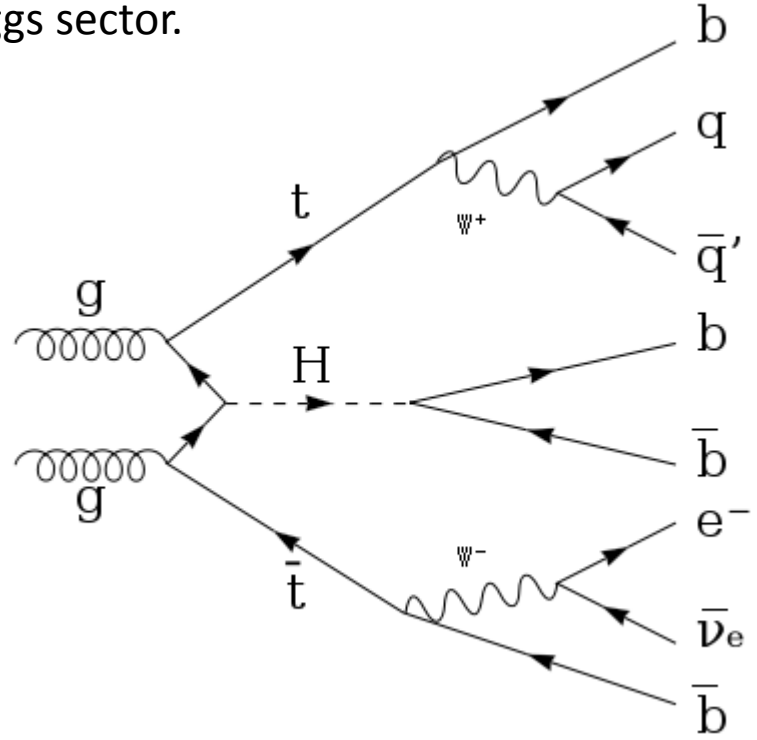
TTH vs. TTBar

studying its coupling to the top quark will play a particularly critical role in our understanding of the Higgs sector.





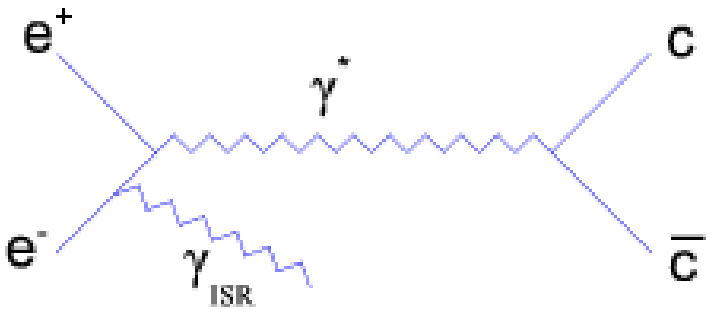
The Top Bucket Algorithm

- algorithm to identify and reconstruct hadronically decaying top pairs.

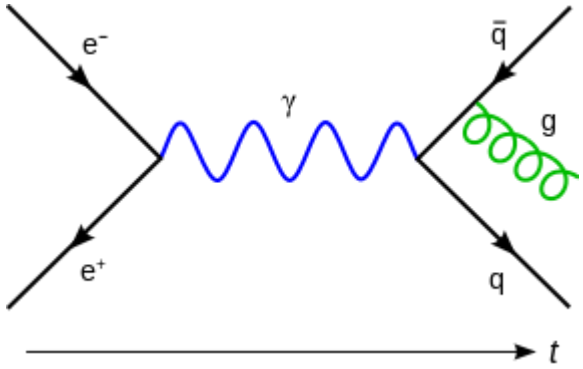
- collecting jets in buckets, corresponding to top quarks and initial state radiation.

ISR/FSR

$$e^+ + e^- \longrightarrow 2\gamma$$



ISR



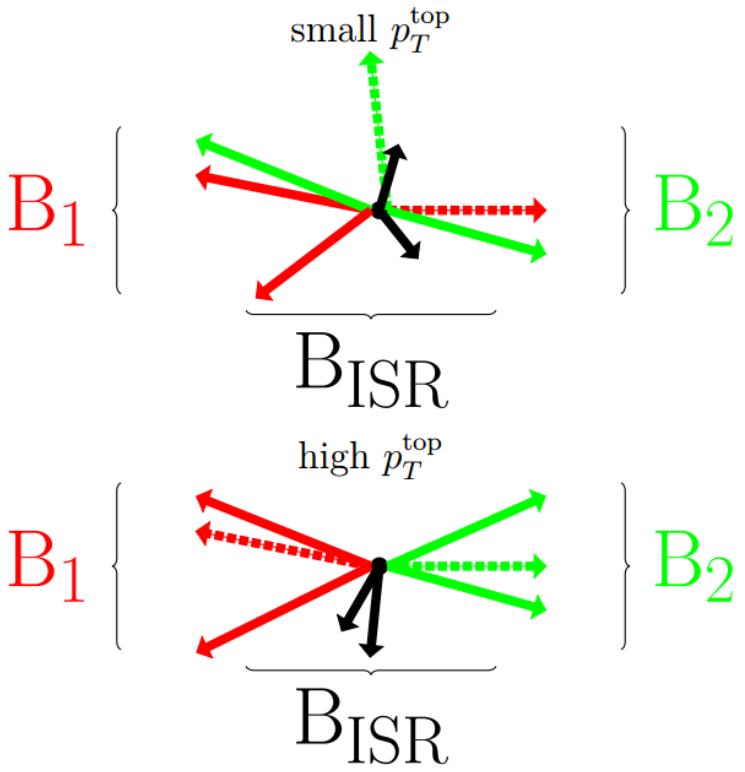
FSR

The Bucket algorithm

Red and greaan arrows – two top

Dotted arrow b-jet.

Black arrow - ISR



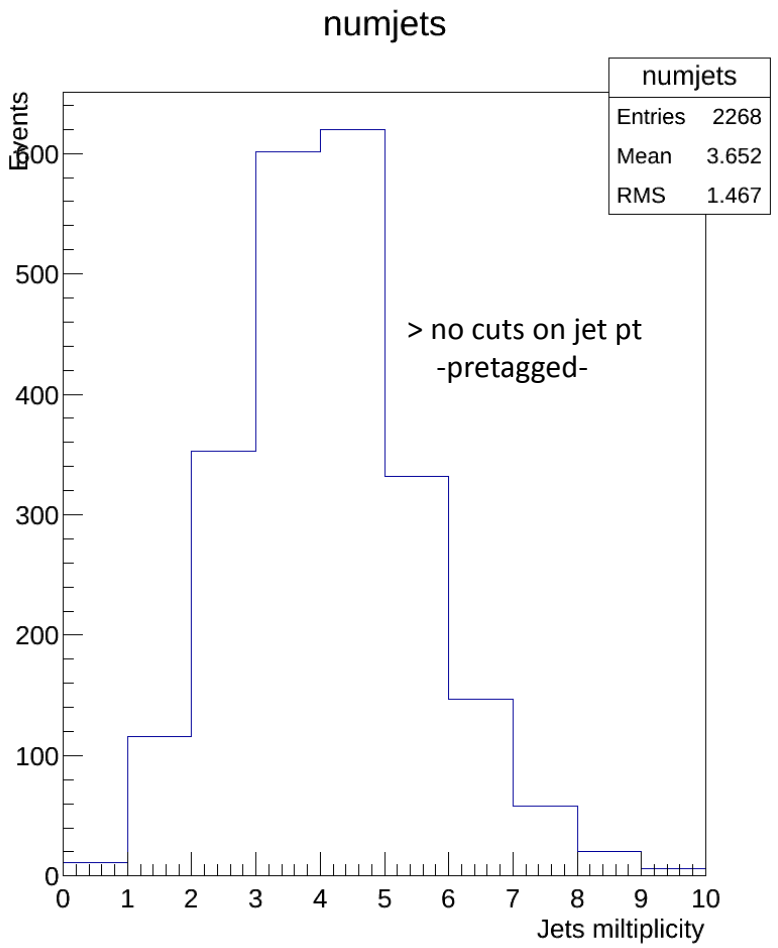
Bucket definition

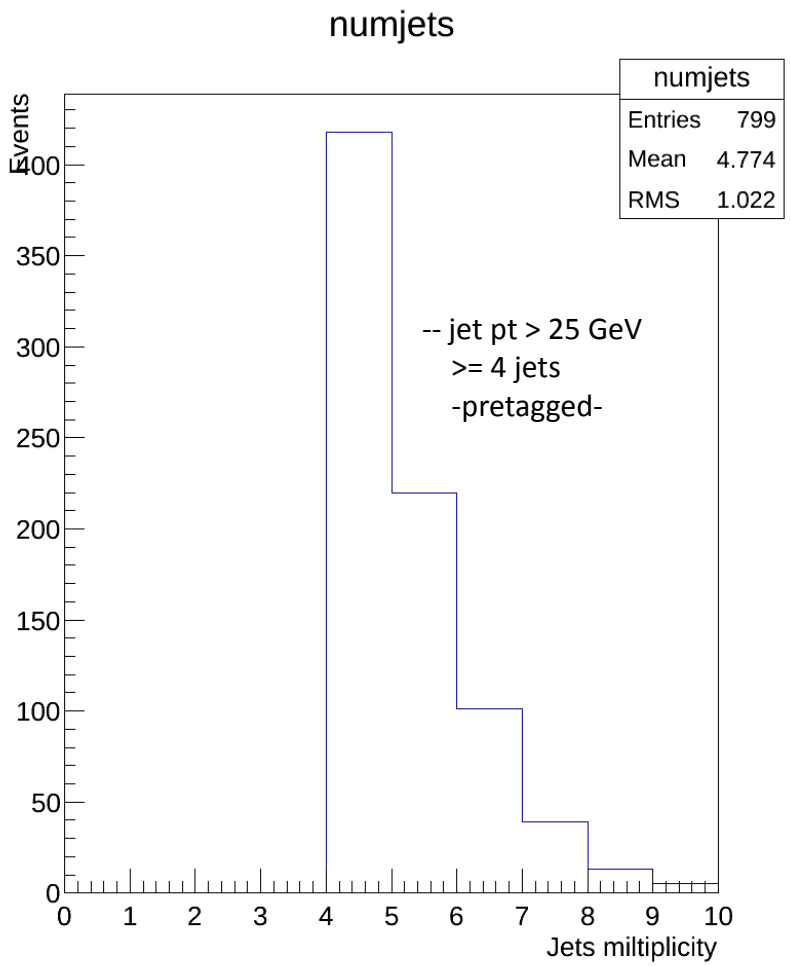
$$\Delta B_i = |m_B - m_T| \qquad (1)$$

$$m_{B_i}^2 = \sum_{j \in B_i} P_j \qquad (2)$$

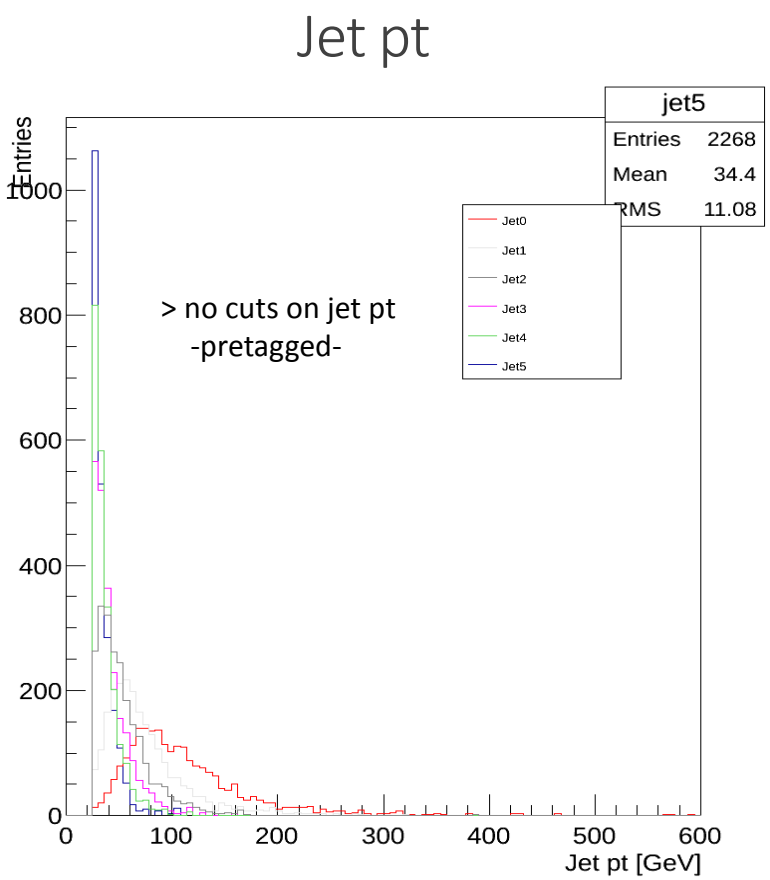
$$\Delta B_1 < \Delta B_2 \qquad (3)$$

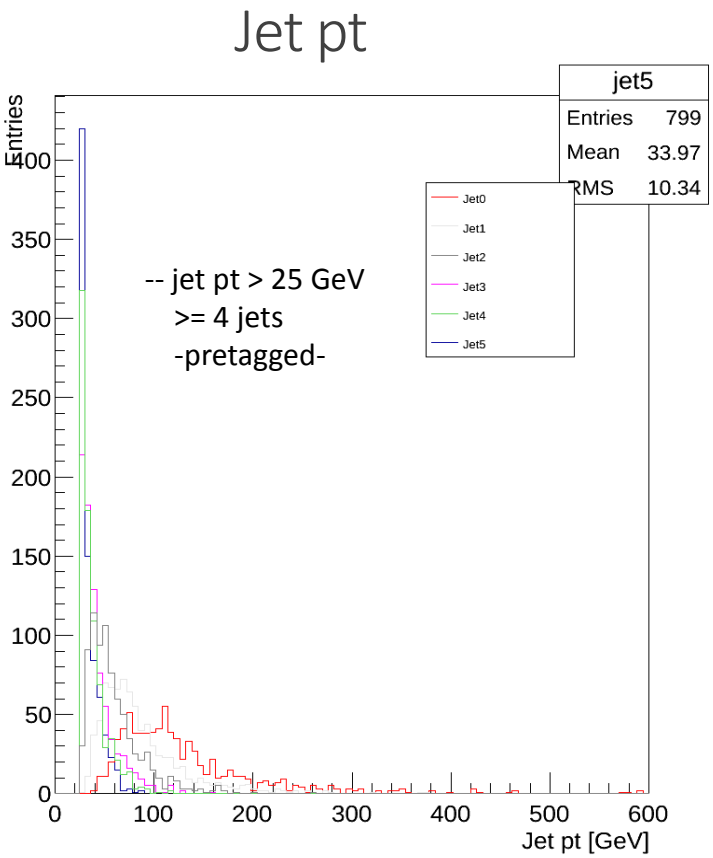
Jet multiplicity





Jet pt

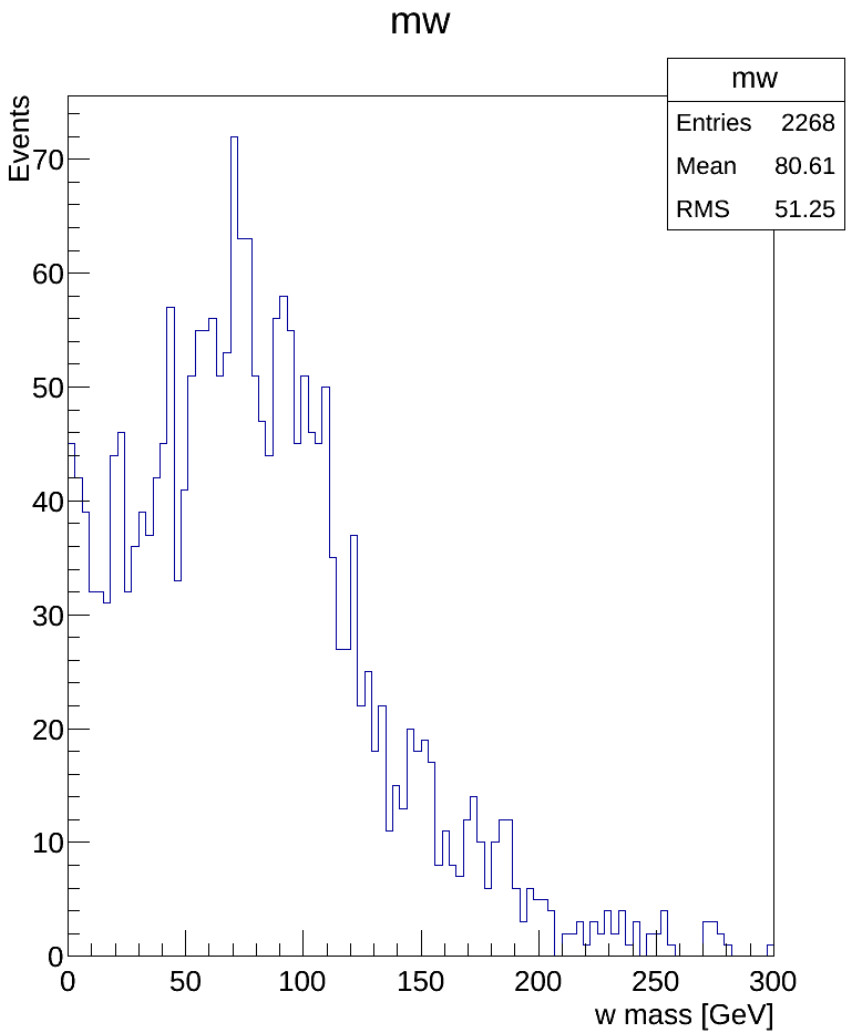

Jet pt
jet5
Entries 2268
Mean 34.4
RMS 11.08
Jet0
Jet1
Jet2
Jet3
Jet4
Jet5
> no cuts on jet pt
-pretagged-
Entries
Jet pt [GeV]


Jet pt
jet5
Entries 799
Mean 33.97
RMS 10.34
Jet0
Jet1
Jet2
Jet3
Jet4
Jet5
-- jet pt > 25 GeV
>= 4 jets
-pretagged-
Entries
Jet pt [GeV]

W transverse mass

$$M_t\,(w) = \sqrt{\left(2p_t^l p_t^v (1 - cos\varphi^l \varphi^v)\right)}$$

$$m_T^2 = m^2 + p_x^2 + p_y^2$$



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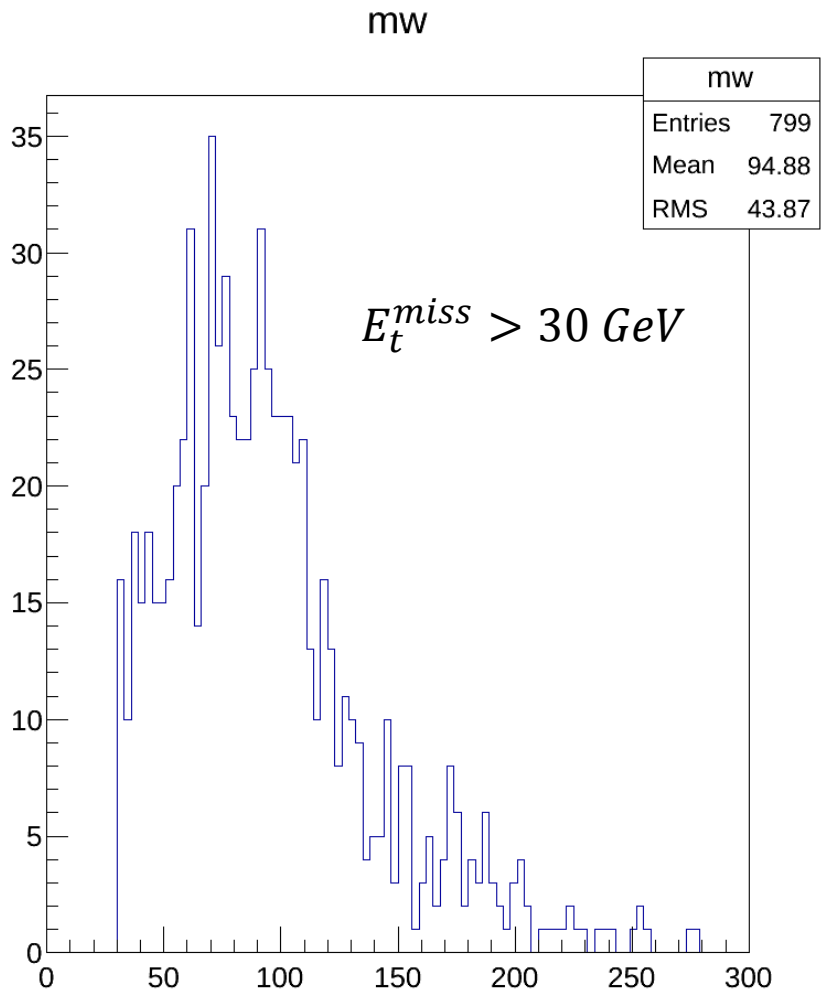
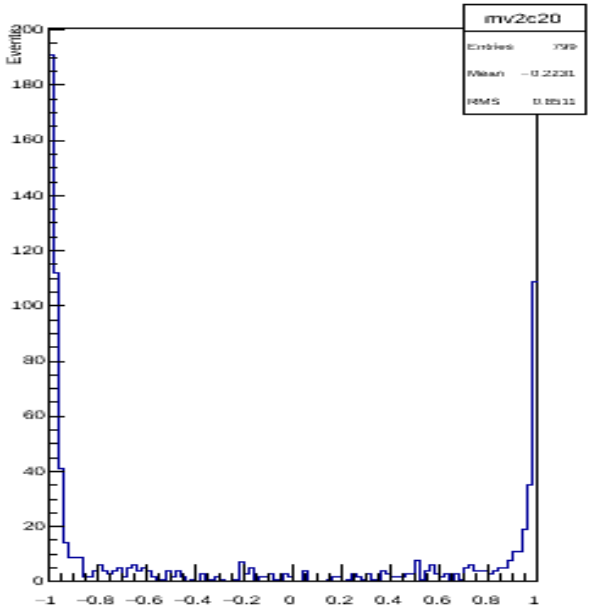
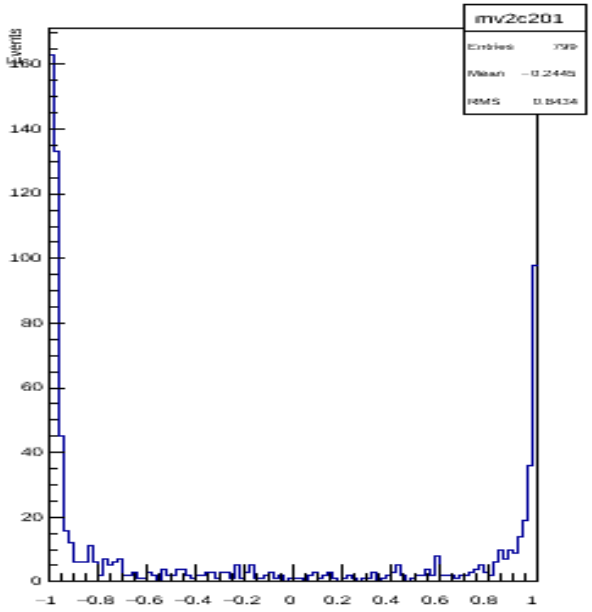


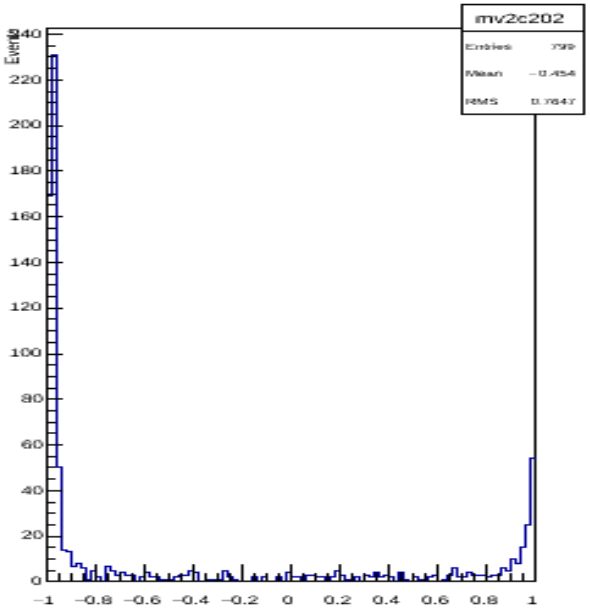
mv2c20



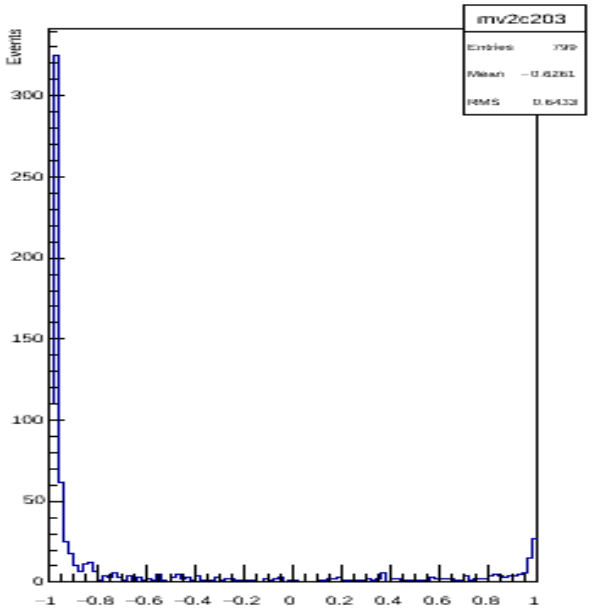
mv2c201



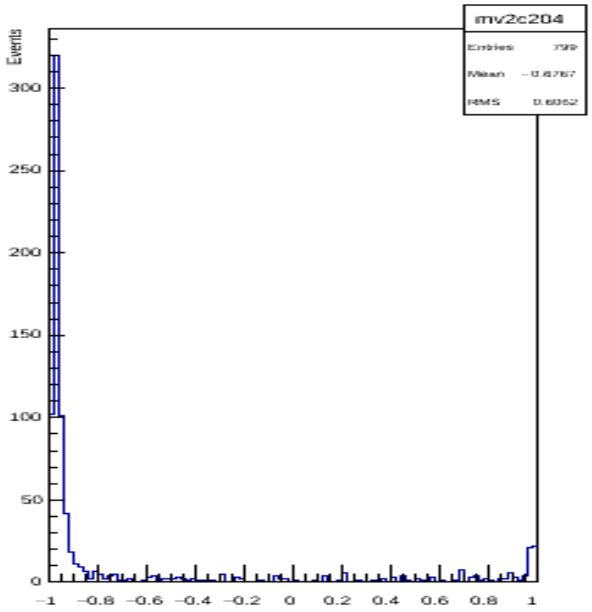
mv2c202



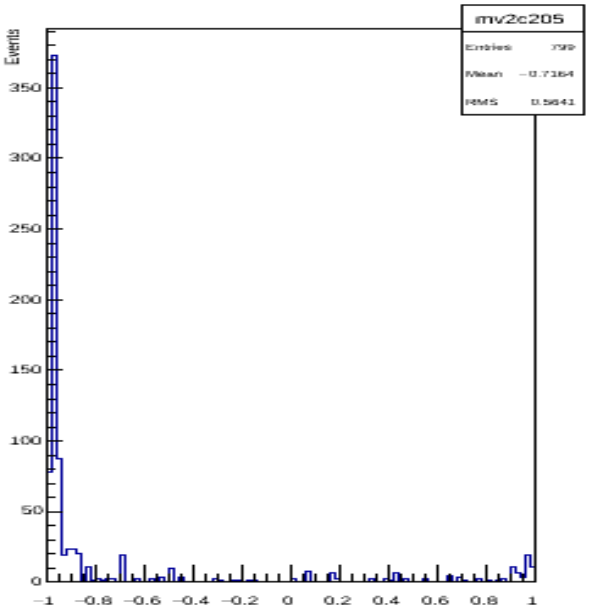
mv2c203



mv2c204



mv2c205



Further work

- Do more readings on : TTH / Top Bucket algorithm.
- Apply cuts on b tagged jets (and find the # of the b-tagged jets)
- Do the same analysis for TTH and compare.