2013 Michigan REU Program Second

Optimization of W Dijet Mass

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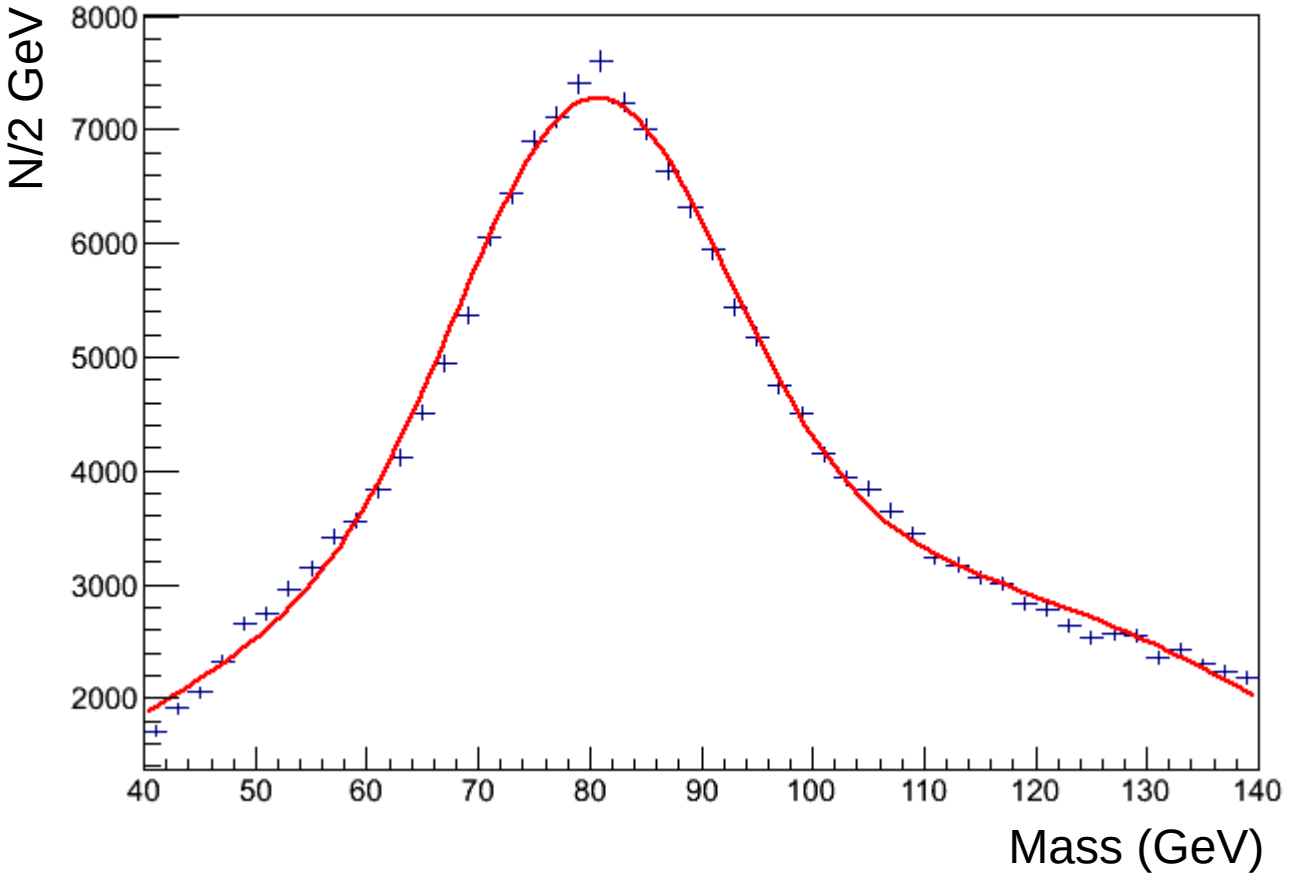
CMS

Compact Muon Solenoid

One of the main goals of the study is to show which jet algorithm gives the best W mass



Mass of dijets

I will be analyzing the effects of different jet recombination algorithms

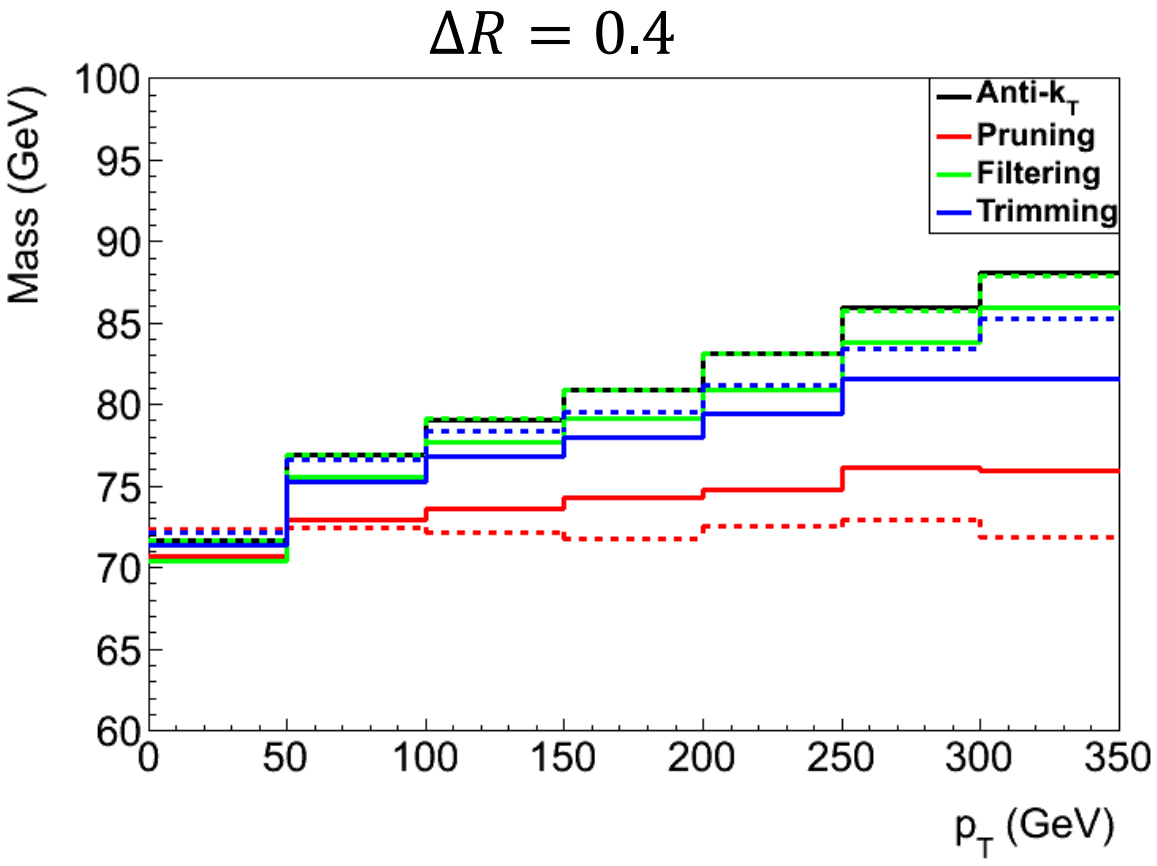
Pruning :

$$z \equiv \frac{\min(p_1, p_2)}{p_{T_P}} \qquad \Delta R_{ij} = \sqrt{\left(\Delta\phi_{ij}\right)^2 + \left(\Delta\eta_{ij}\right)^2}$$

$$z > z_{cut} \qquad \Delta R_{ij} > D_{cut} = \frac{m_J}{p_{T_J}}$$

Ellis, S. *et al.* arXiv:0912.0033

The cone algorithms and sizes affect the mass and width, which are functions of p_T



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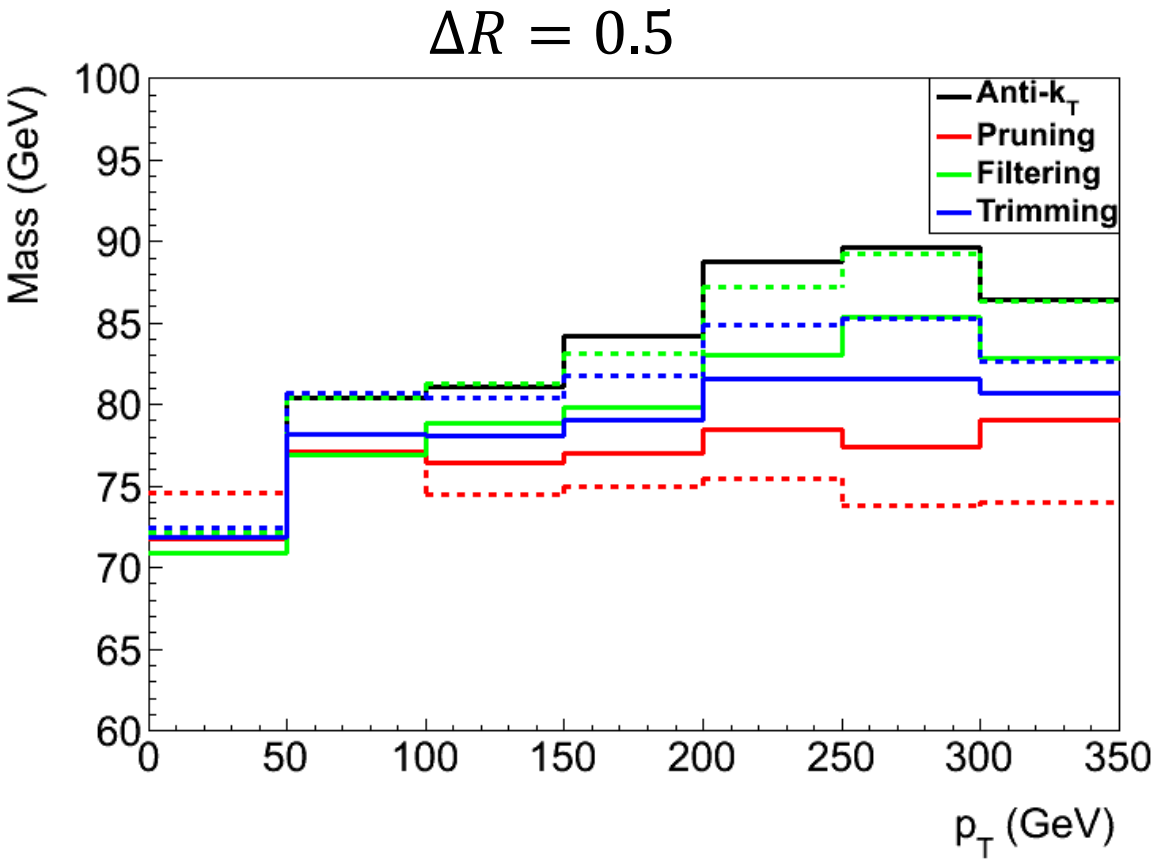

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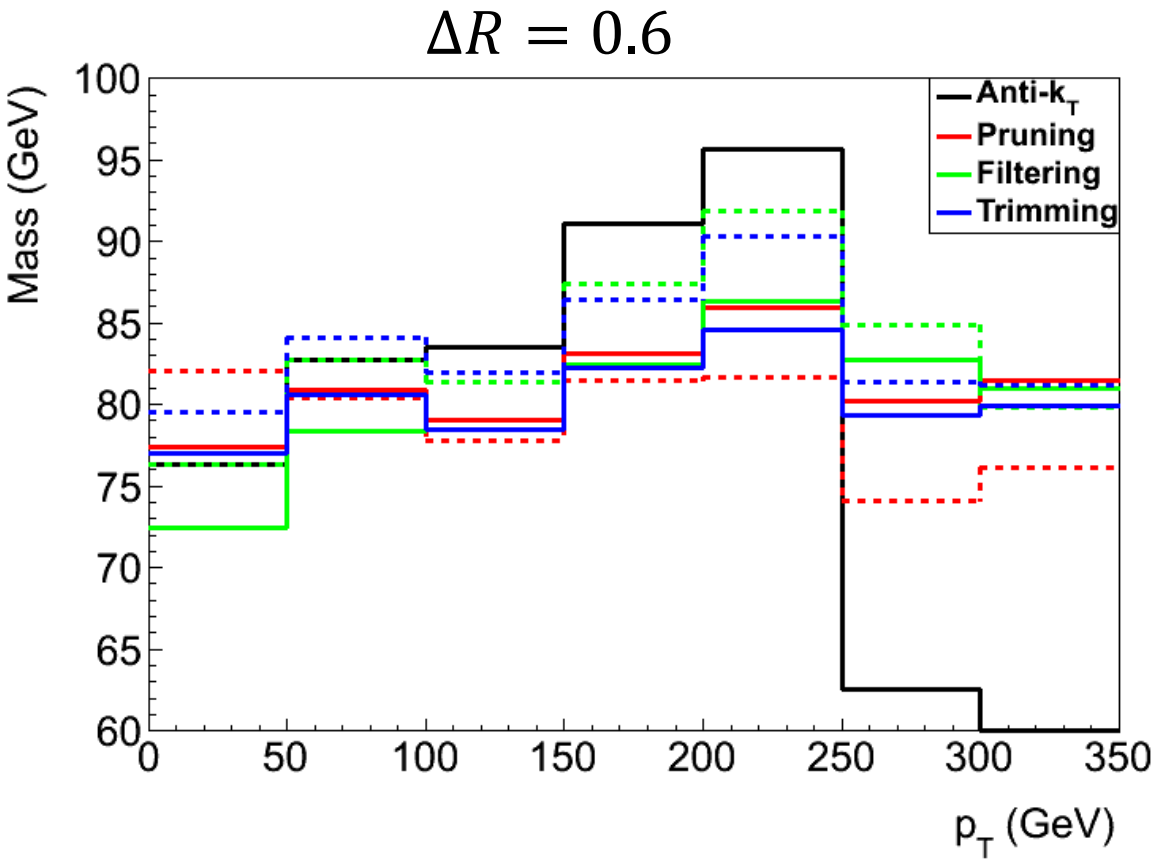
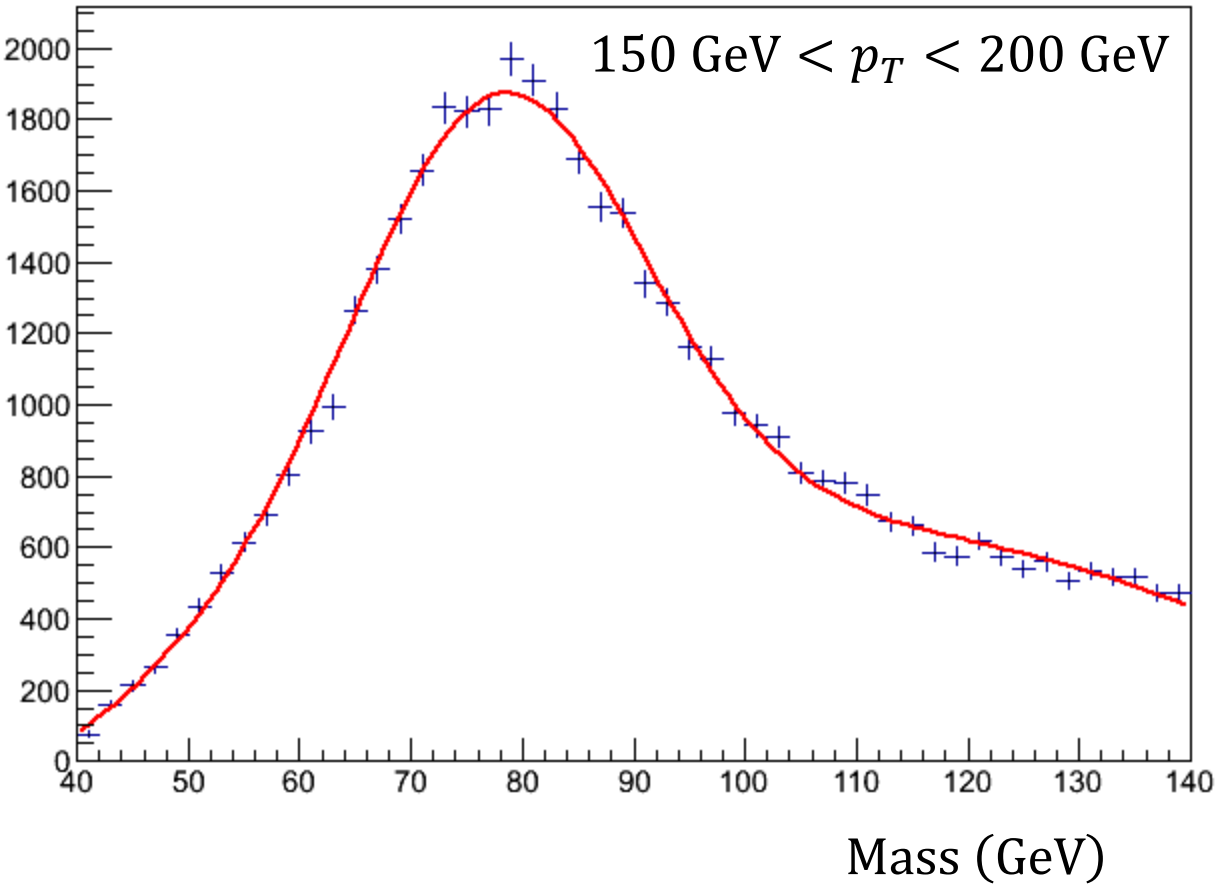


Dependence on p_T also needs to be understood



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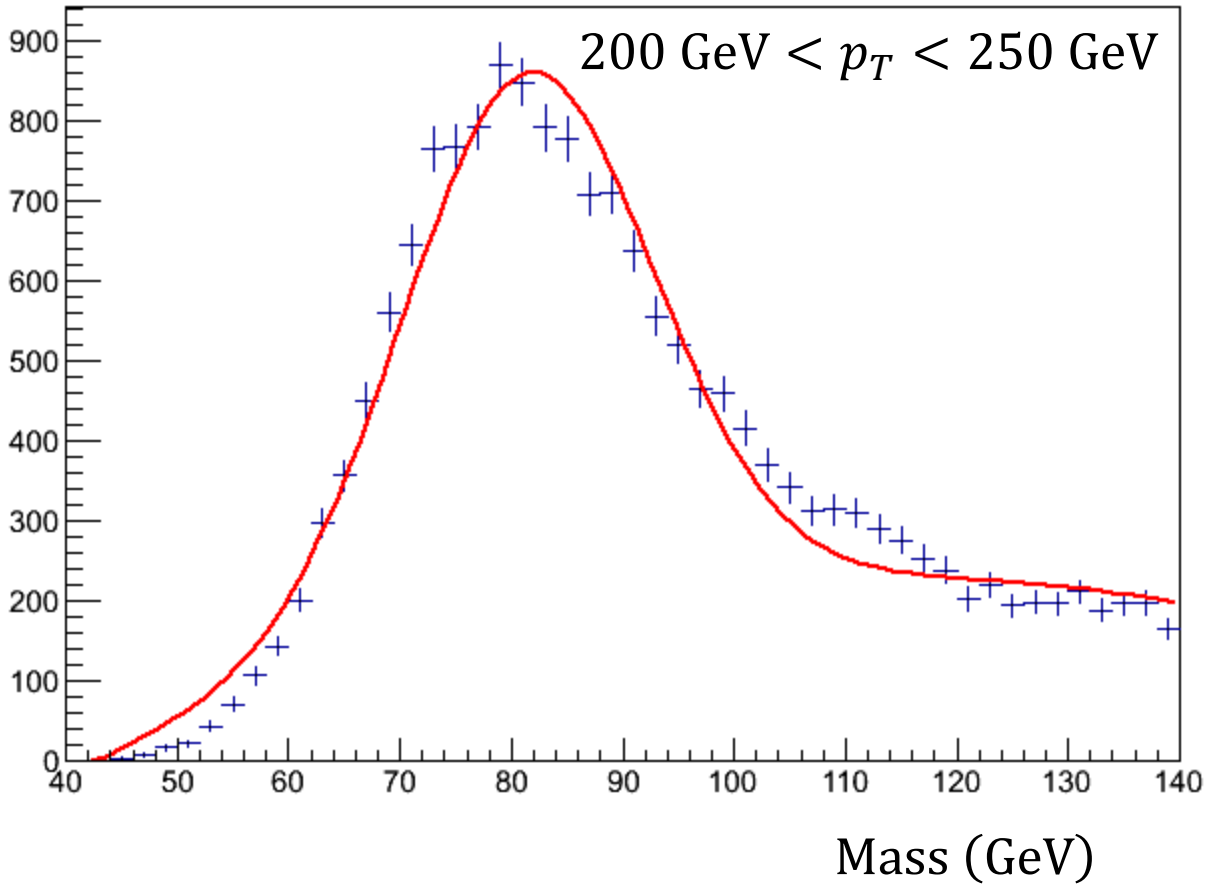

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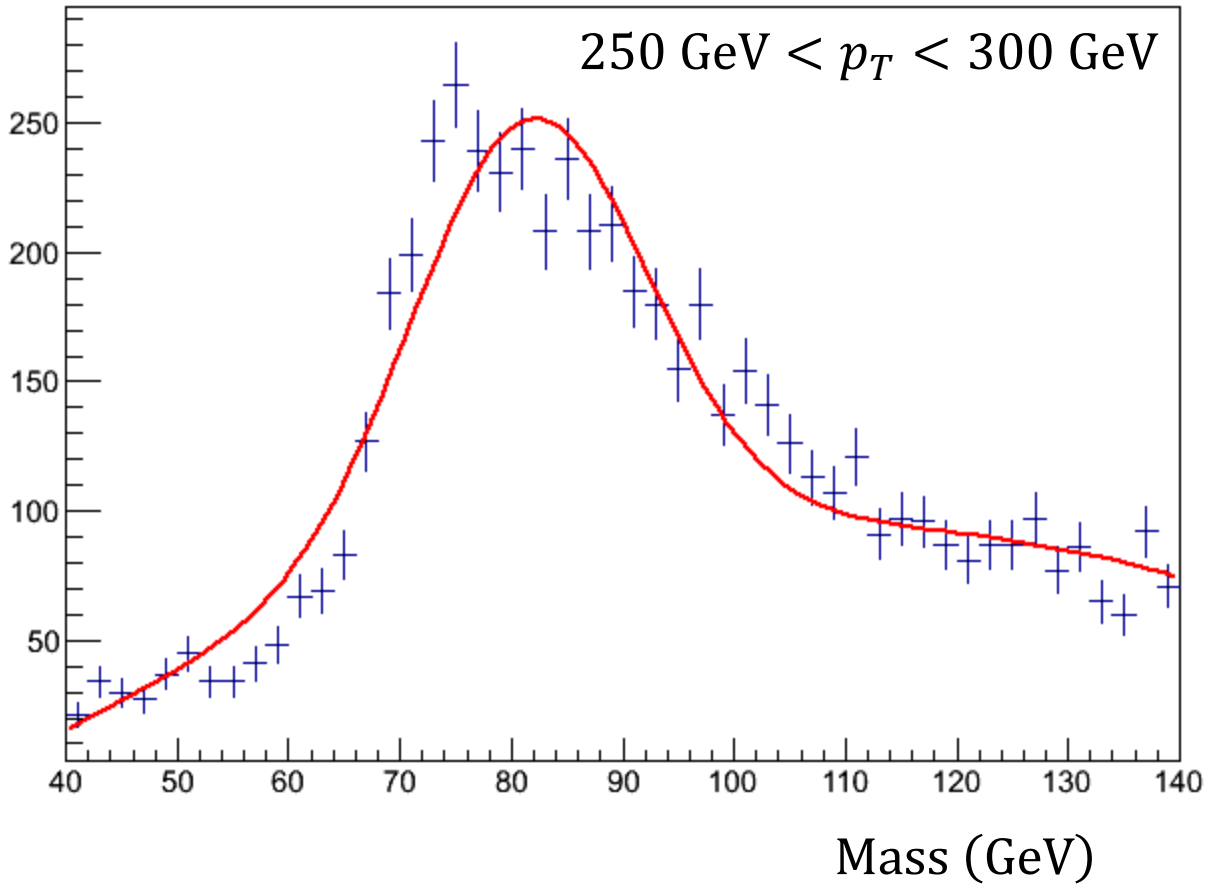

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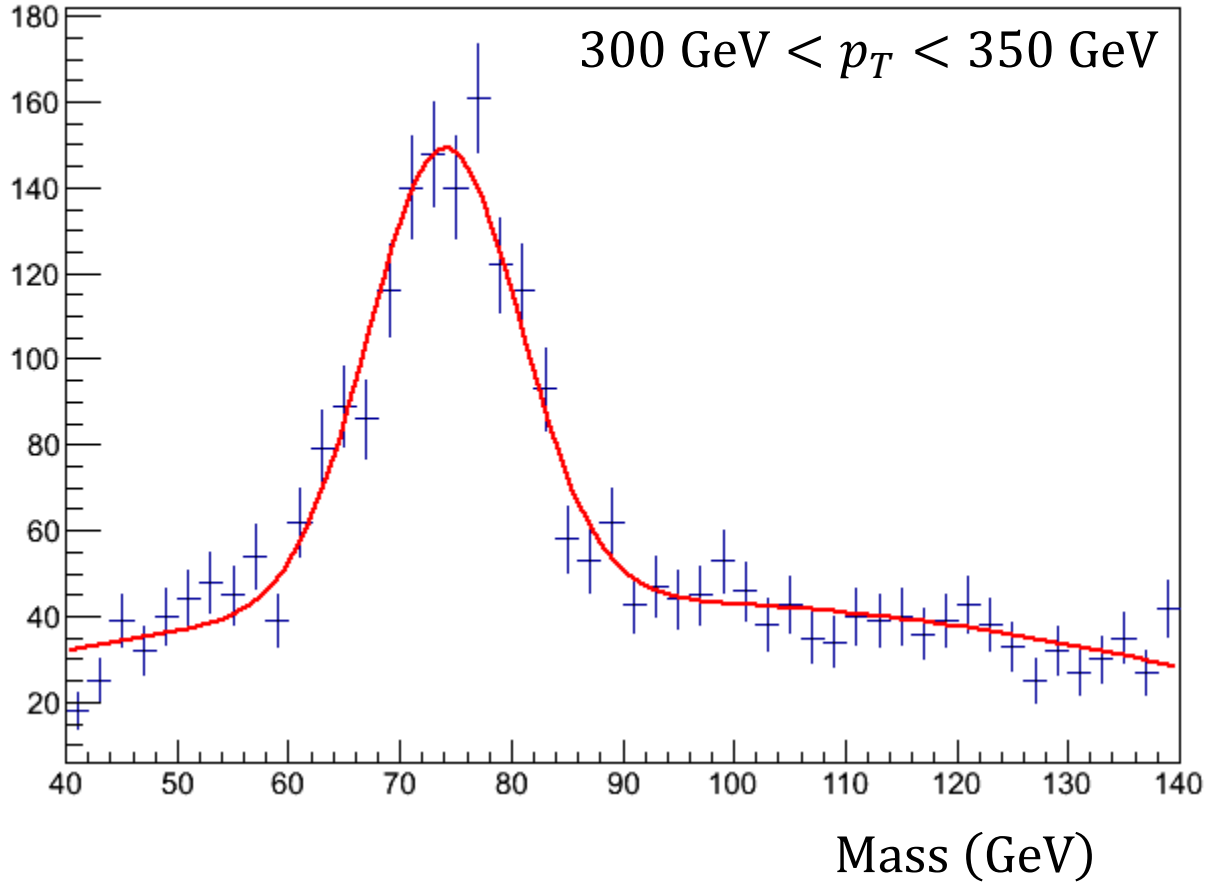
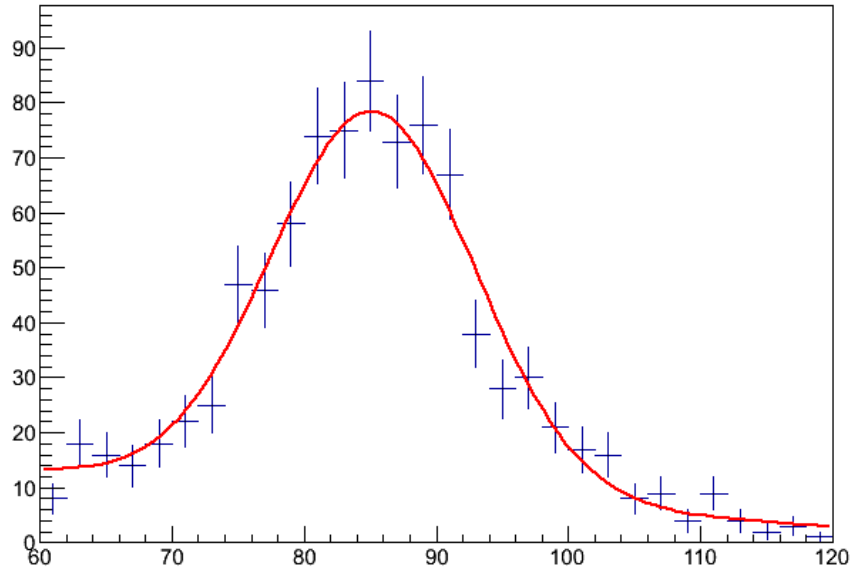
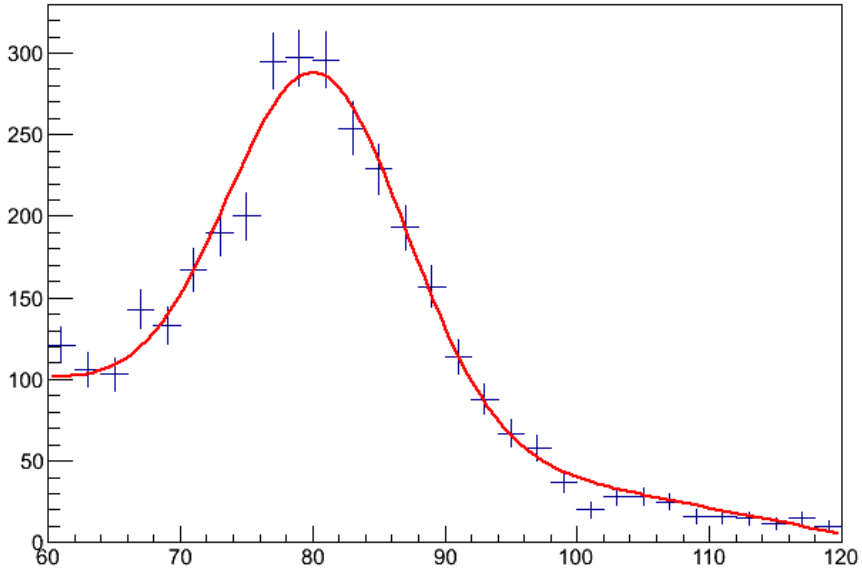


Since the W bosons are highly boosted, identifying single jet decays are also important

Mass Drop



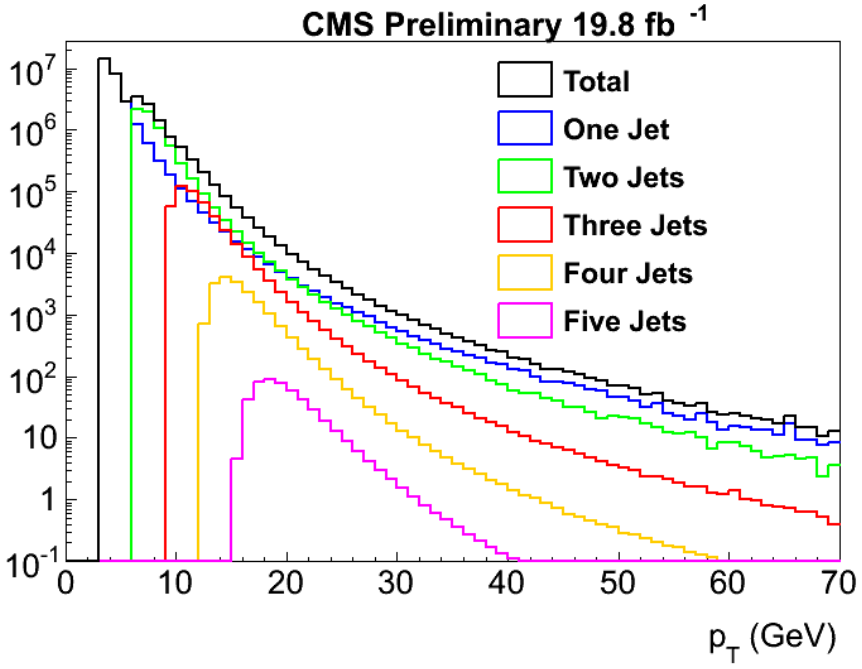
Pruning

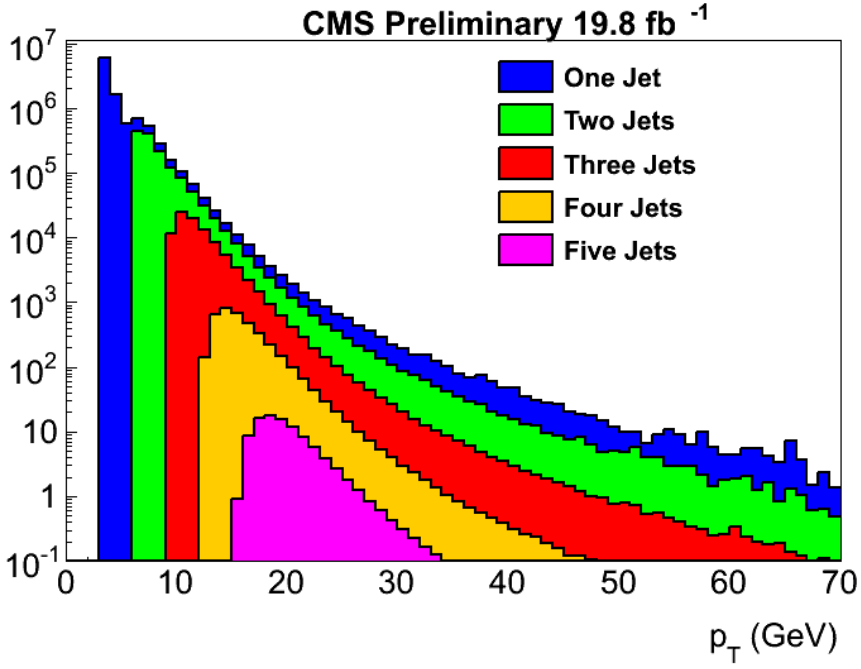


$$\Delta R = 0.6$$

A “quick and fun study” on pileup jets with Christian

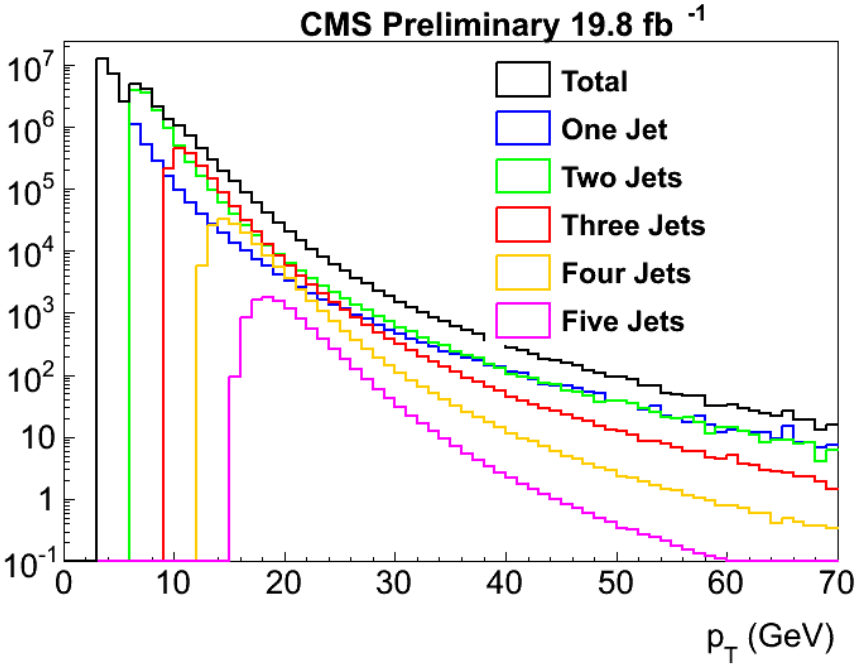
NPU = 10

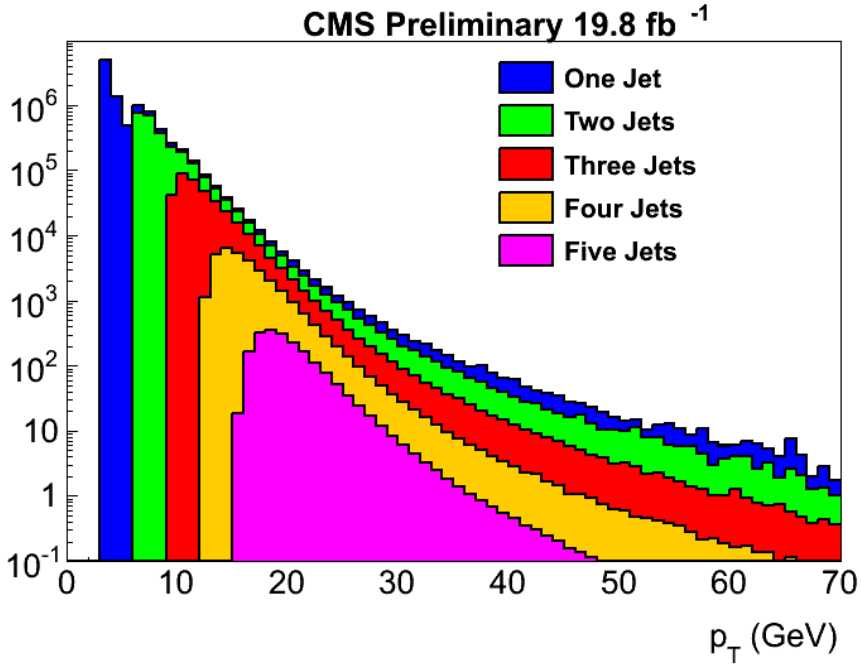




A “quick and fun study” on pileup jets with Christian

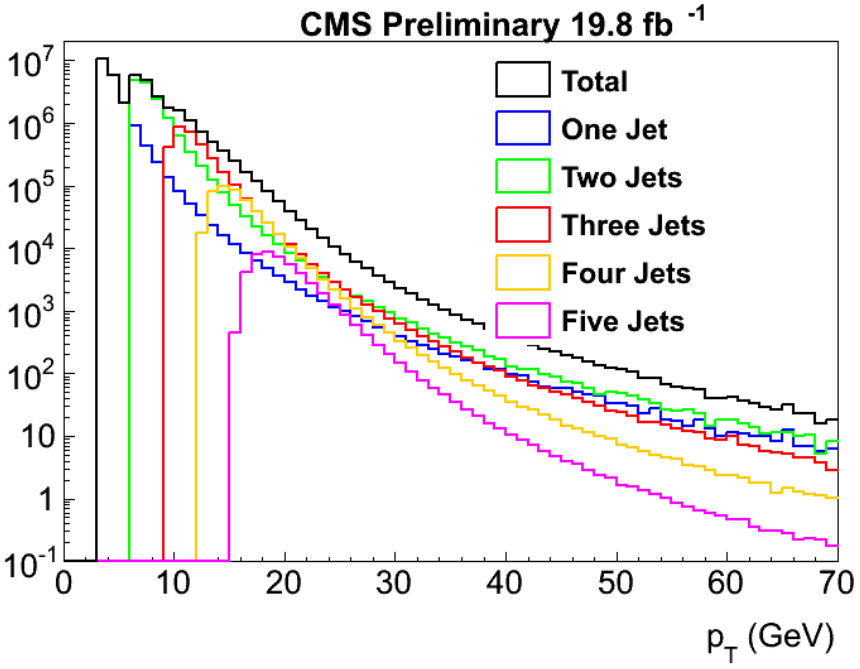
NPU = 20

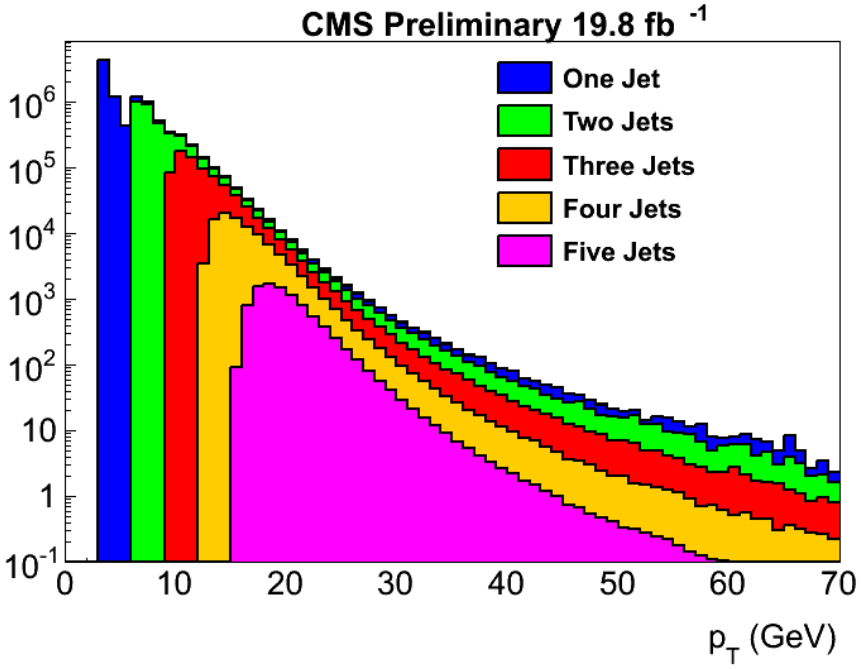




A “quick and fun study” on pileup jets with Christian

NPU = 30





A “quick and fun study” on pileup jets with Christian

NPU = 40