# Jet Cones With Top Flavour

## Measurement of the jet mass and top quark mass in hadronic decays of boosted top quarks with CMS

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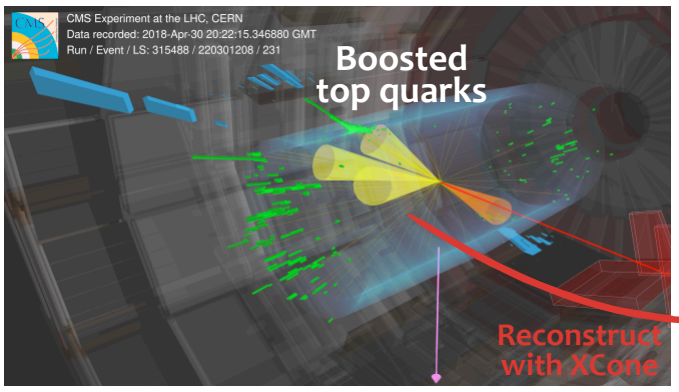
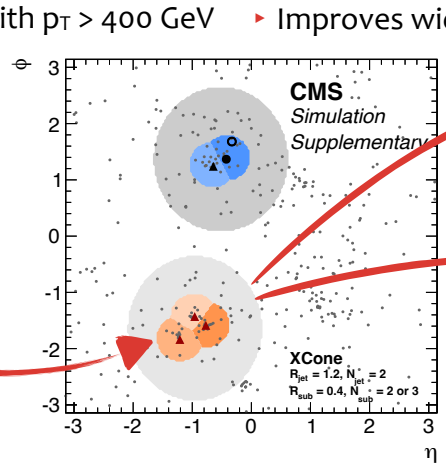
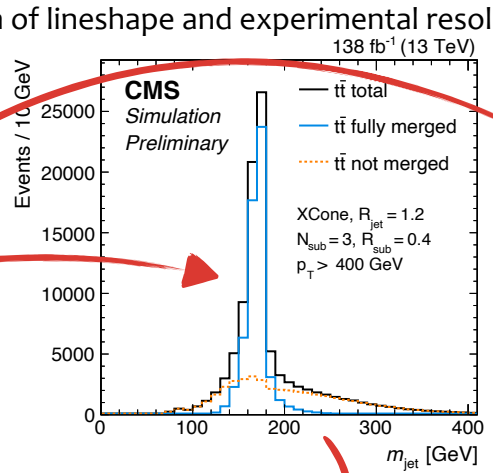
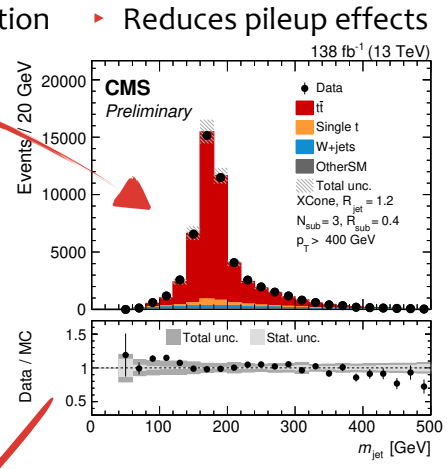
## Reconstruction with XCone

- Fully merged top decays contained in R=1.2 jets with $p_T$ > 400 GeV
- Improves width of lineshape and experimental resolution
- Reduces pileup effects

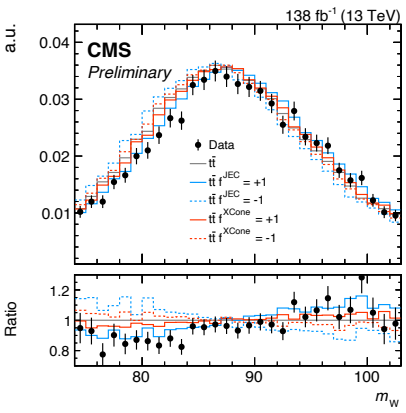


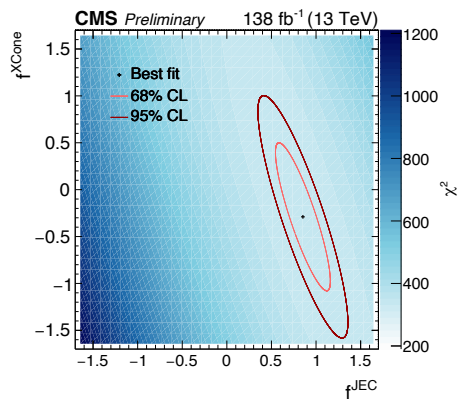



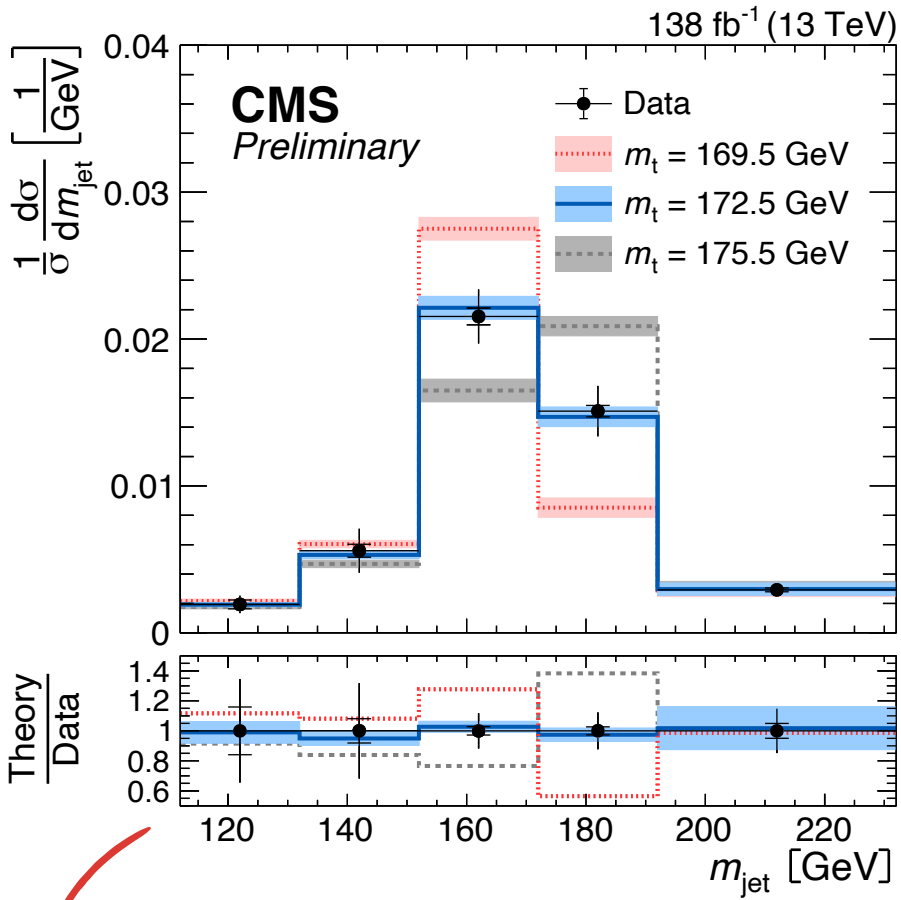

## Jet Mass Calibration



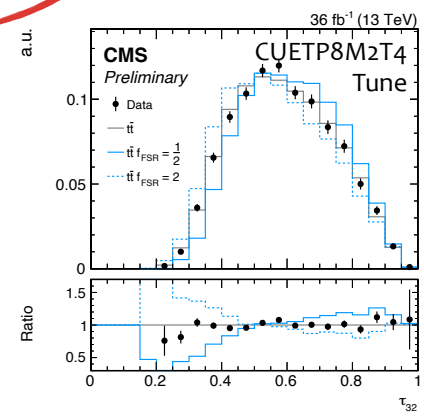

- Reconstruct $m_W$ using the two light-flavoured subjets
- Measure $m_W$ in four regions: $p_T$ < or > 300 GeV and $f_{PT}$ < or > 0.7 ($f_{PT}$ is the leading subjet $p_T$-fraction)
- Measure jet mass scale (JMS) using XCone and jet energy scale corrections

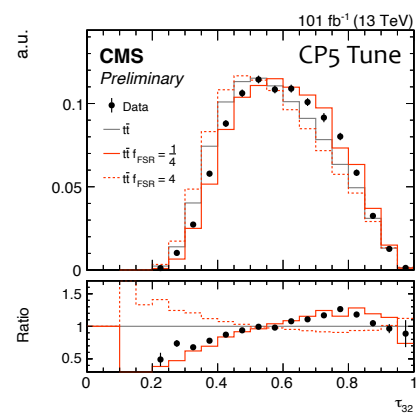
## Unfolded Measurement




- Normalised jet mass: high sensitivity to $m_t$
- Reduction of uncertainties: factor of three w.r.t. earlier measurement

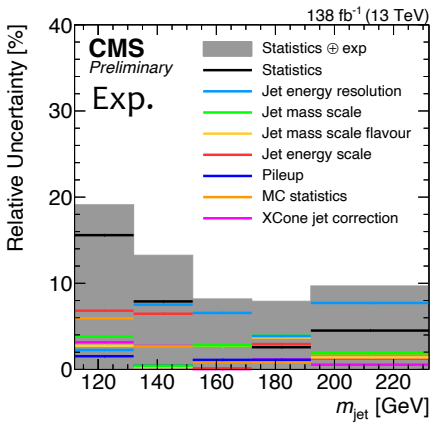
## Modelling

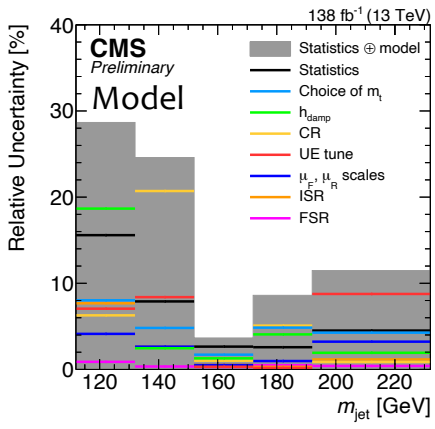



- Large uncertainty from modelling of final state radiation (FSR)
- Constrain FSR by measuring *N*-subjettiness ratio $\tau_{32} = \tau_3/\tau_2$
- Adjust $f_{FSR}$ in $\alpha_S^{FSR}(f_{FSR}\,\mu_0)$, equivalent to choosing different $\alpha_S^{FSR}(M_Z)$

## Uncertainties



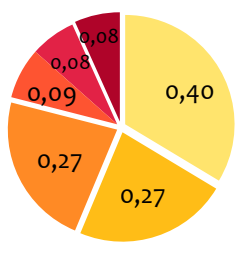

More Information:
CMS PAS-TOP-21-012

## Top Quark Mass

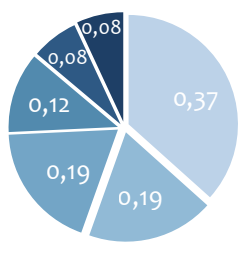
$$m_t = 172.76 \pm 0.81\,\text{GeV}$$

± 0.22 (stat) ± 0.57 (exp) ± 0.48 (model) ± 0.24 (theo) GeV

Experimental [GeV]




Model [GeV]

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