

# **tt+Njets cross section measurements Prospects & Plans**

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# Prospects & Plans

## What we try to measure:

*The  $t\bar{t}$  + 2jets cross section in the semi-leptonic mode of  $t\bar{t}$ , with proton-proton collisions using  $19.0 \text{ fb}^{-1}$  of data collected in CMS/LHC experiment at  $\sqrt{s} = 8 \text{ TeV}$ .*

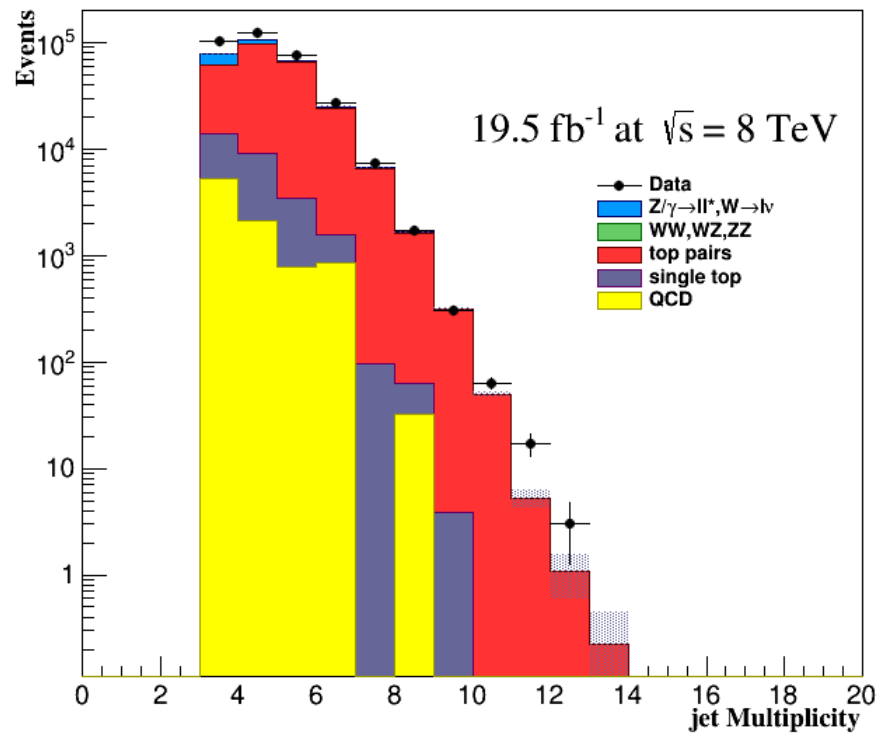
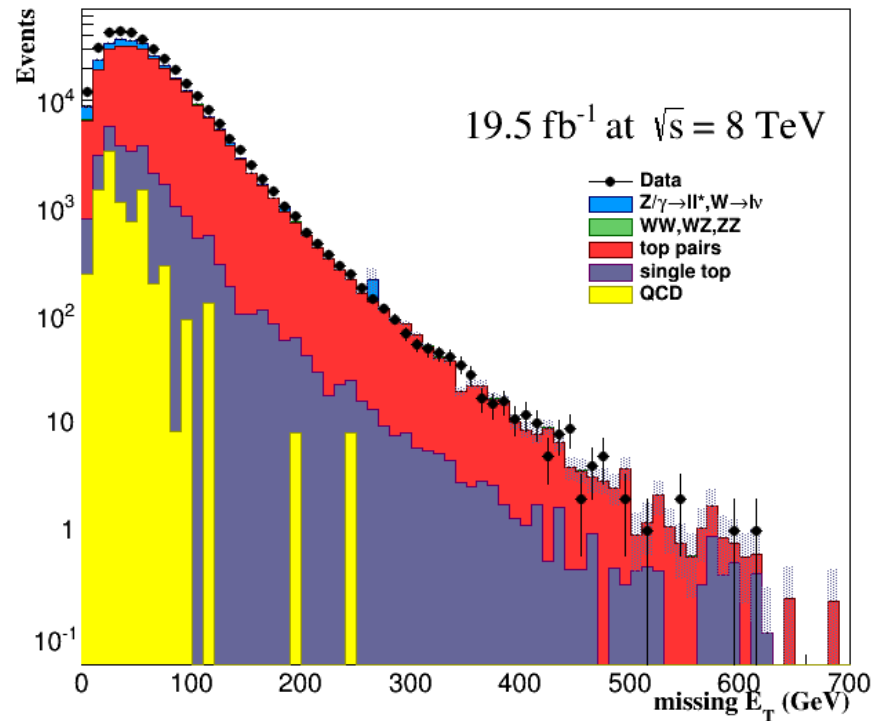
The analysis is performed in the electron + jets and the muon + jets channels.

After applying a first set of selection requirements a comparison of the data with different Monte Carlo generators is made. The agreement is good but not perfect. Many cross checks are required.

The differential  $t\bar{t}$  cross section in jet multiplicity bins is a good indicator of the MC ability to describe the data & a necessary cross check for the analysis. The jet multiplicity distribution is particularly sensitive to extra jets radiation.

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Resent results:



N.B. All SM processes are estimated from MC. No data-driven techniques applied yet.

Out of the box agreement is good but not perfect. Cross checks ongoing.

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$$\sigma \cdot \text{Br} = \frac{N_{\text{candidates}} - N_{\text{background}}}{\text{Acceptance} \cdot \text{Efficiency} \cdot L}$$

From Simulation

$$\epsilon_X = \epsilon_{\text{MC-X}} \times \rho_{\text{eff-X}},$$

External input

$$\rho_{\text{eff-X}} = \frac{\epsilon_{\text{TNP-X}}(\text{data})}{\epsilon_{\text{TNP-X}}(\text{MC})}$$

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## Next steps:

- Improve the agreement of MC with data by applying the correct scale factors and by estimating important backgrounds from data.
- Data driven techniques under study for Wjets & QCD multijets.
- Special methods should be developed for the assignment of the correct jets to the W from the top-quark decay.
- Several kinematic distributions of electrons, muons, jets (Pt, eta, phi), top mass & MT should be compared with data to be sure that the acceptance estimations from MC make sense.
- Cross sections in detector fiducial & corrected for the detector acceptance should be estimated and compared with theoretical predictions.