

Single top quark production in CMS

Matthias Komm*, on behalf of the CMS collaborations

Imperial College London (UK)

E-mail: Matthias.Komm@cern.ch

In this note, latest cross section measurements of single top production in the three main production modes, s -channel, t -channel, and W-associated by the CMS collaboration are presented using proton-proton collision data at centre-of-mass energies of 8 and 13 TeV.

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*Speaker.

1. Introduction

The single top quark production processes are excellent probes to test the predictions of electroweak interactions at the scale of the top quark mass and beyond. Inclusive single top quark cross section measurements can be used to infer the absolute value of the CKM matrix element V_{tb} in a model-independent manner whereas ratios of top quark over antiquark production cross sections are sensitive to the parton distribution function (PDF). In the following recent measurements of single top quark production via the s channel, W-associated, and t -channel are presented.

2. s-channel

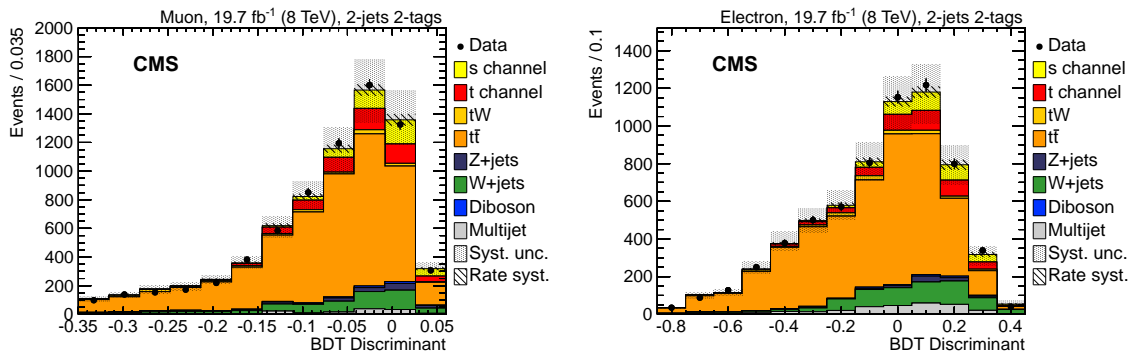


Figure 1: Ref. [1].

3. W-associated production

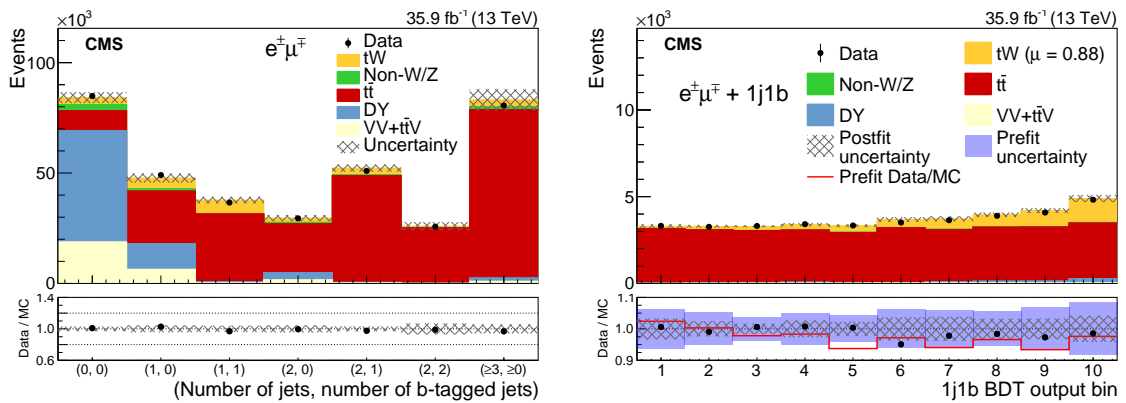


Figure 2: Ref. [2].

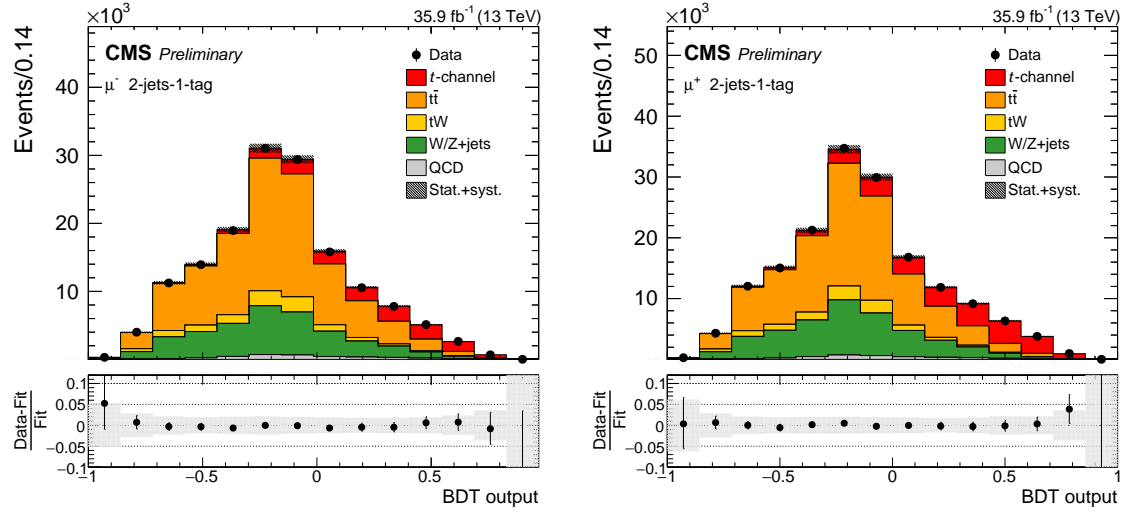


Figure 3: Ref. [3].

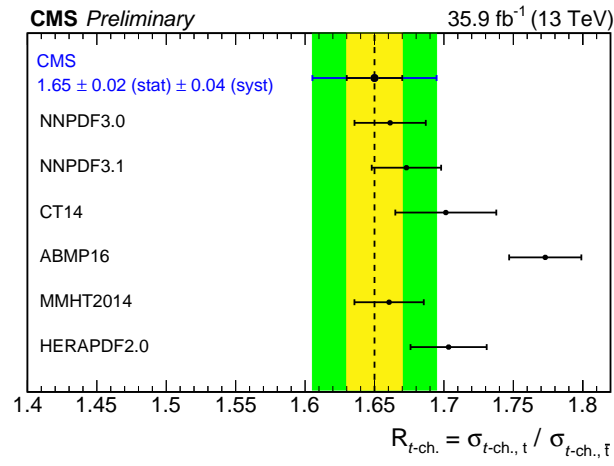


Figure 4: Ref. [3].

4. t -channel

5. Conclusion

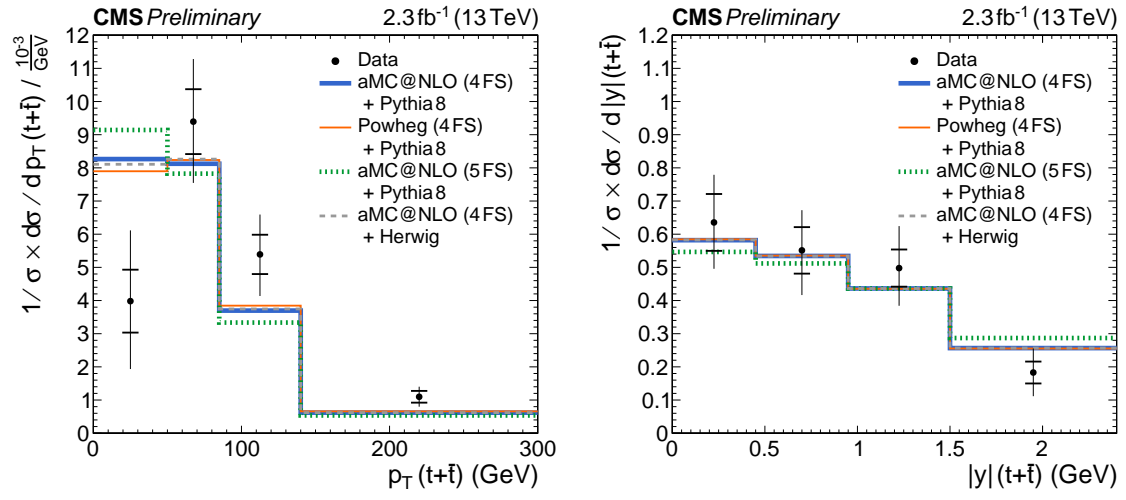


Figure 5: Ref. [4].

References

- [1] CMS Collaboration, *Search for s channel single top quark production in pp collisions at $\sqrt{s}=7$ and 8 TeV*, JHEP 09 (2016) 027, [arXiv:1603.02555](#).
- [2] CMS Collaboration, *Measurement of the production cross section for single top quarks in association with W bosons in proton-proton collisions at $\sqrt{s}=13$ TeV*, JHEP 10 (2018) 117, [arXiv:1805.07399](#).
- [3] CMS Collaboration, *Measurement of the single top quark and antiquark production cross sections in the t channel and their ratio in pp collisions at $\sqrt{s}=13$ TeV*, CMS-PAS-TOP-17-011, 2018, [cds.cern.ch/record/2628541](#).
- [4] CMS Collaboration, *Measurement of the differential cross section for t-channel single-top-quark production at $\sqrt{s}=13$ TeV*, CMS-PAS-TOP-16-004, 2016, [cds.cern.ch/record/2151074](#).