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Top-quark pole mass extraction at NNLO accuracy, from total, single- and double-differential cross sections for tt̄+X production at the LHC

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Reference: https://arxiv.org/abs/2311.05509

We extract the top-quark mass value in the on-shell renormalization scheme from the comparison of theoretical predictions for pp→tt_bar+X at next-to-next-to-leading order (NNLO) QCD accuracy with experimental data collected by the ATLAS and CMS collaborations for absolute total, normalized single-differential and double-differential cross-sections during Run 1, Run 2 and the ongoing Run 3 at the Large Hadron Collider (LHC). For the theory computations of heavy-quark pair-production we use the MATRIX framework, interfaced to PineAPPL for the generation of grids of theory predictions, which can be efficiently used a-posteriori during the fit, performed within xFitter. We take several state-of-the-art parton distribution functions (PDFs) as input for the fit and evaluate their associated uncertainties, as well as the uncertainties arising from renormalization and factorization scale variation. Fit uncertainties related to the datasets are also part of the extracted uncertainty of the top-quark mass and turn out to be of similar size as the combined scale and PDF uncertainty.

Presenters: ZENAIEV, Oleksandr;   ZENAIEV, Oleksandr (Hamburg University)

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