Measurements of differential cross sections for $t\bar{t}$ production at $\sqrt{s} = 13$ TeV with the CMS experiment

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Abstract

Precision tests of the Standard Model are of utmost importance in particle physics, not only in order to test existing theories but also to probe the realm of new physics. The top quark is of particular interest in this context as its heavy mass can link it to production- and decay-modes of new processes at higher energy scales. In this talk measurements of differential cross sections for $t\bar{t}$ production at $\sqrt{s} = 13$ TeV will be presented. The analysis is based on data obtained with the CMS experiment during 2016, 2017 and 2018 in Run 2 of the LHC, corresponding to an integrated luminosity of 137 fb^{-1}. In this period of time more than 100 million pp collisions with a $t\bar{t}$ pair in the final state have occurred and Run 2 therefore facilitates unprecedented precision in measurements of kinematic spectra and topologies in these events. The analysis is performed using the dileptonic decay channel. We perform differential measurements of the $t\bar{t}$ production cross section in bins of kinematic properties of the visible decay products, $t\bar{t}$ system and top quark.

In this talk the general analysis strategy will be presented. This includes an overview of the event selection, kinematic reconstruction of the $t\bar{t}$ system, cross section unfolding procedure and results for full Run 2 differential cross sections compared to MC predictions based on NLO QCD models matched to parton showers.