



Contribution ID: 90

Type: Young Scientist Forum

Measurement of top polarization and $t\bar{t}$ spin correlations at CMS 13 TeV

Friday, 26 April 2019 19:30 (10 minutes)

Measurements of the properties of the top quark can serve as stringent tests of the standard model (SM). To date, all the measurements of its pair and single production cross sections and properties indicate that it is indeed the top quark as predicted by the SM. However, moderate deviations from this expectation still cannot be ruled out. The spin density matrix of top quark pair production consists of coefficients which are affected by various discrete symmetry properties, making it a rich trove of information to search for effects beyond the SM. This talk describes the first measurement of top polarization and $t\bar{t}$ spin correlations at 13 TeV that are encoded in a systematic way into the spin density matrix, using data recorded by the CMS experiment in 2016. The measurements are found to be consistent with the SM prediction derived from Monte Carlo generators and analytic calculations at next to leading order QCD (+weak) accuracy. They are also used to derive the best constraint on the anomalous chromomagnetic moment of the top quark to date.

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Session Classification: Contributed talks