Contribution ID: **1514** Type: **Poster**

Observation of Entangled Top Quarks at the LHC measured with the CMS Detector at sqrt(s) = 13 TeV

Friday, 19 July 2024 20:45 (15 minutes)

We present the observation of entanglement in top quark pairs using data collected with the CMS detector in the 2016 Run II of the LHC. Event signatures are selected only when two high pT leptons are present consistent with the dileptonic decay channel. An entanglement proxy D is used to determine whether the top quark pairs are entangled in the production threshold with D < -⅓ signaling entanglement. D is observed (expected) to be −0.480^{+0.026}{*−0.029*} (*−0.467^{+0.026}*{−0.029}) at the parton level. The observed significance is 5.1 standard deviations with respect to the non-entangled hypothesis. This measurement provides a new probe of quantum mechanics at the highest energies ever produced.

Alternate track

I read the instructions above

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Track Classification: 04. Top Quark and Electroweak Physics