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## Entanglement of top quarks at CMS

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Present the observation of entanglement in top quark pairs using data collected with the CMS detector in the Run II of the LHC. Event signatures are selected only when two high  $p_T$  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  $D < -\frac{1}{2}$  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.

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