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Measurement of the top quark mass in the all- jets final state at root s=13 TeV and combination with the lepton plus jets channel

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Abstract

A top quark mass measurement is performed using 35.9 fb⁻¹ of LHC proton-proton collision data collected with the CMS detector at $\sqrt{s} = 13$ TeV. The measurement uses the tt all- jets final state. A kinematic fit is performed to reconstruct the decay of the tt system and suppress the multijet background. Using the ideogram method, the top quark mass (m_t) is determined, simultaneously constraining an additional jet energy scale factor (JSF). The resulting value of $m_t = 172.34 \pm 0.20$ (stat+ JSF) ± 0.70 (syst) GeV is in good agreement with previous measurements. In addition, a combined measurement that uses the tt lepton+ jets and all- jets final states is presented, using the same mass extraction method, and provides an m_t measurement of 172.26 ± 0.07 (stat+ JSF) ± 0.61 (syst) GeV. This is the first combined m_t extraction from the lepton+ jets and all- jets channels through a single likelihood function.

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