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High-precision measurement of the W boson mass with the Compact Muon Solenoid (CMS) experiment

The goal of precision physics is to perform extremely accurate and consistent measurements in order to test fundamental theories, understand the limits of current models, and search for new physics.

In the standard model of particle physics, the masses of the carriers of the weak interaction, the W and Z bosons, are uniquely related, and a precise determination of their values is important because heavy, as-yet undiscovered particles could modify this relationship. While the Z mass is known to a remarkable precision, the W mass measurement is less precise. Achieving an experimental precision comparable to the theoretical uncertainty of 6 MeV would provide a sensitive and fundamental test of the standard model.

We present here the measurement of the W mass by the CMS Collaboration at the Large Hadron Collider, based on a large data sample collected in 2016 from proton-proton collisions at a centre-of-mass energy of 13 TeV.

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