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Measurement of the weak mixing angle using the forward–backward asymmetry of Drell–Yan events in p p collisions at 8 TeV (Article) (Open Access)

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Abstract

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A measurement is presented of the effective leptonic weak mixing angle ($\sin^2\theta^{\ell}_{\text{eff}}$) using the forward–backward asymmetry of Drell–Yan lepton pairs ($\mu\mu$ and e e) produced in proton–proton collisions at $\sqrt{s}$=8TeV at the CMS experiment of the LHC. The data correspond to integrated luminosities of 18.8 and 19.6fb-1 in the dimuon and dielectron channels, respectively, containing 8.2 million dimuon and 4.9 million dielectron events. With more events and new analysis techniques, including constraints obtained on the parton distribution functions from the measured forward–backward asymmetry, the statistical and systematic uncertainties are significantly reduced relative to previous CMS measurements. The extracted value of $\sin^2\theta^{\ell}_{\text{eff}}$ from the combined dilepton data is $\sin^2\theta^{\ell}_{\text{eff}}$=0.23101±0.00036(stat)±0.00018(syst)±0.00016(theo)±0.00031(parton distributions in proton)=0.23101±0.00053. © 2018, CERN for the benefit of the CMS collaboration.

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