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Measurement of the W-boson rapidity, helicity, and differential cross sections in CMS

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The differential cross section and charge asymmetry for inclusive W boson production at $\sqrt{s} = 13$ TeV is measured for the two transverse polarization states as a function of the W boson absolute rapidity. The measurement uses events in which a W boson decays to either an electron or a muon and a neutrino. The data sample of proton-proton collisions recorded with the CMS detector at the LHC in 2016 corresponds to an integrated luminosity of 36 fb⁻¹. The absolute differential cross section, and its value normalized to the total inclusive W boson production cross section, are measured over the rapidity range $|Y_W| < 2.5$. In addition, the W boson double-differential cross section, $d^2\sigma/dp_T d|\eta|$, and the charge asymmetry, are measured as a function of the charged lepton transverse momentum and pseudorapidity.

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