

Precision Measurements of the weak mixing angle, A new era of Precision Electroweak Measurements at the LHC

Arie Bodek,
University of Rochester
September 8, 2026

In the Standard Model (SM), the effective leptonic mixing weak angle and the mass of the W boson can be predicted to very high accuracy by using the experimental values of the mass of the Z boson (M_Z), the Fermi constant, the fine structure constant, the mass of Higgs boson, the quark masses, and the value of the Quantum Chromodynamics (QCD) strong coupling at M_Z . Therefore, deviations of measurement from SM predictions can be indications of new physics. With recent advances in experimental and analysis techniques, measurements of the weak mixing angle at the Large Hadron Collider (LHC) extracted from the forward-backward asymmetry (A_{FB}) in Drell-Yan dilepton events, can be more precise than previously published measurements at e^+e^- collider experiments. In this talk we report on precise extractions of the mixing from an updated analysis of A_{FB} in Drell-Yan dilepton events at the Large Hadron Collider (LHC) at 13 TeV published by the CMS and

LHCb collaborations, and outlook for future measurements, In addition, we discuss current and future measurements at the LHC of the running of the mixing angle with scale (up to 3 TeV).