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The global electroweak fit at NNLO and constraints on new physics

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We present an update of the global electroweak fit using electroweak next-to-next-to-leading order (NNLO) calculations for all precision observables that enter the fit. The availability of NNLO corrections allows for the first time the inclusion of realistic estimates of theoretical uncertainties due to missing higher order calculations. The knowledge of the mass of the Higgs boson improves the precision of the predictions in the global electroweak fit considerably and the global fits are used as powerful tools to assess the validity of the Standard Model and to constrain scenarios for new physics.
We present updated constraints on a model with modified Higgs couplings to bosons and fermions, two Higgs doublet models, and dimension-6 operators. We show that in many cases the Higgs signal strength measurements give complementary information to constraintes obtained from electroweak precison observables.
Future measurements at the LHC and an expected electron-positron collider promise to improve the experimental precision of key observables used in the fit. We assess the influence of present and future experimental and theoretical sources of systematic uncertainties on the fit predictions.

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