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Understanding the Top Quark Fifteen Years After Its Discovery

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The discovery of the top quark in 1995, by the D0 and CDF collaborations, was the culmination of nearly two decades of intense research at accelerators around the world. Since then, both collaborations have done precise measurements of the top quark properties, in particular its mass and production cross section. The top quark's large mass, by far the heaviest fundamental particle known, makes it a unique probe of physics at the natural electroweak scale. Precision measurements of the top mass, width and couplings may therefore lead to a deeper understanding of electroweak symmetry breaking and the origin of mass. Such measurements are possible in part because the top quark's natural width of 1.4GeV is much greater than the hadronization timescale set by Λ_{QCD}, causing the top quark to decay to a real W boson and a bottom quark before hadronization. The top quark can therefore be completely described by perturbative QCD, and studied as a bare quark. Precision studies of this unconventional quark are considered high priorities at hadron collider machines (Tevatron and LHC) and studies for future accelerators, and are unanimously accepted as a worldwide scientific priority. In this talk I will summarize our current understanding of the properties of this intriguing particle, present the latest results from the Tevatron experiments, and review the prospects of the future top quark physics program both at the Tevatron and the LHC.