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Measuring the running top-quark mass

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We present the first direct determination of the running top-quark mass based on the total cross section of top-quark pair-production as measured at the Tevatron.
Our theory prediction for the cross section includes various next-to-next-to-leading order QCD contributions, in particular logarithmically enhanced terms near threshold, the Coulomb corrections at two loops and all explicitly scale dependent terms at NNLO accuracy.
For Tevatron and LHC we study the dependence of the cross section on the renormalization and
and factorization scale, on the parton luminosity and on the top-quark mass using both the conventional pole mass definition as well as the running mass in the MS scheme.
We extract for the top-quark an MS mass of m(μ = m) = 160.0+3.3−3.2GeV, which corresponds to a pole mass of mt = 168.9+3.5−3.4GeV. We observe that extracted value for the running mass is
remarkable stable with respect to the perturbative order.

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