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Precision Higgs Physics

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The future of the high energy physics program will increasingly rely upon precision studies looking for deviations from the Standard Model. Run I of the Large Hadron Collider (LHC) triumphantly discovered the long-awaited Higgs boson, and there is great hope in the particle physics community that this new state will open a portal onto a new theory of Nature at the smallest scales. A precision study of Higgs boson properties is needed in order to test whether this belief is true. New theoretical ideas and high-precision QCD tools are crucial to fulfill this goal. They become even more important as larger data sets from LHC Run II further reduce the experimental errors and theoretical uncertainties begin to dominate. In this talk, I will review recent progress in understanding Higgs properties,including the calculation of precision predictions needed to identify possible physics beyond the Standard Model in the Higgs sector. New ideas for measuring the Higgs couplings to light quarks as well as bounding the Higgs width in a model-independent way will be discussed. Precision predictions for Higgs production in association with jets and ongoing efforts to calculate the inclusive N^3LO cross section will be reviewed.