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Higher-order QCD corrections to the Higgs decay into bottom quarks from Padé approximants

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We employ the method of Padé approximants to study the higher-order corrections of the massless scalar-current quark correlator. We begin by testing this method in the large-β_0 limit of QCD, where the perturbative series is known to all orders, using it as a testing ground to determine the best strategy to build the series at higher orders using only the first four coefficients. Applying the procedure in QCD, we estimate the yet unknown coefficient of order α_s^5 (six loops) of the imaginary part of the correlator, directly related to $\Gamma(H \rightarrow b\bar{b})$, in a model-independent way as -6900 ± 1400. We conclude that with this correction the series is almost insensitive to renormalization scale variations. This corroborates that the QCD corrections to this decay are under excellent control and the uncertainty of $\Gamma(H \rightarrow b\bar{b})$ will continue to be dominated by the Standard Model parameters in the near future, mainly the strong coupling and the bottom-quark mass.

In-person participation

Yes

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