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Renormalization-group and $Padé$-improved Higgs to two gluons decay rate

Tuesday 13 December 2022 14:00 (1 hour)

We investigate the renormalization group scale dependence of the $H \to gg$ decay rate at the order N^4LO in renormalization-group summed perturbative theory, which employs the summation of all renormalization-group accessible logarithms including the leading and subsequent four sub-leading logarithmic contributions to the full perturbative series expansion. The attractive advantage of this approach is the closed-form analytic expressions, which represent the summation of all RG-accessible logarithms in the perturbative series that is known to a given order. The new renormalization-group summed expansion for the $H \to gg$ decay rate shows an improved behaviour by exhibiting a reduced sensitivity to the renormalization-group scale. The largest uncertainty in the determination of the $H \to gg$ decay width in this work arises due to the 1% change in the strong coupling constant $\alpha_s(M_Z^2)$, and is in the range $(2.3 - 2.6)\%$. We also improve the $H \to gg$ decay rate by estimating the higher order corrections through the asymptotic $Padé$ approximant method.

Session

Heavy Ions and QCD

Author: RES. SCHOLAR, PHYSICS, IIT(BHU), VARTIKA SINGH (Indian Institute of Technology, BHU)

Co-authors: Ms JAIN, Astha (Indian Institute of Technology, BHU); Dr ABBAS, Gauhar (Indian Institute of Technology, BHU); Ms SINGH, Neelam (Indian Institute of Technology, BHU)

Presenter: RES. SCHOLAR, PHYSICS, IIT(BHU), VARTIKA SINGH (Indian Institute of Technology, BHU)

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