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Takuya Agemura ”On Λ_QCD^2/m renormalons of pole mass and interquark potential”

Wednesday, 8 November 2023 10:00 (25 minutes)

Discovery of the cancellation of O(Λ_QCD) renormalons in the QCD potential and quark pole masses improved dramatically our understanding of the quark masses, and furthermore, enabled precise determination of the fundamental physical constants, such as alpha_s(Mz), m_b, m_c and Vcb. Here, we aim to extend our understanding to the cancellation of O(Λ_QCD^2) renormalons, whose nature has not been studied so far. This cancellation is expected to occur between the pole quark masses and non-abelian (NA) potential, -CA*CF*alpha_s^2/mr^2. We perform 3 analyses: (i) We calculate the O(Λ_QCD^2) renormalons of the NA potential in the LL approximation; (ii) Beyond LL approx., we confirm the cancellation of the O(Λ_QCD^2) renormalons at the level of 84-98%; (iii) After the cancellation (beyond LL approx.), the convergence and stability of the perturbative prediction in fact improve. These results indicate that the NA potential and pole masses each carry O(Λ_QCD^2) renormalons and that they cancel out in the heavy quarkonium system.

Session Classification: Short talks