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A Quenched Exploration of Heavy Quark Moments and their Perturbative Expansion

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The parametric error on the QCD-coupling can be a dominant source of uncertainty in several important observables. One way to extract the coupling is to compare high order perturbative computations with lattice evaluated moments of heavy quark two-point functions. The truncation of the perturbative series is a sizeable systematic uncertainty that needs to be under control.
In this talk we give an update on our study [hep-lat/2203.07936] on this issue. We measure pseudo-scalar two-point functions in volumes of $L = 2$ fm with twisted-mass Wilson fermions in the quenched approximation. We use full twist, the non-perturbative clover term and lattice spacings down to $a = 0.010$ fm to tame the large discretization effects.
Our results show that both the continuum extrapolations and the extrapolation of the Λ-parameter to the asymptotic perturbative region are very challenging.

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