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Cut-off effect analysis of the covariant coordinate space method for vacuum polarization calculations in lattice regularization

Tuesday 4 November 2025 18:00 (1h 30m)

The covariant coordinate space (CCS) method for hadronic vacuum polarization calculations has been developed as an alternative to the established time-momentum representation (TMR) and is particularly promising for its potential to mitigate statistical noise. Our investigations further reveal that this framework exhibits a favorable continuum limit. We provide an extensive analysis of the cut-off effects to leading order in lattice perturbation theory. We analyze the issue of $a^2 \log(a)$ artefacts which typically complicate continuum extrapolations. In combination with the inherent flexibility of the integration kernel, we see an overall superior quality of the CCS continuum limit. We expect our insights to be helpful also for other lattice calculations of high-precision observables and that coordinate space methods may be advantageous for such computations.

Parallel Session (for talks only)

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