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Hadronic contributions to $\alpha(Q^2)$ and $\sin^2\theta_W(Q^2)$ from spectral reconstruction on the lattice.

Tuesday 4 November 2025 15:10 (20 minutes)

We present progress towards a new determination of the hadronic vacuum polarization (HVP) function $\Pi(Q^2)$ relevant for the running of the electromagnetic coupling and the electroweak mixing angle. In the conventional time–momentum representation, strong correlations induced by the kernel prevent reliable continuum extrapolations. To address this issue, we reconstruct smeared spectral densities from Euclidean correlators using the Hansen–Lupo–Tantalo (HLT) method. The unsmeared spectral density is then obtained by extrapolating in the smearing width, and results from several ensembles with different lattice spacings are combined to perform a controlled continuum limit.
We present first applications of this strategy and discuss future directions for obtaining continuum results for $\Pi(Q^2)$ with competitive precision for electroweak observables.

Parallel Session (for talks only)

Hadronic and nuclear spectrum and interactions

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