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Towards four-pion effects in multi-hadron decays

Tuesday 4 November 2025 17:20 (20 minutes)

Four-particle intermediate and final states pose major challenges for lattice calculations of scattering and decay amplitudes, as well as long-distance matrix elements. As a step toward addressing these challenges, we present preliminary results from a perturbative study of four-pion effects in finite-volume spectra and in the relation between finite-volume matrix elements and decay amplitudes. Although our approach does not capture all volume effects or provide a full connection to the scattering amplitude, it includes the leading $2 \to 2$ and $2 \to 4$ contributions and reproduces two- and four-pion–like avoided level crossings in the finite-volume spectrum. We also discuss the implications of these findings for hadronic D decays and for four-particle effects in the hadronic vacuum polarisation contribution to $(g-2)$.

Parallel Session (for talks only)

Hadronic and nuclear spectrum and interactions

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