



Contribution ID: 93

Type: **Parallel Talk**

Lattice Calculation of Electromagnetic Corrections to $K \rightarrow \pi \ell \nu_\ell$ decay

Friday, 4 August 2023 09:00 (20 minutes)

We describe a first-principles method to apply lattice QCD to compute the order α_{EM} corrections to $K \rightarrow \pi \ell \nu_\ell$ decay. This method formulates the calculation in infinite volume with the conventional infinite-volume, continuum treatment of QED. Infinite volume reconstruction is used to replace the QCD components of the calculation with finite-volume amplitudes which can be computed in Euclidean space using lattice QCD, introducing finite-volume errors which vanish exponentially as the volume used in the QCD calculation is increased. This approach has also been described in an appendix to the recent hep-lat posting 2304.08026.

Topical area

Quark and Lepton Flavor Physics

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Session Classification: Quark and Lepton Flavor Physics