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The two-photon decay amplitude of $K_L \rightarrow \mu^+ \mu^-$ from Lattice QCD

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The decay of a long-lived kaon to a pair of muons (KL2mu) could serve as a precision test of the Standard Model (SM) and a probe to physics beyond due to its sensitivity to physics at high energies. A precise determination of the size of the long-distance, two-photon contribution to KL2mu – as well as its interference with the analytically-computable short-distance (SD) contribution – are crucial for making a meaningful comparison between the SM prediction and experiment. In this talk, I will present the ongoing effort from the RBC/UKQCD collaboration to extract the two-photon decay amplitude of KL2mu using Lattice Quantum Chromodynamics. In particular, I will discuss the methodology and results from our first, exploratory study on a gauge ensemble at physical pion mass [arXiv:2509.04346].

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Classification de Session: QCD