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Progress on the lattice QCD calculation of the rare kaon decays: K+ -> pi+ nu nu-bar

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The rare kaon decays K+ -> pi+ nu nu-bar are highly suppressed in the standard model and thus provide an ideal place to search for new physics beyond the standard model. These decays are the principal objective of a new experiment, NA62 at CERN. Another new experiment to search for KL -> pi0 nu nu-bar is now underway at J-PARC. Given the goal of 10% precision by NA62, it is important to determine the long-distance contributions to the K+ -> pi+ nu nu-bar amplitude with a controlled uncertainty. In this talk I will report the progress on the lattice QCD calculation of the long-distance contributions to the K+ -> pi+ nu nu-bar decay amplitude, with an emphasis on the treatment of the short-distance divergence in the bilocal operator system.

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