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【309】 Search for $K_S \rightarrow \pi^+ \pi^- \mu^+ \mu^-$ with the Run II LHCb data

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Rare kaon decays are among the most sensitive probes of both heavy and light New Physics. In particular, the $K_S \rightarrow \pi^+ \pi^- \mu^+ \mu^-$ process is of $O(10^{-14})$ in the SM, and can be enhanced by up to a 100 times by exotic BSM models. Unlike the challenges faced by feasibility studies of $K_S \rightarrow \pi^+ \pi^- e^+ e^-$ decays due to the presence of electrons, $K_S \rightarrow \pi^+ \pi^- \mu^+ \mu^-$ is expected to be very clean given the LHCb performance on pion and muon reconstruction. Additionally, this decay presents an opportunity to test for CP violation. We report the status of the first $K_S \rightarrow \mu^+ \mu^- \pi^+ \pi^-$ decay search using Run 2 LHCb data.

Theoretical Work

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