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Test of Lepton Flavor Universality using b-baryons

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In the Standard Model of particle physics, couplings of gauge bosons to leptons of different flavors (electrons, muons and tau leptons) are believed to be identical. However, the recent measurements performed by LHCb Collaboration show hints for Lepton Flavor Universality violation: probabilities of B meson decaying to an (excited) kaon and two muons, and an (excited) kaon and two electrons, look different at about 2.6 sigma level. Several New Physics models were proposed to explain these results. More data is needed to confirm or reject these tensions, and also testing other similar decays would shed more light on this puzzle. One of the prominent ideas is to test the similar observables in the baryonic sector, exploiting a different spin-structure and testing whether possible New Physics effects are spin-dependent.

In this talk, the strategy of the Lepton Universality test using $\Lambda_b \rightarrow pK e^+ e^-$ and $\Lambda_b \rightarrow pK \mu^+ \mu^-$ decays will be covered. Preliminary results will be shown on the background studies, signal selection and important cross-checks evaluated before extracting the final result.

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