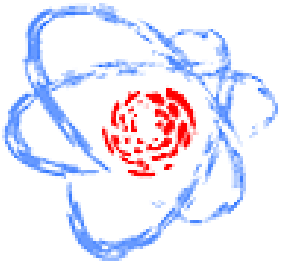

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Interplay of dineutrino modes with semileptonic rare B-decays

Saturday, 11 June 2022 12:25 (10 minutes)

Semileptonic flavor changing neutral current transitions with a pair of neutrinos in the final state are very accurately determined in the standard model (SM) and thus provide an accurate and sensitive probe for physics beyond the SM. Until recently, the poor tagging efficiency for the B -> K(∗)νν modes made them less advantageous as a probe of new physics (NP) compared to the charged lepton counterparts. The most recent Belle II result on B -> Kνν uses an innovative inclusive tagging technique resulting in a higher tagging efficiency; this together with previous BaBar and Belle results indicates a possible enhancement in the branching fraction of B+ ->K+νν. A reanalysis of the full Belle dataset together with upcoming Belle II dataset is expected to result in a much more precise measurement of this mode. If the branching ratio is indeed found to be enhanced with improved measurements, this would provide an unambiguous signal of NP without uncertainties due to long-distance non-factorizable effects or power corrections (in contrast to B-> Kll). We have explored the possibilities of such an enhancement as a signal of NP in scenarios with additional Z'-boson, which can also explain some of the other tensions observed in neutral as well as charged current B-decays. In an effective field theory approach, with the most general dimension-six Hamiltonian including light right-handed neutrinos, we explore the parameter space possible with a generic vector gauge boson Z' model assuming minimal new particle content. While being consistent with all data, correlations between the observed intriguing discrepancies in B-decays are also obtained, which will discriminate between the various NP scenarios.

Summary

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