

Effects of scalar leptoquarks in $b \rightarrow s$ mediated rare B decays

The rare decays of B mesons involving flavor changing neutral current (FCNC) transitions $b \rightarrow s, d$, provide an excellent testing ground to look for new physics.

Although, so far we have not seen any clear indication of new physics in the b-quark sector, but there appears to be some kind of tension with the SM predictions in some $b \rightarrow s$ penguin induced transitions. In particular, the recent measurements by LHCb collaboration show several significant deviations in semileptonic B meson decays involving the quark level transition $b \rightarrow s \mu^+ \mu^-$, from their corresponding SM expectations. Although it is conceivable that these anomalies could be due to statistical fluctuations or under-estimated theory uncertainties, but the possible interplay of new physics could not be ruled out. We consider the possible implications of scalar leptoquarks in order to understand these anomalies. We constrain the leptoquark parameter space using the measured branching ratios of $B_{\{s,d\}} \rightarrow \mu^+ \mu^-$ processes by the CMS and LHCb collaborations and we show that these anomalies can be accommodated in this model. Furthermore, we also investigate the lepton flavor violating rare B decays, e.g., as $B \rightarrow K l_i^- l_j^-$, which occur at tree level in the leptoquark model and are found to be within the experimental reach of B-factories

Summary

Author: MOHANTA, Rukmani

Co-author: SAHOO, Suchismita (University of Hyderabad)

Presenter: MOHANTA, Rukmani