

Angular analysis of $B_{(s)} \rightarrow K_1(\phi)ll$ decay modes

The LHCb experiment has reported discrepancy of $(2.2-2.4)\sigma$ in the μ/e ratio of $\bar{B} \rightarrow \bar{K}^*l^+l^-$ process, R_{K^*} , which reinforce the hints of lepton nonuniversality observed in $B^+ \rightarrow K^+l^+l^-$ process. We investigate the analogous lepton non-universality ratios and other asymmetries in $B \rightarrow K_1l^+l^-$ and $B_s \rightarrow \phi l^+l^-$ processes both in model dependent and independent approaches. We constrain the new parameter space consistent with experimental limit on $\text{Br}(B_s \rightarrow ll)$, $\text{Br}(\bar{B} \rightarrow X_s ll)$, $\text{Br}(\bar{B}^0 \rightarrow \bar{K}^0 ll)$, $\text{Br}(\bar{B} \rightarrow K^{(*)}\nu_l\bar{\nu}_l)$, $\text{Br}(\bar{B} \rightarrow X_s\nu_l\bar{\nu}_l)$, R_K and R_{K^*} parameters. We then show the effects of new parameters on the branching ratios, forward-backward asymmetries, CP violating parameters of $B_{(s)} \rightarrow K_1(\phi)l^+l^-$ processes. As like $R_{K^{(*)}}$, we also check the existence of the violation of lepton universality in these decay modes. We observe that the analysis of B decays to axial vector mesons can also serve as a good tool to probe physics beyond the SM.

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