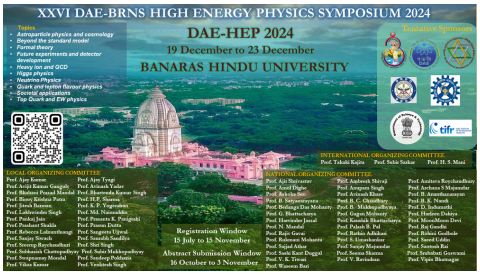

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The role of QCD-inspired model in deciphering semileptonic and radiative B_c decays

We conduct an analysis of electromagnetic and semileptonic decay modes of B_c mesons using a QCD-inspired phenomenological model. In light of recent observations of anomalies in LHC involving the $\mathcal{R}$-Ratios, τ-polarization ($\mathcal{P}\tau$), and forward-backward asymmetry ($\mathcal{A}_{FB}$) —which are particularly sensitive to New Physics, we investigate observables for the decay channels: $B_c \to \eta_c(J/\psi)\tau\nu_\tau$ and $B_c \to D(D^*)\tau\nu_\tau$ within a potential model framework. We also study the radiative channel: $B_c^* \to B_c\gamma$ where we considered a typical case of $B_c^*(1S) \to B_c(1S)\gamma$, our predicted decay width is found quite sensitive to the mass difference between B_c^* and B_c mesons which may help in determining the mass of B_c^* experimentally. Additionally, we calculate the vector, pseudoscalar and electromagnetic form factors, examining their q^2 dependence for these transitions in both ground and radially excited states. Given the fluctuating appearance and disappearance of flavor anomalies in the Run 3 data collection period, this study seeks to identify different measurement tools, capable of probing the limited regions of theoretical parameter space

Field of contribution

Phenomenology

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