Abstract

In this thesis, We have performed a detailed study of the semileptonic $B_s \to (D_s^{(*)-}, K^{(*)-})\ell\nu_\ell$ transitions corresponding to $b \to (c, u)$ decay as well as of the $B \to (\pi, \rho, \omega)\ell^+\ell^-$ and $B_s \to (K, K^*)\ell^+\ell^-$ transitions corresponding to rare $b \to d$ decays. These channels are investigated in the framework of the covariant confined quark model (CCQM) which is one of the effective field theory approaches. The required transition form factors in the entire physical range of momentum transferred squared have been computed. Form factors are further used to compute differential decay rates and hence branching fraction has been calculated. As a test for lepton flavor universality, the ratio for decay width of τ mode to μ mode for $B_s \to D_s^{(*)-}$ has also been determined. For rare $b \to d$ decay, branching fraction has been computed using both resonant and non resonant contributions. Along with this other physical observables like forward-backward asymmetry, longitudinal and transverse polarisation, convexity parameter, longitudinal polarisation fraction have been calculated for both $b \to (c, u)$ and rare $b \to d$ decays. For rare $b \to d$ decays, these observables are determined only using vector resonant contribution. Because of the extremely sensitive nature of these observables, they can be a very useful probe to study physics beyond the standard model.