

Constraining New Physics with D meson decays

Abstract content

Latest Lattice results on D form factors evaluation from first principles show that the standard model (SM) branching ratios prediction for the leptonic $D_s \rightarrow \ell \nu \ell$ decays and the semileptonic SM branching ratios of the D^0 and D^+ meson decays are in good agreement with the world average experimental measurements. It is possible to disprove New Physics hypothesis or find bounds over several models beyond the SM. Using the observed leptonic and semileptonic branching ratios for the D meson decays, we performed a combined analysis to constrain non standard interactions which mediate the $cs^- \rightarrow \ell \nu^-$ transition. This is done either by a model independent way through the corresponding Wilson coefficients or in a model dependent way by finding the respective bounds over the relevant parameters for some models beyond the standard model. In particular, we obtain bounds for the Two Higgs Doublet Model Type-II and Type III, the Left-Right model, the Minimal Supersymmetric Standard Model with explicit R-Parity violation and Leptoquarks. Finally, we estimate the transverse polarization of the lepton in the D^0 decay and we found it can be as high as $P_T=0.23$.

Summary

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