

D Leptonic and semi-leptonic decays from BESIII

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The BESIII experiment has taken 2.92/fb of data at $\sqrt{s} = 3.773$ GeV which contains the largest sample of $e^+e^- \rightarrow \psi(3770) \rightarrow D\bar{D}$ in the world to date. We report the result of our branching fraction measurement of $D^+ \rightarrow \mu^+ \nu$ based on this sample from which we extract its weak decay constant, f_{D^+} , with the $|V_{cd}|$ determined from a global Standard Model fit as an input. We also obtain $|V_{cd}|$ from the measured branching fraction together with a Lattice QCD prediction for f_{D^+} . In addition, we present measurements of $D^0 \rightarrow (K^-/\pi^-) e^+ \nu$, $D^+ \rightarrow K_L e^+ \nu$, and D^+ to $(\omega/\pi/K) e^+ \nu$ decays. Based on analysis of $D^0 \rightarrow (K^-/\pi^-) e^+ \nu$ and $D^+ \rightarrow K_L e^+ \nu$, we extract different parameterizations of the form factors together with the CKM matrix elements $|V_{cs}(d)|$. These will give a precision test on the LQCD calculation on these form factors and the unitarity of the CKM matrix. Based on analysis of $D^+ \rightarrow K^- \pi^+ e^+ \nu$, we perform a partial wave analysis and in return, we determine the S-wave contribution and its phase, the helicity basis form factors of $D^+ \rightarrow K^*(892) e^+ \nu$ based on the SPD model, and we also measure them in a model-independent way. We also report searches for some rare semi-leptonic decays.

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