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Search for the rare charm meson decays $D^0 \to K^-\pi^+l^\pm l^\mp$ SHUAIYAN KANG, SOEREN PRELL, Iowa State University —
Electroweak penguin quark transitions mediated by Flavor Changing Neutral Currents $c \to ul^+l^-$ (where $l^\pm$ is an electron or muon) are forbidden at tree level in the Standard Model (SM). They proceed through an electroweak box or loop diagram in the SM and are further suppressed due to the GIM mechanism and the small quark masses in the loop. This provides a new window for probing NP models such as leptoquarks, Z' model and minimal supersymmetric standard model. Recently, Babar has observed the decay $D^0 \to K^-\pi^+e^+e^-$ in the mass range $0.675 < m_{e^+e^-} < 0.875$ GeV/c^2 where long-distance contributions dominate. LHCb has observed the decays $D^0 \to K^-\pi^+\mu^+\mu^-$, $\pi^-\pi^+\mu^+\mu^-$ and $K^-K^+\mu^+\mu^-$. We present our study of the decays $D^0 \to K^-\pi^+l^\pm l^\mp$, where $l^\pm = e, \mu$ using 942fb^{-1} of e^+e^- data collected at or close to the center-of-mass energy of the $\Upsilon(4S)$ and $\Upsilon(5S)$ with the Belle detector at KEK.

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