

Search for the rare decay $D^0 \rightarrow K^- \pi^+ e^+ e^-$

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Flavor-changing neutral current (FCNC) processes are rare within the Standard Model (SM) as they cannot occur at tree level and are suppressed at loop level by the Glashow-Iliopoulos-Maiani (GIM) mechanism. In D -meson decays, the GIM cancellation is almost exact, leading to expected branching fractions for $c \rightarrow ul^+l^-$ processes of order $\mathcal{O}(10^{-9})$. However, long-distance effects can raise this to $\mathcal{O}(10^{-6})$. Recently, the LHCb collaboration reported a measurement of the $D^0 \rightarrow K^- \pi^+ \mu^+ \mu^-$ branching fraction $\mathcal{B}(D^0 \rightarrow K^- \pi^+ \mu^+ \mu^-) = (4.17 \pm 0.12 \pm 0.40) \times 10^{-6}$ in the mass range $0.675 < m(\mu^+ \mu^-) < 0.875 \text{ GeV}/c^2$. The LHCb collaboration has also reported on hints for deviation from lepton universality in decays of the type $b \rightarrow sl^+l^-$.

In this talk, we report on a search for the FCNC decay $D^0 \rightarrow K^- \pi^+ e^+ e^-$ using data taken by the BABAR experiment at the SLAC National Accelerator Laboratory.

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