

High Energy Physics - Experiment

Search for leptonic decays of D^0 mesons

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We search for the flavor-changing neutral current decays $D^0 \rightarrow \mu^+ \mu^-$ and $D^0 \rightarrow e^+ e^-$, and for the lepton-flavor violating decays $D^0 \rightarrow e^+ \mu^-$ using 660 fb⁻¹ of data collected with the Belle detector at the KEKB asymmetric-energy $e^+ e^-$ collider. We find no evidence for any of these decays. We obtain significantly improved upper limits on the branching fractions: $\mathcal{B}(D^0 \rightarrow \mu^+ \mu^-) < 1.4 \times 10^{-7}$, $\mathcal{B}(D^0 \rightarrow e^+ e^-) < 7.9 \times 10^{-8}$ and $\mathcal{B}(D^0 \rightarrow e^+ \mu^-) + \mathcal{B}(D^0 \rightarrow \mu^+ e^-) < 2.6 \times 10^{-7}$ at 90% confidence level.

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