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Search for BNV and LNV processes at BESIII

The observed matter-antimatter asymmetry in the universe composes a serious challenge to our understanding of nature. BNV decay has been searched in many experiments to understand this large-scale observed fact. In the case of e^+e^- collision, few experiments are performed. Here we proposed to search BNV and LNV with currently the world largest J/ψ data sets in e^+e^- collision experiment. The BNV and LNV channel $J/\psi \rightarrow \Lambda_c^+ e^- + c.c.$ is studied, and no signal event is observed. The upper limit branching fraction is set to be $6.910E-8$ at 90% C.L., which is still much higher than the estimation based on SM. The Majorana neutrino is searched in LNV decays $D \rightarrow (K\pi/K\pi^0/K\pi^+) e^+e^+$ and no significant signal is observed, the upper limits on the branching fractions are set to be $2.710E-6$, $3.310E-6$ and $8.510E-6$ at 90% C.L., respectively. The Majorana neutrino is also investigated with different mass assumption, ranging from 0.25 to 1.0 GeV/c^2 in the decays $D^0 \rightarrow K^- e^+ \nu_N(\pi^+ e^+)$ and $D^{+-} \rightarrow K^{\pm} e^+ \nu_N(\pi^+ e^+)$, and the upper limits on the branching fractions are extracted to be at the level of $10E-7$ to 10^{-6} at 90% C.L..

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