

Search for LNV by the NA48 Experiment

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In 2003–2004 the NA48/2 experiment at CERN collected a large sample of charged kaon decays to final states with multiple charged particles. A new upper limit on the rate of the lepton number violating decay $K^\pm \rightarrow \pi^\mp \mu^\pm \mu^\pm$ is reported: $B(K^\pm \rightarrow \pi^\mp \mu^\pm \mu^\pm) < 8.6 \times 10^{-11}$ at 90% CL. Searches for two-body resonances X in $K^\pm \rightarrow \pi \mu \mu$ decays (such as heavy neutral leptons $N4$ and inflatons χ) are also presented. In the absence of signals, upper limits are set on the products of branching fractions $B(K^\pm \rightarrow \mu^\pm N4) \cdot B(N4 \rightarrow \pi \mu)$ and $B(K^\pm \rightarrow \pi^\pm X) \cdot B(X \rightarrow \mu^+ \mu^-)$ for ranges of assumed resonance masses and lifetimes. The limits are in the $(10^{-11}, 10^{-9})$ range for resonance lifetimes below 100 ps.

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