

$\tau \rightarrow \ell \ell \ell$ at a rate of one out of 10^{14} tau decays?

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We present in full analytic form the partial widths for the lepton flavor violating decays $L^\pm \rightarrow \ell^\pm \ell'^+ \ell'^-$, with $L = \tau, \mu$ and $\ell^{(\prime)} = \mu, e$, mediated by neutrino oscillations in the one-loop diagrams. Compared to the first result by Petcov:1976ff, which was obtained in the nonphysical zero momentum limit $\mathcal{P} \ll m_\nu \ll M_W$, we retain full dependence on external scales \mathcal{P} and determine the branching ratios in the physical limit $m_\nu \ll \mathcal{P} \ll M_W$. We show that in this limit the conclusion by Pham:1998fq that $\tau \rightarrow \ell \ell' \ell'$ could be as large as 10^{-14} is flawed. In this talk we will describe the details of our calculation, present our results, and motivate some of the peculiarities of this calculation from the viewpoint of effective field theory.

What is your topic?

Lepton universality and flavour violation

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