

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

Content

We present in full analytic form the partial widths for the lepton flavour violating decays $L^\pm \rightarrow \ell^\pm \ell'^+ \ell'^-$, with $L = \tau, \mu$ and $\ell(\ell') = \mu, e$, 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.

Summary

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