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A Novel Approach to Detect Lepton Flavor Violating Scalar

We propose using two existing neutrino experiment and one future experiment to probe a simple charged lepton flavor violation (CFLV) model. It is assumed that a complex scalar couples to (e, μ) or (μ, τ) and we focus the case that the scalar mass is within $[|m_{l_1} - m_{l_2}|, m_{l_1} + m_{l_2}]$ in which l_1 and l_2 are the two different charged leptons. First the muon magnetic moment can give the allowed parametric space in the coupling-mass parameter plane. For $\mu - e$ sector, we exploit the muonium decay branching ratio and LSND which can exclude the parametric region explained by $g_\mu - 2$. For the $\tau - \mu$ sector, there are 3 ways to produce the scalar at beamdump experiments, the Drell-Yan process, the heavy meson decay and muon of target. We explore the constraints from the CHARM, NuTeV and the future beamdump experiment SHiP. It turns out CHARM and NuTeV cannot exclude the parameter region that explains the muon g – 2 anomaly, while the future SHiP experiment covers the whole parameter space.

Participation

I prefer to give a remote talk

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