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Effects of scalar leptoquarks S_1 and R_2 on charged lepton flavor violating decays $\tau \to \ell_n \ell_n \ell_m^c \ (\ell = e, \mu)$

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The observation of charged lepton flavor violation would be a clear signal of new physics. In this work, we study flavor-violating three-body τ decays induced by the scalar leptoquarks R_2 and S_1. We consider a parameter space constrained by the radiative processes Δa_μ and $\ell_i \to \ell_n \gamma$, focusing on flavor structures where only the top or charm quark contributes. We compute the one-loop contributions to the processes $\tau \to \ell_n \ell_n \ell_m^c$ and provide analytical expressions for the corresponding branching ratios in the R_2 and S_1 representations. We then analyze the phenomenology of these channels, comparing the roles of the top- and charm-quark sectors in the parameter space. Our results show that, within the considered scenarios, the scalar leptoquarks R_2 and S_1 can lead to sizable branching ratios consistent with the imposed coupling constraints

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