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Constraining a Z' boson with $\mu\tau$ LFV coupling from ANTARES and IceCube data

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Recently the neutrino experiments ANTARES and IceCube have released new constraints to the non-standard neutrino interaction (NSI) parameter $\epsilon^d_{\mu\tau}$ (flavor off-diagonal). To the light of this new data, in this work, we study the new physics implications on the parameter space of a simplified Z' model with lepton flavor violating ($\mu\tau$) couplings. For a Z' boson with a mass heavier than the τ lepton, our results show that ANTARES and IceCube can provide additional constraints to such a new physics scenario with $\mu\tau$ couplings, when compared to bounds from low-energy flavor physics. Moreover, these neutrino experiments can exclude a similar region than ATLAS experiment, showing the potential to provide complementary information to the one obtained from direct searches at the Large Hadron Collider. The impact of the expected sensitivity at DUNE and Belle II experiments is also studied.

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