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Vector leptoquark U_3 : A possible solution to the recent discrepancy between NOvA and T2K results on CP violation

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In the current epoch of neutrino physics, many experiments are aiming for precision measurements of oscillation parameters. Thus, various new physics scenarios which alter the neutrino oscillation probabilities in matter deserve careful investigation. Recent results from NOvA and T2K show a slight tension on their reported values of the CP violating phase δ_{CP} . Since the baseline of NOvA is much larger than the T2K, the neutral current non-standard interactions (NSIs) of neutrinos with the earth matter during their propagation might play a crucial role for such discrepancy. In this context, we study the effect of vector leptoquark U_3 , which induces non-standard neutrino interactions that modify the oscillation probabilities of neutrinos in matter. We show that such interactions provide a relatively large value of NSI parameter $\varepsilon_{e\mu}$. Considering this NSI parameter, we successfully explain the recent discrepancy between the observed δ_{CP} results of T2K and NOvA. We also briefly discuss the implication of U_3 leptoquark on lepton flavour violating muon decay modes: $\mu \rightarrow e\gamma$ and $\mu \rightarrow eee$.

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