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Probing non-standard interactions with a muon decay-at-rest source

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The hybrid setup of T2HK (neutrino) in conjunction with a muon decay-at-rest (muDAR) source (antineutrinos) has been shown to have very good sensitivity to the standard oscillation parameters. We now explore the ability of this setup to observe charged-current non-standard interactions (NSIs) of neutrinos that can affect the production and detection of neutrinos. We discuss the interplay between the detector NSI parameters and standard oscillation parameters, which affects the sensitivity of the setup. We demonstrate the robustness of the hybrid setup in measuring the standard CP phase even in the presence of NSIs, as well its ability to measure the non-standard phases. Finally we discuss correlations between the phases. The treatment of source NSIs at a muDAR setup is different since there are two neutrino flavours involved. We highlight the sensitivity reach of this setup to measure the NSI parameters, which is comparable to the current sensitivity.

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