

Distinguishing between Dirac and Majorana neutrinos in the presence of general interactions

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We revisit the possibility of distinguishing between Dirac and Majorana neutrinos via neutrino-electron elastic scattering in the presence of all possible Lorentz-invariant interactions. Defining proper observables, certain regions of the parameter space can only be reached for Dirac neutrinos, but never for Majorana neutrinos, thus providing an alternative method to differentiate these two possibilities. We first derive analytically and numerically the most general conditions that would allow to distinguish Dirac from Majorana neutrinos, both in the relativistic and non-relativistic cases. Then, we apply these conditions to data on ν_μ - e and $\bar{\nu}_e$ - e scatterings, from the CHARM-II and TEXONO experiments, and find that they are consistent with both types of neutrinos. Finally, we comment on future prospects of this kind of tests.

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