

Analytical description of neutrino propagation in a realistic Earth potential

Abstract content

Recently, it has been shown that a very accurate description of the propagation of neutrinos inside the Earth is obtained by using the Magnus expansion. This approach consists in finding the time evolution operator for the two neutrino system in the adiabatic base, keeping a finite number of terms of the Magnus expansion. These studies have been performed by using a simplified form of the Earth potential. In this work we study the performance of the Magnus approximation when a realistic shape of the Earth potential is considered. In particular, we focus our study on the accuracy of this approximation when different values of the Nadir angle are considered, i.e. where the structure of the potential becomes more important.

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