

## Decomposing Neutrino Oscillation in the Propagation Basis

A general formalism of decomposing event rates in the propagation basis is established to study the neutrino oscillation phenomena. The contributions from the neutrino mass hierarchy, the atmospheric mixing angle and its octant, as well as the CP phase can be analytically disentangled in this formalism which is extremely useful in the study of atmospheric neutrino oscillation that experiences complicated earth matter profile and can apply generally to any type of neutrino experiments. As a complementary tool to oscillogram, the decomposition formalism can unveil more detailed/hidden patterns, especially the dependence on the three unknown parameters. To illustrate its usefulness, we take SK as an example by exploring the hierarchy and octant sensitivities.

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