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Decoherence and Relaxation in Long Baseline Neutrino Experiments

Focusing in the next generation of Long Baseline Neutrino Experiments, we study phenomenologically the neutrino oscillations behavior when decoherence and relaxation effects are taken into account in the propagation. In three neutrino oscillation approach, we can see that one particular oscillation channel may be enhanced due to decoherence and matter effect in the resonant region decoherence. We can explain this effect even in two neutrino approximation. We also show as it is possible to implement these effects in the analytical solution that use $\Delta m^2_{12} << \Delta m^2_{31}$ approximation. In the behavior study, we use numerical solution to investigate the three possible decoherence effects and two relaxation effects. We discuss the situation where all effects are combined and how these future experiments may limit all these effects.

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