

Determination of the Neutrino Flavor Ratio at the Astrophysical Source

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We discuss the reconstruction of neutrino flavor ratios at astrophysical sources from future neutrino-telescope measurements, given the knowledge of neutrino mixing angles obtained from terrestrial experiments. With a statistical analysis, we demonstrate that the pion source and the muon-damped source can be distinguished at the 3σ level provided the accuracies on measuring $R \equiv \phi(\nu_\mu)/(\phi(\nu_e) + \phi(\nu_\tau))$ and $S \equiv \phi(\nu_e)/\phi(\nu_\tau)$ can both reach 10%. On the other hand, the above two sources are very difficult to distinguish by merely measuring R alone. We also discuss the effect of leptonic CP phase on such a flavor-ratio reconstruction.

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