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Tau Neutrino Appearance in the Flux of Atmospheric Neutrinos at the Super-Kamiokande Experiment

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The Super-Kamiokande experiment (SK) is the water Cherenkov detector which discovered the oscillation of atmospheric neutrinos. The dominant effect of the oscillation of muon neutrinos is the appearance of tau neutrinos. Direct detection of ν_τ in the atmospheric neutrino flux provides an unambiguous confirmation of neutrino oscillations. ν_μ changing to ν_e is the sub-dominant ν_μ oscillation mode, which is studied at SK to determine mass hierarchy. Currently, ν_τ interactions form the biggest background to the mass hierarchy signal in the SK analysis. SK uses machine learning techniques of neural networks to segregate ν_τ charged-current interactions from the interactions of the atmospheric muon and electron neutrinos. This poster will discuss improvements in the ν_τ identification algorithm and discuss corresponding improvements in the search for tau neutrinos and the suppression of mass hierarchy backgrounds.

In-person participation

Yes

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