Abstract Submitted
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Tau electromagnetic energy loss and tau polarization for very high energy tau leptons[1] DIKSHA GARG, University of Iowa, CARLOS A. ARGUËLLES, Harvard University, SAMEER PATEL, MARY HALL RENO, University of Iowa, IBRAHIM SAFA, University of Wisconsin Madison and Harvard University — The neutrino interaction length scales with energy, and becomes comparable to Earths diameter above PeV energies. At such high energies, the tau's short lifetime leads to energetic regenerated tau neutrino flux, $\nu_\tau \to \tau \to \nu_\tau$, within the Earth. The next generation of neutrino experiments aim to detect ultra-high energy neutrinos, and many of them rely on detecting either the regenerated tau neutrino, or the tau decay shower. Both of these signatures are affected by polarization of the tau through the energy distribution of the secondary particles produced from the tau's decay. While τ's produced in weak interactions are nearly 100% polarized, it is expected that τ's experience depolarization due to electromagnetic energy loss in the Earth. In this talk, we quantify the depolarization of τ's in electromagnetic energy loss. Tau depolarization can be directly implemented in Monte Carlo simulations such as NuPyProp, TauRunner and other tau neutrino propagation codes.

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