

Environmental decoherence in atmospheric neutrinos with IceCube

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Dissipative interactions between neutrinos and the environment in which they propagate lead to quantum decoherence. Such an environment is predicted by quantum gravity models featuring a ‘foamy’ space-time structure. Environmental decoherence degrades the interference between neutrino states that is responsible for neutrino oscillations, resulting in exponential damping of oscillation probability with propagation distance. The IceCube detector at the South Pole measures atmospheric neutrinos that have traversed a range of distances, up to 12,742 km for neutrinos crossing the Earth’s diameter, making it sensitive to decoherence effects. In this poster, a phenomenological model of neutrino environmental decoherence and the resulting signal in IceCube is presented, and the measurement sensitivity estimated for a 6 year data sample.

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