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82 - Search for Neutrino Trident Events in IceCube

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Neutrino trident production (NTP) is a standard model (SM) sub-dominant process where two charged leptons are produced via neutrino-nucleus scattering. Presence of additional beyond standard model (BSM) vector and scalar bosons can increase NTP cross-sections significantly. Thus the observation of trident events in neutrino detectors can be used as a powerful probe into the search for new physics even if the SM contribution alone is below the detection threshold. The IceCube neutrino observatory at the South Pole is a multi-purpose Cherenkov detector which uses a cubic kilometer of Antarctic ice as its detector volume with arrays of 10-inch diameter photomultiplier tubes (PMTs) called optical modules instrumented in the ice. We can search for NTP events using atmospheric neutrinos through di-muon NTP channel which creates a distinctive double-track event topology in the IceCube detector. In this poster presentation, we demonstrate the preliminary study of neutrino trident cross section calculation, expected event rate in IceCube and the limitation of the detector resolution for double-track reconstruction which are crucial steps for the sensitivity study of BSM bosons.

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