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Optical Cherenkov Signals from Upwards Going Extensive Air Showers Induced by Neutrinos AUSTIN CUMMINGS, ROBERTO ALOISIO, Gran Sasso Science Institute, JOHN KRIZMANIC, University of Maryland, Baltimore County — Detection of high energy neutrinos requires extremely large target volumes to combat the low astrophysical flux and interaction cross section. One method of observation involves using the Earth and its atmosphere as the detector. A neutrino which undergoes a charged-current interaction inside the Earth close enough to the surface can emerge into the atmosphere and initiate an upward going extensive air shower (EAS). The optical Cherenkov emission from these EASs is often very bright, and can have characteristic diameters on the order of tens of kilometers when projected to space altitudes. This talk will detail the Cherenkov detection method for the Earth-skimming neutrinos. Specifically, we outline the characteristics of the arriving photons (wavelength, timing, and spatial distributions) resulting from the neutrino induced EASs, as well as show the sensitivity of the upcoming EUSO-SPBII (Extreme Universe Space Observatory aboard a Super Pressure Balloon 2) and POEMMA (Probe Of Extreme Multi-Messenger Astrophysics) instruments to the cosmogenic neutrino flux, assuming different source evolution models and cosmic ray compositions. We will also show that the inclusion of showers induced by muon neutrinos and muons from tau-lepton decay improve the sensitivity at energies <10PeV.

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