CHARACTERISTICS OF UPWARD-GOING EEV TAU NEUTRINO AIRSHOWERS

D. Kieda
University of Utah

In the past few years, it has been realized that upward-going extensive air showers may be generated by EeV Tau Neutrino interactions with the surface of the Earth. The Tau neutrino is generated in the Earth through neutrino oscillation from astrophysical source generated Muon neutrinos. Detection of these Tau neutrinos might be accomplished by observing the optical Cherenkov radiation emitted by these upward going extensive air showers. This type of detection has been proposed for the EUSO and OWL satellite experiments.
However, because the upward going tau-induced air shower develops in the reverse direction of the cannonical downward going shower, the Cerenkov light observed at the top of the atmosphere is substantially more spread. Atmospheric effects also attenuate various optical frequencies.
In this talk I describe the properties of Cerenkov light generated by upward going tau neutrinos, and observed from an orbiting satellite. Characteristics such as lateral distribution, spectral properties, and arrival time properties are calculated via Monte carlo Simulation. We estimate the detection threshold, effective aperture, angular and energy resolution for a typical orbiting observatory using upward going Cerenkov light to observe the upward going tau neutrino flux.