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Neutrino spectrum on Moon

We explore the neutrino energy spectrum and directional distribution in the energy range of 1 MeV to 10 TeV on Moon. The lunar surface has a variety of neutrino sources, including those generated by cosmic rays interacting with the lunar regolith (referred to as lunar regolith neutrinos), geoneutrinos from decays of natural radioactive elements, Earth's atmospheric neutrinos, solar neutrinos, solar atmospheric neutrinos, diffuse supernova neutrinos, and high energy astrophysical neutrinos. Among these neutrinos, the lunar regolith neutrinos and lunar geoneutrinos require detailed calculations, as others are same as those on Earth or can be easily estimated. Here we present the energy spectra and directional distributions of lunar regolith neutrinos calculated through Monte Carlo simulations, as well as lunar geoneutrinos determined via analytical methods. Based on the derived lunar neutrino spectrum, we will also briefly discuss the potential advantages of lunar-based neutrino experiments.

Collaboration(s)

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