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Measurements of the Atmospheric Neutrino Flux at Super-Kamiokande

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Measurements of the atmospheric neutrino flux have been performed using Super-Kamiokande, a 22.5 kton fiducial-volume water-Cherenkov detector located in the Mozumi mine in Japan. Beginning operation in 1996, the detector has the world's highest statistics for observation of neutrinos originating from cosmic ray interactions in the atmosphere, which may be compared to the predictions given by atmospheric neutrino flux models. We present measurements of the $\nu_e + \bar{\nu}_e$ and $\nu_\mu + \bar{\nu}_\mu$ fluxes as a function of energy, direction, and time, with a detailed analysis of systematic errors. In particular, we compare the energy spectra in the sub-GeV to TeV range to those of the various published flux models, confirm the discovery of azimuthal asymmetries caused by the geomagnetic field for both neutrino flavours, and present an analysis showing the first indications of a correlation between the atmospheric neutrino flux and the solar magnetic activity cycle.

Collaboration

– not specified –

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