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Seasonal Variations of the Atmospheric Neutrino Flux measured in IceCube

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The IceCube Neutrino Observatory measures high-energy atmospheric neutrinos with high statistics. These atmospheric muon neutrinos are produced in cosmic ray interactions in the atmosphere, mainly by the decay of pions and kaons. The rate of the measured neutrinos is affected by seasonal temperature and pressure variations in the stratosphere, which are expected to increase with the particle's energy. In this contribution, seasonal energy spectra are obtained using a novel spectrum unfolding approach, the Dortmund Spectrum Estimation Algorithm (DSEA+), in which the energy distribution from 125 GeV to 10 TeV is estimated from measured quantities with machine learning algorithms. We determined the seasonal spectra differences with respect to the average annual flux from 11.5 years of IceCube's atmospheric muon neutrino data.

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