Earthshine Spectrum: Earth as an Exoplanet

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We can obtain the albedo that can be observed from outside the earth using the spectrum of the earthshine. Based on this, we conducted this study analyzing the chemical composition of exoplanets through the spectrum of the planets. We expect that this study would be used as a basic data when we judge the possibility of organism of the planets. First, we analyzed the Earth’s atmosphere constituents that is known to be the only living organisms. We observed the spectra of moonshine, earthshine, and background sky. The obtained spectra were corrected for bias, dark, flat. After stacking, we performed the wavelength calibration. We subtracted the background sky spectrum from the earthshine spectrum and got the spectrum of the earth's atmosphere. We obtained albedo of the earth by dividing the spectrum of the earthshine with the moonshine spectrum. We found the O3 absorption line in each of the spectra and which supports the idea that O2 exists in the Earth's atmosphere because O3 is produced by photo dissociation of O2. We also analyzed the constituents of the Mars atmosphere and the Venus atmosphere. We found that the two planets were not suitable for life. Thus, through this study, we have concluded that analysis of the planet’s atmosphere constituents through the spectrum of the planet can serve the possibility of life existence.

Awards Won:

Third Award of $1,000