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New Concept for Direct Detection and Spectra of Exoplanets

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We present a novel spectral imaging method for characterization of exoplanets. This method uses 4 collecting telescopes, combined with phase chopping and a spectrometer. Focusing on contiguous observing wavelengths in space, the (u, v) plane can be simultaneously filled by the use of the contiguous observing wavelengths instead of continuously rotating the baselines. For a target comprising a star and a planet, observations on two baselines are sufficient to extract an image of the planetary system and a spectrum of the planet. This method also avoids an incompleteness of co-phasing during rotation of the array.

Our simulations show that this new method allows us to detect an analog Earth around a Sun-like star at 10pc and to acquire its spectrum over the wavelength range from 8 to 18 microns with a spectral resolution $R=100$.