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Characterization of Magnetic Activity on the Sun Using Disc-integrated Spectra

Stellar surface inhomogeneities presented by convection, magnetic spots, bright plages, and faculae are recognized as important in the accurate retrieval of exoplanet properties as they can be a source of noise and confusion in stellar radial-velocity (RV) measurements. The identification and characterization of exoplanets around Sun-like stars are impacted by changes in intensity and other spectral signatures due to such spatial inhomogeneities over time scales spanning a few minutes to years. High-energy events like solar flares and coronal mass ejections (CMEs) also leave characteristic signatures in the activity indices derivable from various spectral lines. In this work, we investigate activity-related features seen in the disk-integrated spectra of the Sun using time series of Sun-as-a-star spectral observations by HARPS-N and NEID instruments. We also look for signatures of high-energy solar events and solar cycle variation in the spectral indices, which in turn help us understand such variations in sun-like exoplanet host stars. Further, we carry out an analysis examining correlations between spot, faculae, and plage fill factors and the stellar activity indices.

Contribution Type

Theme

Solar - Stellar Connections

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