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Towards a robust green astro-comb for Earth-like exoplanet searches AAKASH RAVI, Department of Physics, Harvard University, LEOPOLDO MARTIN, INAF - Fundacion Galileo Galilei, DAVID PHILLIPS, Harvard-Smithsonian Center for Astrophysics, NICHOLAS LANGELLIER, TIMOTHY MILBOURNE, CHRISTIAN DOLLIFF, Department of Physics, Harvard University, RONALD WALSWORTH, Harvard-Smithsonian Center for Astrophysics —
The detection of exoplanets using the radial velocity (RV) method has become a very exciting and active area of research. Detecting Earth-like planets, however, is still very challenging as it requires extremely precise calibration of the spectrographs used in such measurements. To address this challenge, we employ a visible wavelength frequency comb - referenced to the global positioning system - as a calibration source. Our comb calibrator is realized by spectrally broadening and shifting the output of a 1 GHz repetition rate modelocked Ti:sapphire laser using a photonic crystal fiber and then filtering the comb lines to create a 16 GHz-spacing comb. This system has been implemented at the TNG telescope on La Palma to calibrate the HARPS-N spectrograph. However, the complexity of the system has thus far prevented its routine use as it requires frequency comb specialists to be on site during measurements. Here, we propose some automation strategies and present preliminary results from our efforts. We also discuss ongoing comb-calibrated astrophysical observations, including measurements of the Sun. The solar measurements are part of an effort to understand stellar noise sources in the RV data and demonstrate the sensitivity of the instrument to detect terrestrial exoplanets.

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