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Calibration of an Astrophysical Spectrograph with an Astro-comb DAVID F. PHILLIPS, ALEX GLENDAY, CHIH-HAO LI, CLAIRE CRAMER, SYLVAIN KORZENNIK, Harvard-Smithsonian Center for Astrophysics, GUOQING NOAH CHANG, LI-JIN CHEN, ANDREW BENEDICK, FRANZ X. KAERTNER, MIT, DIMITAR SASSELOV, ANDREW SZENTGYORGYI, RONALD L. WALSWORTH, Harvard-Smithsonian Center for Astrophysics — Searches for extrasolar planets using the periodic Doppler shift of stellar lines are approaching Earth-like planet sensitivity. To find a 1-Earth-mass planet in an Earth-like orbit, an order of magnitude improvement in state-of-the-art radial velocity spectroscopy is necessary. An astro-comb, the combination of an ocatve-spanning laser frequency comb with a Fabry-Perot cavity, producing evenly spaced frequency markers with the potential for large wavelength coverage is a promising avenue towards improved wavelength calibration. Here we demonstrate the calibration of a high-resolution astrophysical spectrograph below the 1 m/s level in the 800-900 nm spectral band using an octave-spanning Ti:Sapphire laser and an ultra-low dispersion Fabry-Perot filter cavity adjusted for a mode spacing of approximately 31 GHz. Modeling of spectrograph response function and overall system stability and reproducibility will be described.

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