Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Progress with a green astro-comb for exoplanet searches CHIH-HAO LI, ALEXANDER G. GLENDAY, DAVID F. PHILLIPS, NICHOLAS LANGELLIER, Harvard-Smithsonian Center for Astrophysics, GUOQING CHANG, Physics Dept., Hamburg University, DESY and MIT, GABOR FURESZ, Massachusetts Institute of Technology, FRANZ X. KAERTNER, Physics Dept., Hamburg University, DESY and MIT, DIMITAR SASSELOV, ANDREW SZENTGYORGYI, RONALD L. WALSWORTH, Harvard-Smithsonian Center for Astrophysics — Searches for extrasolar planets using the precision stellar radial velocity (RV) measurement technique are approaching Earth-like planet sensitivity. Astro-combs, which consist of a laser frequency comb, coherent wavelength shifting mechanism (such as a doubling crystal and photonic crystal fiber), and a mode-filtering Fabry-Perot cavity (FPC), provide a promising route to increased accuracy and long-term stability on the astrophysical spectrograph calibration. We first present the design of a green astro-comb from an octave spanning Ti:Sapphire laser, spectrally broadened by custom tapered PCF to the visible band via fiber-optic Cherenkov radiation for frequency shifting, and filtered by a broadband FPC, constructed by a pair of complementary chirped mirrors. We also present results from two years of operation of the astro-comb calibrating the HARPS-N spectrograph at the Italian National Telescope on La Palma, Canary Islands, including its use in measurements of solar radial velocities as well as its use in searches for extrasolar planets.

David Phillips
Harvard-Smithsonian Center for Astrophysics

Date submitted: 30 Jan 2015 Electronic form version 1.4