Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

A high accuracy FTS for laser frequency combs, lamps and other sources ALEXANDER GLENDAY, CHIH-HAO LI, NICHOLAS LANGELLIER, GABOR FURESZ, Harvard-Smithosnian Center for Astrophysics, GUOQING CHANG, Physics Dept., Hamburg University and DESY and MIT, HUNG-WEN CHEN, JINKANG LIM, Massachusetts Institute of Technology, FRANZ KAERTNER, Physics Dept., Hamburg University and DESY and MIT, DAVID PHILLIPS, ANDREW SZENTGYORGYI, RONALD WALSWORTH, Harvard-Smithosnian Center for Astrophysics — We present results from a custom Fourier Transform Spectrograph (FTS) optimized for characterizing broadband, high repetition-rate laser frequency combs ("astro-combs") as well as other sources such as calibration lamps and solar spectra. The FTS is a 2.4 m maximum optical path difference (OPD) Michelson interferometer with a resolving power at 500 nm of $R \sim 8$ million for a single transverse mode and long coherence length source (e.g., a laser frequency comb) and $R \sim 1$ million for a source with multiple transverse modes and short coherence length (e.g., Th:Ar lamp). In our FTS, the reference laser co-propogates with the light being characterized, canceling finite aperture frequency shifts and is locked to an atomic clock via a laser frequency comb providing intrinsic accuracy of the FTS at the part per trillion level. Due to residual systematic effects, we realize an accuracy of < 2 MHz on multiple transverse mode sources. We will present results from our ongoing use of the FTS to characterize various sources.

David Phillips
Harvard-Smithosnian Center for Astrophysics

Date submitted: 28 Jan 2013 Electronic form version 1.4