

NASA EPSCoR Poster Abstract- Stephanie Letourneau

The phase-stabilized Optical Frequency Comb (OFC) technology enables high-precision molecular spectroscopy with absolute optical frequency calibration. Compared to traditional frequency-scanning spectroscopy with single-frequency lasers, OFC spectroscopy leverages the broadband nature of the comb's modes, allowing for the simultaneous probing of numerous transitions. This capability enables the generation of absorption spectra containing thousands of spectral lines, significantly enhancing molecular identification. A TOPTICA dual-OFC system, spanning 700 to 2200 nm, in our department facilitates extensive research in the spectroscopy of interstellar and atmospheric molecules. The combination of dual-comb spectroscopy and frequency-calibrated Doppler-free spectroscopy enables seamless integration of broadband survey spectroscopy with sub-kilohertz frequency precision. In this poster, I will outline the experimental plan and present preliminary results on the molecular absorption spectra of water vapor. A DFB laser serves as a reference for comparing the spectra obtained using a dual-OFC setup.