TUNABLE LASER SPECTROSCOPY REFERENCED WITH DUAL FREQUENCY COMBS

F. R. GIORGETTA, I. CODDINGTON, E. BAUMANN, W. C. SWANN, N. R. NEWBURY, *NATIONAL INSTITUTE OF STANDARDS AND TECHONLOGY, BOULDER, CO 80305*.

Frequency combs provide broadband spectroscopic measurements with high frequency accuracy and precision. However, because the comb power is distributed over a broad spectrum, the sensitivity can be low unless some form of multiplexed detection or cavity enhancement is used. In contrast, tunable laser spectroscopy can achieve much higher sensitivities because the full laser power is within the measured frequency window, but the frequency accuracy and precision of a rapidly tuned laser is challenging to characterize and control. We propose to combine the advantages of these two forms of spectroscopy by performing tunable cw laser spectroscopy in conjunction with a dual frequency comb setup. The cw laser would provide broadband high SNR measurements of a samples transmission spectrum on a single detector, while dual frequency combs would provide absolute instantaneous frequency measurements of the cw laser. Preliminary measurements characterizing a tunable laser have demonstrated Kilohertz frequency accuracy and resolution with a measurement time of a few milliseconds over a 25 nm band around 1550 nm.