Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

Generation of Tunable Frequency Combs for Cavity-Enhanced Ultrafast Spectroscopy[1] MYLES C. SILFIES, YUNING CHEN, Stony Brook University, HENRY TIMMERS, ABIJITH S. KOWLIGY, NIST, ALEX LIND, SCOTT A. DIDDAMS, University of Colorado Boulder and NIST, THOMAS K. ALLISON, Stony Brook University — Through the use of a frequency comb laser and optical enhancement cavities, we have previously demonstrated a detection limit of $\Delta\text{OD} = 1 \times 10^{-9}/\sqrt{\text{Hz}}$ in a time resolved measurement on a dilute molecular beam. However, in order to have a more widely applicable spectrometer, the pump and probe wavelengths must be tunable. Here we present a frequency conversion setup for the generation of high average power frequency combs across the ultraviolet, visible, and infrared. The initial comb is generated using an Er:fiber oscillator at 100 MHz which, after nonlinear amplification, is shifted in a highly nonlinear fiber to 1 μm and amplified to 10W in a home built Yb:fiber amplifier. This light is then used as a pump for several nonlinear processes including a dual-focus optical parametric oscillator for the generation of tunable visible frequency combs from 450 to 700 nm. Optical parametric amplifiers are used for infrared comb generation from 3 to 5 μm which are seeded by additional shifted erbium comb branches.

[1]This work was supported by the National Science Foundation under grant number 1708743.

Myles C. Silfies
Stony Brook University

Date submitted: 26 Jan 2018 Electronic form version 1.4