

Cavity Enhanced Molecular Spectroscopy for Developing Ultrastable Frequency Standards and Generating Frequency Combs in the Mid-IR

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We discuss the development of a NICEOHMS-based clock at 10-15 stability using an overtone of carbon monoxide interrogated at telecom wavelengths. This robust, compact, ultrastable frequency standard with magnetic insensitivity will be flown on a future satellite mission to test for violations of Lorentz Invariance under boost conditions (Kennedy Thorndike experiment).

We also present recent results in broadband molecular spectroscopy for developing frequency combs in the mid-IR using optical parametric oscillators (OPOs) at degeneracy, where the generated signal is at half the frequency of the input pump. This technique can be used to coherently translate well-established near-IR frequency comb sources to the mid-IR spectral region between 2 and 6 micrometers.