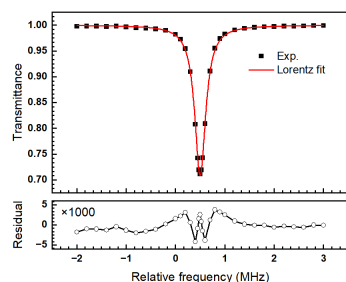


TWO-PHOTON ABSORPTION SPECTROSCOPY OF A $^{13}\text{CO}_2$ VIBRATIONAL TRANSITION

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Two-photon absorption spectroscopy is an ideal method for precision measurements of molecular energy levels and trace gas concentration. We report a two-photon absorption of the Q(36) rovibrational transition of $^{13}\text{CO}_2$, measured by cavity-enhanced absorption spectroscopy (CEAS) at $\lambda = 2.8 \mu\text{m}$. The high signal-to-noise ratio of two-photon absorption spectra was obtained by optical locking of a narrow-linewidth mid-infrared laser to a high finesse cavity. One longitudinal mode of the cavity was shifted to scan the frequency, calibrated by an optical frequency comb. We studied the properties of the two-photon absorption spectrum. It is expected that this method can be applied in the field of molecular frequency reference and high-sensitivity detection.