# DUAL WAVELENGTH CAVITY RINGDOWN SPECTROSCOPY FOR HIGH PRECISION METHANE ISOTOPE RATIO MEASUREMENTS

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We demonstrate a frequency stabilized cavity ringdown spectrometer capable of measuring simultaneous isotopes of methane ($^{12}CH_4$, $^{13}CH_4$, $^{12}CH_3D$) of enriched samples to high precision ($\delta$D$<0.03\%$ and $\delta$13C$<0.01\%$). The spectrometer employs coupling of two orthogonally polarized CW lasers into a ringdown cavity for simultaneous spectral measurements over the full wavelength range of 1.45-1.65$\mu$m. In addition, we discuss the necessity of modeling methane lineshapes with the Galatry profile to achieve the highest precision.