Carbon dioxide isotopologue laser absorption spectrometer

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Details on the development and performance of a CO_2 isotopologue laser absorption spectrometer (CILAS) will be presented [1]. Using a difference frequency generation laser source at 4.32 μm, isotopic signatures of ^{13}C and ^{12}C in CO_2 are measured and calibrated against reference gas standards analyzed by isotope ratio mass spectrometry. CILAS attains a precision of up to 0.02 ‰ for 150 s of averaging, and an overall accuracy of 0.05 ‰.

Figure 1: Photograph of the CILAS mobile instrument package.

[1] D. Richter, B.P. Wert, A. Fried, P. Weibring, J. G. Walega, J.W.C. White, B.H. Vaughn, F.K. Tittel: "High-precision CO_2 isotopologue spectrometer with a difference-frequency-generation laser source," Optics Letters **34**, pp. 172-174 (2009)