INFRARED LASER BASED SENSOR TECHNOLOGY FOR $^{13}CO_2/^{12}CO_2$ SOTOPIC RATIO MEASUREMENTS: OPPORTUNITIES AND CHALLENGES

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gh precision measurements of $^{13}CO_2/^{12}CO_2$ are needed in several fields that includ mospheric chemistry, volcano emission studies, combustion diagnostics, medica agnostics and the life sciences. Currently we are developing a compact, field deployabl iantum cascade laser based sensor to perform real time measurements with a precision c $0.1^0/_{00}$, using absorption spectroscopy. The initial design of this analyser will target th ediction of potential volcano activities, but can be useful in other trace gas sensin plications. A thermoelectrically cooled, pulsed, single frequency quantum cascade lase ill be employed as spectroscopic source, which is required for field deployment. Th ser is designed to operate at 4.33 mm, where the P-branch of $^{12}CO_2$ overlaps the R anch of $^{13}CO_2$ of the 00^01-00^00 transition. To reach a high precision delta value, th fluences of temperature and pressure stabilities must be taken into account, as well a ater vapor collision broadening.

itial details will also be reported of a CO_2 isotopic ratiometer based on a compac ectroscopic source using difference frequency generation (DFG). This work is currentl progress at NCAR, Boulder with support by the University of Colorado Isotop aboratory and the Rice University Laser Science Group