# DUAL FREQUENCY COMB SPECTROSCOPY FOR DEVELOPMENT AND TESTING OF HIGH PRESSURE, HIGH TEMPERATURE ABSORPTION MODELS

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The development of accurate absorption models for high pressure, high temperature environments is complicated by the increased relevance of higher order collisional phenomena on the absorption lineshape (e.g. line mixing, collision-induced absorption, finite duration of collisions). Accurate reference spectroscopy at these conditions is important for the study of combustion systems and remote sensing of dense planetary atmospheres. We present a new high pressure, high temperature absorption spectroscopy facility at the University of Colorado Boulder. This facility is coupled with a dual frequency comb absorption spectrometer to record broadband (~$1500\mathrm{cm}^{-1}$), high resolution (~$0.0066\mathrm{cm}^{-1}$) spectra in a controlled environment at high pressures and temperatures. Measurements of the NIR spectrum of carbon dioxide will be compared to modeled spectra extrapolated from the HITRAN 2016 database as well as other published models that include line mixing corrections. This comparison gives insight into the effectiveness of existing absorption models in the high pressure, high temperature limit as well as the improvements required to accurately model absorption spectra in harsh systems.