HIGH-TEMPERATURE METHANE ABSORPTION WITH A DUAL FREQUENCY COMB SPECTROMETER

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Quantitative measurements of combustion system fueling and hot-Jupiter exoplanets require accurate methane absorption data at elevated temperatures. The ExoMol and HITRAN spectral databases in the near-infrared 6500-9000cm-1 range are based on the 10to10 potential energy surface, and the 80K and 296K empirical WKLMC linelist, respectively, which do not empirically constrain all elevated-temperature behavior. We present spectra of the near-infrared methane overtone band around 1400nm at temperatures from 296 K to 900 K. The spectra are taken using a three-zone tube furnace and a dual-frequency comb spectrometer with 600 cm-1 bandwidth and .00667cm-1 resolution. These measurements are targeted toward providing a compact, accurate methane absorption linelist for 300-900K.