

PRECISE FREQUENCY MEASUREMENTS OF THE $2\nu_3$ A₁ - ν_3 BAND TRANSITIONS OF METHANE WITH COMB-REFERENCED INFRARED-INFRARED DOUBLE-RESONANCE

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We have carried out infrared-infrared double-resonance spectroscopy of the $2\nu_3$ A₁ - ν_3 band of methane. The ν_3 band transitions are pumped using a 90.5-THz difference-frequency-generation (DFG) source frequency-controlled with an optical frequency comb (OFC), and ten tetrahedral components of the Q(1) to Q(4) transitions from the pumped levels are observed with a linewidth of 0.8 MHz using another 88.4-THz DFG source. The transition frequencies are determined with an uncertainty of a few tens kilohertz using the OFC.

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