

HIGH ACCURACY SPECTROSCOPY OF H₂ ROVIBRATIONAL TRANSITIONS IN THE (2-0) BAND NEAR 1.2 μm

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Metrological measurements of rovibrational frequencies in molecular hydrogen provide stringent tests for the most advanced theoretical calculations and for searching for physics beyond the standard model. We will present the accurate transition frequencies of a series of lines belonging to the (2-0) vibrational band of H₂ near 1.2 μm. These weak electric-quadrupole transitions were measured at room temperature by comb referenced cavity ring-down spectroscopy and are the first H₂ (2-0) transition frequencies referenced to an absolute frequency standard. Accurate transition frequencies determination - up to three orders of magnitude better than previous measurements - will be presented. The impact of the line profile on zero-pressure line centers will be evaluated. These transition frequencies are used to infer the separation of lower energy levels in the vibrational ground state. All these experimental results will be compared to the most recent calculated frequencies.