OVERTONE AND COMBINATION BAND SPECTROSCOPY OF H_3^+

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We report our detection of H_3^+ rovibrational transitions between 7700 and 8200 cm^{-1}. This work employed a New Focus external cavity tunable diode laser, a positive column discharge, and the velocity modulation technique for enhanced sensitivity to molecular ions. This frequency range encompasses transitions of the $3\nu_2^1 \leftarrow 0$ and $\nu_1 + 2\nu_2 \leftarrow 0$ bands — the highest energy transitions studied to date.

As the simplest three-atom molecule, H_3^+ has long served as a benchmark for *ab initio* calculations. We have compared our observed frequencies with our predictions, and expect that this work (along with detection of even higher overtones) will lead to better *ab initio* treatments of this important molecule.

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