

LABORATORY DETECTION OF VIBRATION-ROTATION TRANSITIONS OF $^{12}\text{CH}^+$ AND $^{13}\text{CH}^+$ AND IMPROVED MEASUREMENT OF THEIR ROTATIONAL TRANSITION FREQUENCIES

JOSÉ LUIS DOMÉNECH, *Instituto de Estructura de la Materia, (IEM-CSIC), Madrid, Spain*; PAVOL JUSKO^a, STEPHAN SCHLEMMER, OSKAR ASVANY, *I. Physikalisches Institut, Universität zu Köln, Köln, Germany*.

The elusive C-H vibration-rotation transitions of the fundamental ions $^{12}\text{CH}^+$ and $^{13}\text{CH}^+$ have been observed for the first time in the laboratory. The technique of state-dependent attachment of He atoms to these ions in a cryogenic trap^b has been used to obtain high-resolution rovibrational data. The excitation source is an IR OPO whose frequency is measured using a frequency comb. In addition, the lowest frequency rotational transitions of $^{12}\text{CH}^+$, $^{13}\text{CH}^+$ and $^{12}\text{CD}^+$ have been revisited^{c,d,e} using a synthesizer and a multiplier chain with the same ion trap, leading to a significant improvement of their rest frequency values.

^aCurrent affiliation: Institut de Recherche en Astrophysique et Planétologie (IRAP), Université de Toulouse (UPS), CNRS, CNES, 9 Av. du Colonel Roche, 31028 Toulouse Cedex 4, France.

^bO. Asvany, S. Brünken, L. Kluge, and S. Schlemmer 2014, *Appl. Phys. B*, 114, 203-211.

^cS. Yu, B. J. Drouin, J. C. Pearson and T. Amano 2015, in *Contribution RD06*, 70th International Symposium on Molecular Spectroscopy.

^dT. Amano 2010, *Astrophys. J. Lett.*, 716, L1.

^eS. Brünken, L. Kluge, A. Stoffels, J. Pérez-Ríos, and S. Schlemmer 2017, *J. Mol. Spec.* 332, 67.