FURTHER ANALYSIS OF THE LABORATORY ROTATIONAL SPECTRUM OF CH$_3$NCO

ZBIGNIEW KISIEL, ON2, Institute of Physics, Polish Academy of Sciences, Warszawa, Poland; LUCIE KOLESNIKOVA, E. R. ALONSO, JOSE L. ALONSO, Grupo de Espectroscopia Molecular, Lab. de Espectroscopia y Bioespectroscopia, Unidad Asociada CSIC, Universidad de Valladolid, Valladolid, Spain; MANFRED WINNEWISSER, FRANK C. DE LUCIA, Department of Physics, The Ohio State University, Columbus, OH, USA; IVAN MEDVEDEV, Department of Physics, Wright State University, Dayton, OH, USA; BELÉN TERCERO, JOSE CERNICHARO, Departamento de Astrofísica, Centro de Astrobiología CAB, CSIC-INTA, Madrid, Spain; J.-C. GUILLEMIN, Institut des Sciences Chimiques de Rennes, UMR 6226 CNRS - ENSCR, Rennes, France.

Identification by the Rosetta mission that CH$_3$NCO is among the more plentiful molecules on the surface of the comet Churyumov-Gerasimenko stimulated rapid detection of this molecule in the interstellar medium.$^{a,b}$ In particular, we have been successful in detecting almost 400 lines of CH$_3$NCO in Orion$^b$ by extending the Koput$^c$ cm-wave assignment to frequencies relevant to mm-wave radio-telescopes through measurement of the complete laboratory spectrum up to 363 GHz.$^{b,d}$

Presently, we describe further progress in understanding the laboratory rotational spectrum of CH$_3$NCO. Assignment has been extended to transitions with $K > 3$ by analysis of Stark and hyperfine patterns of the corresponding lowest-$J$ transitions. Broadband spectra of synthesised pure $^{13}$CH$_3$NCO and CH$_3$N$^{13}$CO isotopic species have also been recorded and assigned. Furthermore, the progress in fitting this very low barrier and highly perturbed internal rotation spectrum is described.

$^{d}$Z.Kisiel et al., 65th ISMS, Columbus, Ohio, RC-13 (2010); 70th ISMS, Champaign-Urbana, Illinois, TG-08 (2015).