INVESTIGATING ISOMERS OF ASTROPHYSICAL MOLECULES BY ROTATIONAL SPECTROSCOPY: THE CASE OF [C_2H_2O] COMPOUNDS

MARIE-ALINE MARTIN-DRUMEL, *CNRS, Institut des Sciences Moleculaires d'Orsay, Orsay, France*; KELVIN LEE, *Radio and Geoastronomy Division, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, USA*; OLIVIER PIRALI, *AILES beamline, Synchrotron SOLEIL, Saint Aubin, France*; J.-C. GUILLEMIN, *UMR 6226 CNRS - ENSCR, Institut des Sciences Chimiques de Rennes, Rennes, France*; MICHAEL C McCARTHY, *Atomic and Molecular Physics, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, USA*.

Detection of isomers in the interstellar medium is a valuable tool toward a better understanding of the formation and destruction mechanisms at play, especially because kinetics effects are thought to be as important as thermodynamic ones, if not preponderant. About a third of the interstellar species discovered so far are isomers but little remains known on reactive isomers of relatively large astrophysical species (5 atoms and more), in part due to the difficulty to both produce and detect these species in the laboratory.

Ketene is one such species: the molecule is a known interstellar species but none of its isomers has so far been detected by mean of rotational spectroscopy, preventing any interstellar detection so far. We have undertaken an experimental and theoreticcal investigation of the rotational spectrum of the isomers of ketene, and in particular of its two close-shell isomers, hydroxyacetylene (HCCOH) and oxirene (c-C_2H_2O). We will report our results on these compounds and propects of using a recent experimental technique – spectral taxonomy – to investigate isomers of astrophysical interest in the millimeter and submillimeter domains.