DETECTION OF THE ROTATIONAL SPECTRUM OF SULFOXYLIC ACID (HOSOH)

KYLE N. CRABTREE, OSCAR MARTINEZ, JR., LOU BARREAU[a] and MICHAEL C. McCARTHY, *Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, 02138*; SVEN THORWIRTH, *I. Physikalisches Institut, Universität zu Köln, 50937 Köln, Germany*.

Sulfoxylic acid (HOSOH) is a chemical intermediate that falls roughly midway in the oxidation states of sulfur, between its highly reduced (H_2S) and oxidixed (H_2SO_4) forms. It is likely formed during atmospheric oxidation of anthropogenic and natural sulfur emissions, and might also be produced by UV processing of circumstellar ices. Despite considerable theoretical work, no gas-phase spectra of sulfoxylic acid or any of its structural isomers have previously been observed. We report the detection of the rotational spectra of the C_2 and C_s rotamers of HOSOH using a combination of Fourier transform microwave spectroscopy and microwave-microwave double resonance techniques, guided by new high-level quantum chemical calculations of their structures. The present work enables radioastronomical searches for these species, and also lays the groundwork for further chemical studies of its gas-phase formation and spectroscopic studies of other H_2SO_2 isomers.

[a]Present address: École Normale Supérieure de Cachan, 94235 Cachan Cedex, France