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Rotational Spectroscopic Studies and Observational Searches for HO₃

SUSANNA WIDICUS WEAVER¹, Emory University

Interstellar chemistry is largely driven by reactions of unstable molecules that serve as reaction intermediates in terrestrial chemistry. One such class of compounds are weakly-bound clusters. These clusters could form in interstellar environments through radiative association reactions, but their identification and characterization in interstellar environments is limited by a lack of rotational spectral information. One such species is HO₃, which could be formed in the interstellar medium from O₂ and OH. HO₃ has been studied extensively in the infrared, and there are a few microwave spectral studies that have also been reported. However, no millimeter or submillimeter spectral information is available to guide astronomical observations. In this talk, we will present the laboratory characterization of *trans*-HO₃ and *trans*-DO₃ from 70 to 450 GHz using our newly developed fast sweeping technique. The molecular constants have been significantly refined, and additional higher order centrifugal distortion constants have been determined. We will also present an initial observational search for HO₃ in 32 star forming regions. Although no HO₃ lines have been detected thus far, strict upper limits can be placed on the HO₃ column density in these sources based on this analysis.

¹Additional Authors: Luyao Zou, Brian M. Hays