

THE MILLIMETER/SUBMILLIMETER SPECTRUM OF METHYLPHOSPHINE, CH₃PH₂ (\tilde{X}^1A)

D. T. HALFEN, *Department of Chemistry, Department of Astronomy, and Steward Observatory, University of Arizona, Tucson, AZ 85721*; D. J. CLOUTHIER, *Department of Chemistry, University of Kentucky, Lexington, KY 40506*; and L. M. ZIURYS, *Department of Chemistry, Department of Astronomy, and Steward Observatory, University of Arizona, Tucson, AZ 85721*.

The millimeter/submillimeter spectrum of methylphosphine, CH₃PH₂ (\tilde{X}^1A), has been measured using direct absorption techniques. Previously, only the microwave spectrum had been recorded. This molecule was created by the reaction of gas-phase phosphorus and methane or Si(CH₃)₄ in the presence of argon carrier gas and an AC glow discharge. Several transitions have been recorded in the range 280 - 422 GHz in both the $v = 0$ and $v = 1$ states each with multiple asymmetry components ranging from $K_a = 0$ to 16. Several of the K_a components in the $v = 0$ state show A/E splittings, while others appear collapsed. The $v = 1$ state has multiple K_a components with A/E splittings and is currently being analyzed. The data for the $v = 0$ state has been fit with an asymmetric top Hamiltonian, including internal rotation interactions, and the spectroscopic constants have been determined. Methylphosphine is the third row analog of methylamine, a known interstellar molecule, and could be a potential interstellar species.