THE MILLIMETER/SUBMILLIMETER SPECTRUM OF METHYLPHOSPHINE, CH_3PH_2 ($\tilde{X}^1A$)

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The millimeter/submillimeter spectrum of methylphosphine, CH_3PH_2 ($\tilde{X}^1A$), 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 $Si(CH_3)_4$ 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.