EXAMINING METHYLAMINE DISSOCIATION PRODUCTS USING THEORY AND ROTATIONAL SPECTROSCOPY: THE CH_2NH_2 RADICAL

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Studying the chemical inventory of the interstellar medium (ISM) is critical to developing new theories of molecular formation and evolution. Furthermore, the search for biologically-relevant species and their precursors has been at the forefront of astrobiology and astrochemistry in recent years. As such, this work focuses on the dissociation products of methylamine (CH_3NH_2), a known precursor to the simplest amino acid, glycine ($C_2H_5NO_2$). It is likely that the radical products of cosmic-ray induced photodissociation of methylamine are important in prebiotic interstellar pathways as well as atmospheric models of planetary bodies such as Titan. Therefore, we are studying the radical species produced in a methylamine discharge as a guide for future studies of methylamine photodissociation. Our initial molecular target is the CH_2NH_2 radical, for which no rotational spectroscopic information is available. We examined the structure of this radical using high-level computational methods and then predicted the rotational spectrum based off of this information. We then compared these predictions to the rotational spectra of species obtained using a high voltage discharge of methylamine in argon at the throat of a supersonic expansion. Here we will present the spectroscopic predictions and the initial experimental results for CH_2NH_2, and discuss the implications of this work for astrochemistry and astrobiology.