PREDICTED ROTATIONAL AND LAMBDA-DOUBLING TRANSITIONS OF NH^-

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Positive molecular ions have been detected in molecular clouds in the interstellar medium, where they are known to play a major role. However no negative molecular ions have been detected in astronomical sources, except possibly $C_7{}^-$. This situation may be in part because of a lack of published predictions of transition frequencies suitable for astronomical detection. Lepp and Dalgarno have predicted that negative ions may be present in reasonable abundances in some molecular clouds. Usually the most favorable cases for astronomical detection of molecular ions are pure rotational transitions in the sub-mm or far infrared. We draw upon experimental infrared vibrational-rotational spectra to obtain transition frequencies for pure rotational lines and lambda-doubling transitions of NH^-. The corresponding transitions in isoelectronic OH were observed astronomically years ago. The prospects for astrophysical observation of NH^- are discussed. [a]

[a] Supported by DOE EPSCoR