A LABORATORY SEARCH FOR THE CARRIER OF U-LINES ATTRIBUTED TO \( l\)-C\(_3\)H\(^+\) IN THE HORSEHEAD NEBULA PDR

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Recent radio observations of the Horsehead nebula PDR in the millimeter-wave band by Pety et al.\(^a\) detected a series of unidentified lines which have been attributed to \( l\)-C\(_3\)H\(^+\), a molecular cation for which no high-resolution laboratory data presently exist. We have detected a pair of rotational lines in the centimeter-wave band at frequencies predicted from their derived spectroscopic constants using Fourier transform microwave and microwave-microwave double resonance spectrosopies. Experimental evidence strongly suggests that the laboratory and astronomical lines arise from a common carrier, and that the carrier is a closed-shell, reactive hydrocarbon containing a linear or nearly-linear three carbon atom backbone.