THE SEARCH FOR l-C_3H^+ (B11244) IN MORE THAN 40 ASTRONOMICAL SOURCES

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In 2012, Pety et al. (*A&A*, 548, A68) reported the detection of a series of transitions from 90 to 270 GHz arising from a molecular carrier (B11244) which they attributed to the l-C_3H^+ cation, a species never-before seen in the laboratory. Theoretical work, however, suggested the anion, C_3H^-, was a more likely carrier (Fortenberry et al. 2013, *ApJ*, 772, 39). We conducted several observational studies to examine these possibilities, and concluded l-C_3H^+ was supported by the observational evidence, a conclusion which has recently been confirmed by laboratory work (Brünken et al. 2014, *ApJL*, 783, L4). Here, we present a body of observational results compiled in our search for l-C_3H^+ toward more than 40 sources. Despite spanning a wide range of environments, including hot molecular cores, cold cores, PDRs, and HH objects, we find definitive evidence for l-C_3H^+ in only three sources. We will discuss the implications of the apparent scarcity of this molecule. What is so special about these specific regions that favors the formation of this molecule, and in turn, what can l-C_3H^+ tell us about the physical and chemical conditions within these environments? Interferometric observations with ALMA are the ideal path forward for answering these questions, and we discuss what these observations will tell us about l-C_3H^+ and the unique environments in which it is present.