DETECTION OF D_2H^+ IN THE DENSE INTERSTELLAR MEDIUM

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The 692 GHz para ground-state line of D_2H^+ has been detected at the Caltech Submillimeter Observatory towards the pre-stellar core 16293E. The derived D_2H^+ abundance is comparable to that of H_2D^+, as determined by observations of the 372 GHz line of ortho-H_2D^+. This is an observational verification of recent theoretical predictions (Roberts, Herbst & Millar 2003), developed to explain the large deuteration ratios observed in cold, dense regions of the interstellar medium associated with low mass pre-stellar cores and protostars. This detection confirms expectations that the multiply deuterated forms of $H_3{}^+$ were missing factors of earlier models. The inclusion of D_2H^+ and $D_3{}^+$ in the models leads to predictions of higher values of the D/H ratio in the gas phase.