A STUDY OF THE c-C_3HD/c-C_3H_2 RATIO IN LOW-MASS STAR FORMING REGIONS.

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Deuterium fractionation increases significantly in cold ($T < 25$ K), dense ($n_{\rm H} > 10^4\,{\rm cm}^{-3}$) molecular clouds, in which molecules like CO freeze out onto dust grains leading to an enhanced abundance of H_2D^+, D_2H^+ and D_3^+. c-C_3H_2 is formed and deuterated exclusively by gas-phase chemistry. This makes it to a very good indicator of gas-phase deuteration and therefore to an excellent tool to study the early phases of star formation.

We observed the c-C_3HD/c-C_3H_2 ratio toward 13 prestellar and 4 protostellar cores in the Taurus and Perseus Complex, respectively. In particular, the $3_{0,3} - 2_{1,2}$ and $2_{1,2} - 1_{0,1}$ transitions of the isotopologues c-C_3HD and c-$^{13}CC_2H_2$ were observed in all prestellar and protostellar cores with a very high S/N. In both samples a high deuteration factor was found. In the prestellar cores the c-C_3HD/c-C_3H_2 ratio varies between 5% and 13% while in protostellar cores is found to be 9%-23%.

I will present our results on the correlation between the deuterium fractionation of c-C_3H_2 and evolutionary indicators such as central density and dust temperature and compare them with the deuteration of N_2H^+ observed in the same sources.