THE COLD ENVELOPES AND THE HOT CORINOS OF SOLAR TYPE PROTOSTARS

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Last years have seen substantial progresses in our understanding of the solar type protostars structure, and particularly of the chemical structure of the protostellar envelopes. On the one hand, the cold outer regions keep intact the memory of the past pre-collapse phase, when the dust is so cold and dense that almost all molecules freeze out onto the dust grain mantles. The gas chemical composition undergoes dramatic changes, whose the most spectacular aspect is the huge increase of the molecular deuteration degree, which can reach 8 orders of magnitudes with respect to the elemental D/H ratio. On the other hand, in the innermost regions of the envelope -the so-called hot corinos- the grain mantles evaporate, when the dust temperatures exceeds 100K, injecting in the gas phase plenty of hydrogenated molecules, like formaldehyde and methanol. Those molecules probably undergo chemical reactions which form more complex, organic molecules, now observed also in the low mass hot corinos. Puzzling enough, the involved timescales seem to be much shorter than the theoretical chemical timescale!

In this contribution, I will review what we have recently understood and what we have not yet, on both aspects of the same objects: the cold envelopes and the hot corinos of solar type protostars.