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Hot corinos: pre-biotic molecules in solar-type protostars

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One of the major goals of modern astrophysics is to understand the formation of our Solar System. Since low-mass protostars are suns in the making, the study of these objects and their environment provides one of the best ways to investigate the Sun's formation process and to peek in the past history of our Solar System. In particular, by studying the chemistry occurring in Class 0 sources (the earliest known phases in the evolutionary scenario of low-mass protostars), we can uncover the formation and evolution of pre-biotic molecules in the precursors of solar-type stars. Such molecules (e.g. CH_3CN, $HCOOCH_3$, HCOOH, etc) have been discovered in IRAS16293−2422, the prototype of Class 0 sources, proving the existence of hot corinos, the inner regions of the protostellar envelope where the icy grain mantles sublimate. Some of these molecules have also been observed in comets in our Solar System, raising the question of whether (and if so, how) the chemistry of Class 0 objects affects the chemical composition of the protoplanetary disk material from which comets and other planetary bodies form. However, it is first necessary to determine whether hot corinos are ubiquitous in low-mass protostars or if IRAS16293−2422 is an exception. In this talk, I present the steps I took to search, find and characterize other hot corinos, using the IRAM-30m and PdBI. To try and discriminate whether complex organic molecules form via gas-phase or grain-surface reactions, I confront the possible formation pathways with the results of my observations, and I also compare hot corinos with their high-mass analogs, the hot cores. I will conclude with some prospects for the study of pre-biotic molecules in young solar-type objects and questions that future facilities will address.