

The PILS program: a large spectral survey of the solar-type protostar IRAS 16293-2422 with ALMA

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Solar-type protostars are known to be chemically rich. A lot of complex organic molecules are detected in the warm inner regions of these objects due to the thermal desorption of the molecules frozen on grains. Some of these molecules could be incorporated into comets and asteroids before being delivered into planets through impacts. They could then potentially play a role in the emergence of life if the conditions on the planets are suitable. Large unbiased spectral surveys are ideal to fully characterize the molecular content of star-forming regions. With the arrival of the Atacama Large Millimeter/submillimeter Array (ALMA), the sensitivity has significantly improved and many new species have been detected. These new detections provide important constraints on the chemistry of the early stages of the star formation process.

IRAS 16293-2422 is one of the most studied solar-type protostars. It has been the target of a large and sensitive spectral survey with ALMA in the framework of the PILS program ([1]), which led to important results such as first detections of molecules in solar-type protostars (e.g., [2], [3]) and first determinations of deuterium fractionation ratios of several complex organic molecules (e.g., [4], [5]). In this presentation, I will give an overview of the results obtained with this survey and discuss the constraints provided by these data regarding the chemistry of solar-type protostars.

References

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