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TITLE: Water, ammonia, methanol and complex molecules in the earliest phases of star formation

ABSTRACT BODY:

Abstract Body: Herschel and ground based observations toward the contracting pre-stellar cloud core L1544 in the Taurus Molecular Cloud Complex have provided constraints on the distribution of water and organic molecules just before the formation of a Solar-type star and its potential planetary system. In this talk I shall present Herschel WISH observations of the ground state transitions of ortho-H₂O and ortho-NH₃ as well as IRAM 30m maps of methanol and deuterated methanol toward L1544. Together with recent observations of complex organic molecules toward the same source, and new ALMA data, conclusions can be drawn on the importance of surface processes and cosmic rays in the chemical evolution during the initial stages of star formation. D and ¹⁵N fractionations in this object as well as in other objects in early stages of evolution and in different environments, will also be presented and links to later stages in the star formation process and to our Solar System attempted.

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