

From hot-corinos to comets: astrochemistry and the protostellar heritage

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How the chemical complexity evolves during the process leading to the formation of a Sun and its planetary system? Is the chemical richness of a Solar-like planetary system (partially) inherited from the earliest stages or there is a complete chemical reset? A powerful way to start answering these questions is by comparing the observed astrochemical content in young protostars with that in comets, i.e. with the most pristine known material from which our Solar System formed. While hot-corinos in young sources are relatively well-known, very little has been done so far to study the composition of more evolved Class I sources, which represent the link between the protostellar stage and the planetary system formation.

We present a chemical systematic study of the Class I object SVS13-A [1,2,3] obtained in the framework of two IRAM Large Programs: ASAI (Astrochemical Survey At IRAM-30m: [4]) with the 30m and SOLIS (Seeds Of Life In Space: [5]) with NOEMA. Thanks to the ASAI high-sensitivity unbiased spectral survey of the 3, 2 and 1.3 mm bands, we detected and analysed several emission lines from deuterated species and iCOMs. Within SOLIS, we obtained high-sensitivity and high-spatial resolution maps of crucial iCOMs (Fig. 1,2), thanks to the new Polyfix correlator. The Class I molecular abundances are compared with those measured in the comet 67P, to start to test the inheritance scenario from the protostellar phase.

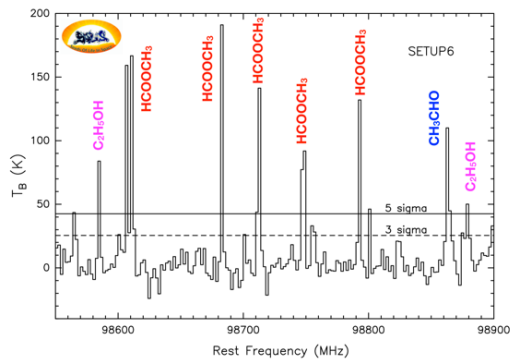


Figure 1: Selected windows from the new SOLIS NOEMA (Polyfix) observations.

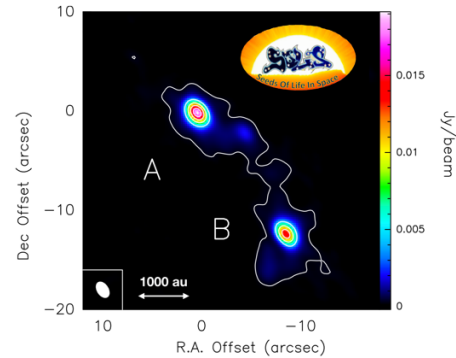


Figure 2: Continuum emission of the SVS13 system as observed by SOLIS NOEMA at 82 GHz.

References

- [1] Bianchi E. et al., MNRAS, 467, 3011 (2017)
- [2] Bianchi E. et al., MNRAS, 483, 1850 (2019)
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