☒ ORAL presentation ☐ POSTER

In depth study of a rich population of young high-mass proto-stars unveiled by the emission of complex organic molecules

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Session : **S13 Atelier général du PCMI**
Keywords: **High-mass star formation, ISM**

ABSTRACT:

The detailed processes involved in the formation of high-mass stars have been long-standing issues in astrophysics. The new capabilities of state-of-the art radio-interferometers have recently opened a new window on the study of high-mass star-forming sites. In particular, the high-sensitivity wide-bandwidth observations delivered by ALMA, coupled with wide field mosaic mapping, give access to a large population of dense clumps, of which we are able to probe the structure and the chemical content, over scales from clouds to individual protostellar envelopes.

The ALMA-IMF observing program [1,2,3] targets 15 of the most massive star-forming regions in the Galaxy. The observational data give access to the innermost part of these high-mass star-forming sites, that contains nearly a thousand compact dust continuum cores [4], providing an instantaneous view on Galactic star formation, at different scales and different evolutionary stages. Based on the emission that arises from complex organic molecules we built an unprecedented catalog of more than 70 hot cores [5]. We find that the investigated protoclusters host 5 hot cores each in average, except for two cases where we find single hot cores isolated up to >2pc around the source. By cross correlating the hot core catalog with the list of cold dust continuum sources we find that hot cores represent about 9% of our total sample of sources, while 90% of the cores with a mass above 20 M⊙ are associated to hot core emission. Finally, by cross correlating the hot core catalog with the list of pre- and proto-stellar sources, we estimated the appearance of the hot core phase to be not longer than 3×10^4 yr.

References:

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