

The protostellar cluster OMC-2 FIR 4: a laboratory to study the formation environment of the Solar System

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There is strong evidence that the Solar System formed in a large cluster hosting massive stars [1, 2]. Investigating solar-mass protostellar objects in massive star forming regions can thus help us understand the origin of our planetary system. An excellent target for this is the protostellar cluster OMC-2 FIR 4, located in the Orion North star formation complex. Indeed, Herschel -HIFI observations of N_2H^+ and HCO^+ suggest that this region hosts a source of energetic particles (>10 MeV) whose irradiation field is comparable to that experienced by the young Solar System [3], thus making OMC-2 FIR 4 a close analogue of what must have been the natal environment of the Sun.

In the framework of the IRAM large programme SOLIS (Seeds Of Life In Space; [4]), we made use of the interferometer NOEMA (Northern Extended Millimeter Array) to map several molecular lines in OMC-2 FIR 4. I will present our first SOLIS results, which allow us to explore how the presence of an internal source of energetic particles affects the molecular chemistry of the region [5,6].

References: [1] Adams 2010, ARA&A, 48, 47; [2] Pfalzner et al. 2015, PhyS, 90, 068001; [3] Ceccarelli et al. 2014, ApJ 790, L1, [4] Ceccarelli et al. 2017, ApJ, 850, 176, [5] Fontani et al. 2017, A&A, 605, 57, [6] Favre et al. (*submitted*)