

# QUIJOTE: Q-band Ultrasensitive Inspection Journey to the Obscure TMC-1 Environment.

## The chemical complexity of a cold dark cloud

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I will present the recent results obtained with the QUIJOTE line survey of the cold dark core TMC-1. The observations have been carried out with the YEBES 40m radio telescope in the Q-band. A new set of receivers have been installed in the telescope within the frame of the ERC synergy Nanocosmos project that allows to cover the whole 31-50 GHz band in dual polarization with a spectral resolution of 38.15 kHz. The sensitivity achieved so far varies between 0.08 and 0.20 mK, and allows to search for new molecules in a line by line (no stacking) detection procedure. These new data have permitted to detect many protonated species of abundant molecules, several sulfur-bearing species, cycles (benzynes, cyclopentadiene, indene), radicals, and long hydrocarbon chains. I will show the present chemical models we have performed to explain the chemistry of these species and in particular the possible reactions leading to the formation of these cycles. We suggest that a bottom-up approach starting with reactions of simple radicals, such as propargyl and the vinyl radical, with vinyl and allyl acetylene and other hydrocarbons could reproduce satisfactorily well the observed abundances. None of the new molecules found in TMC-1 are detected towards the carbon-rich evolved star IRC+10216.

Finally, I will show the SANCHO project which is devoted to the study of the spatial distribution of these molecules around TMC-1 with a sensitivity never achieved so far (4 mK).