

# The dust and gas interplay in star and planet forming regions

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Stars and planetary systems in our Galaxy form within dense ( $n(\text{H}_2) \sim 10^5 \text{ cm}^{-3}$ ) and cold ( $T \sim 10 \text{ K}$ ) fragments of interstellar molecular clouds, called pre-stellar cores. Important processes take place at this early stage thanks to the interplay of dust grains and the gas, such as isotope fractionation, production of complex organic molecules and formation of thick icy mantles onto dust grains, where water and organics are stored. These processes affect later phases of star and planet formation, which can now be traced with powerful interferometers such as ALMA and NOEMA. I shall review the chemical and physical structure of pre-stellar and protostellar cores, as well as theoretical work on protostellar disk formation and early evolution. Links to protoplanetary disks and our Solar System will be made.