

Molecular Disks around Young Stars

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Understanding how planets and life appeared is one of the older dreams of Mankind. Today, more and more circumstellar disks are found around Young Stellar Objects (YSOs) called T Tauri stars. These stars are indeed young suns at the stage where our Sun was still surrounded by a flattened structure of rotating gas and dust: the so-called proto-solar Nebula which provided the material to build the Solar System. Therefore, understanding the physics, the chemistry and the evolution of these disks, is the important clue to find how planetary systems form around Solar-type stars. In protoplanetary disks, except very close to the star, the gas and the dust remain at low temperatures and radiate at long wavelengths, from the Far-Infrared to millimeter waves. Unfortunately, these systems are relatively far away. With a sensitivity 30-40 times larger than that of the best mm array (IRAM interferometer), ALMA will provide images with details as small as a few astronomical units, allowing to image disks at the scale at which planetary formation is believed to occur. In this talk, I will review the kinematics and the physical properties of the gas surrounding YSOs, from the early stages of planet formation to more evolved ones such as the β Pic-like disks, showing how our knowledges are definitely limited by the possibilities of current mm arrays. In conclusion, I will show that ALMA will allow the first quantitative studies of gas evolution towards planet formation.

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