POSTER

ABSTRACT

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Understanding the mm-wave emission of protoplanetary disks

Circumstellar disks around young pre-main sequence stars are often called "protoplanetary" because of their potential to harbour planet formation. Evidence for the early stages of planet formation in young disks has been provided in the past by different techniques at different spectral windows. Observations at sub-mm and mm wavelengths offer the best way to investigate the evolution of dust grain growth in the disk midplane, where planet formation is supposed to occur. Although evidence for grain growth to mm-sized pebbles has been claimed since almost two decades ago by the observed low values of the (sub-)mm spectral indeces of young disks, a physical explanation of these values is still lacking. In particular it is still unclear how these large grains can survive in the outer regions of the disk, instead of drifting radially toward the central star because of the interaction with gas. Other than presenting state-of-the-art observations obtained with mm-interferometers (PdBI, CARMA, ATCA) for disks in Taurus, Ophiuchus and Orion star forming regions, we describe how these data can be used to constrain physical models of dust evolution (through coagulation and fragmentation) and radial mixing. We discuss also how future millimeter facilities, expecially ALMA, will be able to put more stringent constraints to the physics of dust evolution and migration in protoplanetary disks, and possibly give us a deeper insight into the formation of planetesimals, which represents one of the most critical steps in the whole process of planet formation.