[JJ] Evening Poster | P (Space and Planetary Sciences) | P-CG Complex & General

[P-CG22]New Developments of Planetary Sciences with ALMA

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The Atacama Large Millimeter/Submillimeter Array (ALMA) starated its science operation in 2011, and long-baseline observations have become available since 2014. ALMA, with its high sensitivity and resolution, has provided us with qualitatively new information on star and planet formation and small bodies in our Solar System. For example, the discovery of narrow gap structures in the protoplanetary disks around young stars HL Tan and TW Hya enabled us to actually compare the long-standing theoretical models of planet formation with real observations. In our solar system, 60km pixel-scale non-uniform brightness distribution and the rotation of the asteroid Juno are detected. Spatially-resolved thermal mapping of Europa icy surface enables us to search for thermal anomaly in possible plume source regions. As of Cycle 4, Solar observations are available, enabling us, for example, to determine the physical parameters of plasmoid quantitatively. In this session, we overview the latest results of ALMA observations in the field of planetary sciences. We also accept any theoretical and experimental works that are closely related to the observations and discuss the impact on the planetary science community.

[PCG22-P12]ALMA Observations of Dust Emission from Protoplanetary Disks : Comparison with Radial Drift Model of Dust Particles

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ALMA observations of protoplanetary disks with high spatial resolution and high sensitivity have made it possible to observe detailed structure statistically and discuss the evolution of gas and dust in the disks, which will lead to our understanding of the formation process of planetary systems.

In this work we have observed 10 T Tauri disks in the Taurus molecular clouds with ALMA. We have analysed the data and compared the results with the theoretical model in which the gas evolution due to turbulent viscosity and the radial drift of dust particles towards the central star due to gas friction are taken into account. The model fits the observations towards 5 objects, and the followings are the tendency of the obtained best fit parameters:

- The initial disk radii are a few hundreds of au.

- The dust parameters A which is related with the Stokes parameter are around 0.1.

- The initial dust surface densities at the disk radius of 1au range from 0.17 to 5.4 g/cm^2.

Meanwhile, the model did not fit the observations towards the remaining 5 objects. It is because the dust surface density profiles are always inversely proportional to the disk radius, and the result suggests that more realistic model in which, for example, the dust size growth is taken into account is

needed for further analysis.