[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-P13]Detecting Non-Axisymmetric Structures of Protoplanetary Disks from Low-Resolution Radio Interferometric Data

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Keywords:Protoplanetary Disk, Interferometric Observations, Data Analysis

We suggest a novel method of detecting non-axisymmetric structures of protoplanetary disks from low-resolution radio interferometric data. We make use of visibility, which are directly observed quantities in interferometry. We show that the asymmetric structures on the plane of the sky shows up as asymmetry in the visibility data in the uv-space. We perform a systematic parameter search of a number of disk models and their simulated observations, and investigate how the disk asymmetric structures appear in the visibility data. We find that the asymmetry of the visibility in the uv-space appears even when the array configuration is not very extended. Even in the case where the asymmetry is indistinguishable in the image on the sky plane due to large beam, it is possible to identify such structures in the uv-space. We have developed a method to identify disks harboring possible asymmetric structures, which may be useful, for example, in archival search.