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

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

convener:Takayuki Muto(Division of Liberal Arts, Kogakuin University), Munetake Momose(The College of Science, Ibaraki University), Hideo Sagawa(京都産業大学理学部, 共同), Masumi Shimojo(National Astronomical Observatory of Japan)

Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

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-P06]The studies of protoplanetary disks with ALMA: towards comprehensive understanding of planet formation

*Munetake Momose[1] (1.The College of Science, Ibaraki University)

Keywords:Planet formation, Protoplanetary disks, Astronomical observations

Thanks to its unprecedented sensitivity and spatial resolution, ALMA is providing us with striking informations about nearby star-forming regions and protoplanetary disks. In this presentation, I will review important results to establish comprehensive understanding of planet formations. The first part will discuss the possible planet formations via disk fragmentation by gravitational instability. ALMA has found ring-gap features in more than 10 protoplanetary disks, and these gaps are likely to be carved by a planet. One can estimate the mass of the planet from the width and depth of a gap by comparing them with hydro-dynamic simulations, and the inferred combination of planet mass and its location around some pre-main sequence stars seems to be realized only through disk fragmentation by gravitational instability in a early evolutionary stage. In fact, ALMA has also revealed disk structure which strongly suggests ongoing disk fragmentation in some protostellar disks. The second part, on the other hand, will emphasize the studies related to the dust growth, which is the most fundamental process in the planet formation via rocky planetesimals. The topics will include the discoveries of dust-concentrated regions in some disks and the estimation of dust particle size based on polarization observations of dust thermal radiation.