

Future Exploration of Jovian System by LAPLACE: Origin of Jupiter and Evolution of Satellites

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LAPLACE is a planned Jovian system mission with three spacecrafts aiming at coordinated observations of the Jovian satellites especially Europa and the magnetosphere, atmosphere and interior of Jupiter. In October 2007, it was selected as one of future ESA scientific missions Cosmic Vision (2015-2025). From the beginning, Japanese group is participating in the discussion process of the mission. There is a possibility that JAXA will take a role on the magnetosphere spinner (and if possible one of the launchers).

Japanese scientists working on the origin and evolution of Jupiter, satellite evolution, and astrobiology have been participating in the LAPLACE working group in Japan. Detailed observation of Jovian satellites Europa, Ganymede, Callisto and Io as well as smaller satellites such as Amalthea would be important also for the study of the origin of Jovian system. Resurfacing processes on Europa and Ganymede should be studied to know the properties of the internal oceans. Not only the thickness of icy crust of Europa but also thickness of the ocean and its bottom topography should be important target. Compositions of the satellites of Jovian system in contrast to those of Saturnian and Uranian systems should provide a key for the origin of gas-rich planets.

Japan, the lunar explorer Kaguya is ongoing successfully, and Venus remote sensing mission (PLANET-C) will be launched in 2011. Several instruments such as cameras, spectrometers, altimeter, sounder and magnetometer should be applied using the heritage of Kaguya and PLANET-C.