

国際共同木星総合探査計画「Europa Jupiter-System Mission」による木星電磁圏探査

笠羽 康正 [1]; 高島 健 [2]; 藤本 正樹 [3]; 佐々木 晶 [4]
 [1] 東北大・理; [2] 宇宙研; [3] 宇宙機構・科学本部; [4] 国立天文台 RISE

Challenge to the Jovian Magnetospheric World by the International "Europa Jupiter-System Mission"

Yasumasa Kasaba[1]; Takeshi Takashima[2]; Masaki Fujimoto[3]; Sho Sasaki[4]
 [1] Tohoku Univ.; [2] ISAS/JAXA; [3] ISAS, JAXA; [4] RISE, NAOJ

We 'the JMO Science Forum' try to define the Science Requirement for the Jupiter Magnetospheric Orbiter (JMO) in the context of the Europa Jupiter System Mission (EJSM). The Europa Jupiter System Mission (EJSM) includes 3 spacecraft:

(1) The Jupiter Europa Orbiter (JEO) by NASA, (2) the Jupiter Ganymede Orbiter (JGO) by ESA, (3) the Jupiter Magnetospheric Orbiter (JMO) studied by JAXA, and, (4) the Europa lander is also studied by Roscosmos as a stand-alone mission.

For this objectives, the JMO Science Forum is established in June 2008. It opens to all key scientists in this fields. The JMO is dedicated to the Space Sciences of the Jovian System. It is not the satellite orbiter, and covers the key regions of the Jovian System by in-situ and remote sensing instruments.

The JMO can potentially cover the following objectives:

- (1) Magnetospheric and Space Sciences [In-situ & Remote sensing],
- (2) Satellite Sciences [In-situ (flybys) & Remote sensing], and
- (3) Atmospheric Sciences [Remote sensing].

The mission design will be optimized to the first topics. It is supported by and coordinated complementarily with other elements of the EJSM. For the second and third topics, the JMO will support the objectives of other elements of the EJSM.

The JMO try to achieve the three main breakthrough, by the First Multi-Scale studies for Jovian System. (1) First Complete survey of Jovian magnetosphere Orbit: from 'Io Torus' (6 R_J) to 'Corotation Boundary & Tail reconnection region' (50 - 100 R_J). (2) First Complete survey of time-regime in the Jovian Magnetosphere Time Scale: from 'msec order' (electron - ion scale) to 'Years' (effect of Io activities / solar wind controls). (3) First multi-scale studies of the Jovian Magnetosphere Coordination: Coupling of 'the latest IN-SITU & IMAGING techniques' (Full optimization toward the Plasma Universe) and 'Coupling with JGO & JEO' (Multipoint studies)

Based on those strategy, we resolve the Jovian system by three main topics:

I. Jupiter : Investigation of 'a Fast & Huge Rotating System' like Pulsar: We will solve the energy transfer in the Fast-Rotating Magnetosphere, in order to investigate 'How is the energy procurement from the Jovian rotational energy toward the Magnetosphere?' and 'How is the control of the solar wind energy toward the Magnetosphere?'.

II. Jupiter : Investigation of 'the Strongest Accelerator' in the solar system: The mechanism of relativistic particle acceleration will be investigated, in order to solve 'How is the effective mechanism of non-linear wave-particle interaction?' and 'How is the radiation environment of Europa / Ganymede?', etc. The Mechanism of unknown particle acceleration and heating process, like the mechanism of 40min quasi-periodic burst, will also be investigated.

III. Jupiter : Investigation of 'a Binary System' by electromagnetic mechanisms: Procurement of Cold heavy ion plasmas, Io, is important to understand 'How is the transport and heating process - seeds of the cosmic ray?' and 'How is the loss of high-energy particles?'. Magnetosphere - Magnetosphere coupling process, Ganymede, is also interesting for 'How is the difference of icy satellite environment with / without magnetic field?' etc.

In this paper, we describe the updated status of those investigations in order to stimulate the communities' discussions.

[Reference Web Page]

*Japan (in Japanese) : <http://sprg.isas.jaxa.jp/researchTeam/spacePlasma/mission/Laplace/Laplace.html>

*Europe : <http://jupiter-europa.cesr.fr/>

*USA : <http://www.lpi.usra.edu/opag/announcements.html>