**R009-13**
**Zoom meeting D ：11/1 PM1 (13:45-15:30)**
**14:00〜14:15**

# Radio & Plasma Wave Investigation (RPWI) aboard JUICE: 木星および氷衛星への科学目標およびその実現性

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# Radio & Plasma Wave Investigation (RPWI) aboard JUICE: Sciences and their feasibilities for Jupiter and Icy Moons

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Outer solar system is one of the key area of future sciences. JUpiter ICy moons Explorer (JUICE) is ESA's first L-class mission which will aims the largest target in this area, Jupiter and its large icy moons. Now, JUICE is during the final test campaign before the launch planned in 2022, and showing the good capability to perform the outer solar system explorations in early 2030s. This talk shows a view of Radio & Plasma Wave Investigation (RPWI) aboard JUICE which provides a unique and first opportunity in this huge mission.

Japan contributes this mission by the participation to the development of four instruments (PEP, RPWI, GALA, and SWI) and the science teams of six instruments (the above four plus JANUS and J-MAG). RPWI provides an elaborate suite for electromagnetic fields and plasma environment around Jupiter and icy moons, with 4 Langmuir probes (LP-PWI; 3-axis E-field -1.6 MHz, and cold plasmas), a search coil magnetometer (SCM; 3-axis B-field -20 kHz), and a tri-dipole antenna system (RWI; 3-axis E-field 0.08-45 MHz, 2.5-m tip-to-tip length). The RPWI Japan team provides the high frequency part of this system, i.e., Preamp of RWI and its High Frequency Receiver (HF), under with the collaboration of Japan, France, Poland and Sweden. In this paper, we provide the performance and operation concepts with their feasibilities, including the test and emulation results on the ground, planned activities in commissioning and cruise phases, and the full observations around Jupiter and icy moon system. Those are the basis of the observation and telemetry plans which are now heavily discussed in the JUICE SWT including RPWI.

We have confirmed that this system has high sensitivity reaching close to the galactic background enough for the detection of Jovian radio emissions from magnetosphere (aurora etc.), atmosphere (lightning), and icy moons. Direction and polarization capabilities are first enabled in the Jovian system, to identify their source locations and characteristics. RPWI with other instruments covers the survey of harsh environment around Jupiter, environments and interaction with icy moons, and their surface and subsurface characteristics. The most key parts is the sensing of the ionospheres, surface, and subsurface of icy moons during the flybys and on the orbit around Ganymede. Our 'High frequency part of RPWI' can do unique remote observations of the ionospheres below the spacecraft orbit by the radio occultation and reflection of Jovian radio signals, It has a capability to detect the highest ionospheric density not only in usual status but also episodic plume ejections triggered by expected crustal activities. The sensing of surface and subsurfaces are more challenging topics, based on the passive subsurface radar (PSSR) concept which sounds the icy crusts of Galilean satellites by the reflections of penetrated Jovian radio emissions (HOM/DAM). We introduce their possibility and the status of developing simulation system for the evaluation.