

The Radio & Plasma Wave Investigation (RPWI) for JUICE: Contribution plan from Japan

Yasumasa Kasaba[1]; Hiroaki Misawa[2]; Fuminori Tsuchiya[3]; Yoshiya Kasahara[4]; Tomohiko Imachi[4]; Tomoki Kimura[5]; Yuto Katoh[6]; Atsushi Kumamoto[7]; Hirotsugu Kojima[8]; Satoshi Yagitani[4]; Keigo Ishisaka[9]; Yoshizumi Miyoshi[10]

[1] Tohoku Univ.; [2] PPARC, Tohoku Univ.; [3] Planet. Plasma Atmos. Res. Cent., Tohoku Univ.; [4] Kanazawa Univ.; [5] JAXA/ISAS; [6] Dept. Geophys., Grad. Sch. Sci., Tohoku Univ.; [7] Dept. Geophys, Tohoku Univ.; [8] RISH, Kyoto Univ.; [9] Toyama Pref. Univ.; [10] STEL, Nagoya Univ.

We present the Radio & Plasma Waves Investigation (RPWI) for implementation on the ESA JUICE mission [PI: J.-E. Wahlund (IRF-Uppsala, Sweden)].

RPWI consists of a highly integrated instrument package that provides a whole set of Langmuir probe and electromagnetic wave measurements. RPWI focus, apart from cold plasma studies, on the understanding of how, through electro-dynamic and electromagnetic coupling, the momentum and energy transfer occurs in the space environments encountered by JUICE and with the icy Galilean moons: RPWI would be able to study the electro-dynamic influence of the Jovian magnetosphere on the exospheres, surfaces and conducting oceans of Ganymede, Europa and Callisto. RPWI would also be able to monitor the sources of radio emissions from auroral regions of Ganymede and Jupiter, and possibly also from lightning activity in Jovian clouds. Moreover, RPWI will search for exhaust plumes from cracks on the icy moons, as well as micron sized dust and related dust-plasma surface interaction processes occurring near the icy moons of Jupiter.

The RPWI consortium consists of experienced international teams who provide a long heritage record from several previous ESA/NASA/JAXA missions and a track record of collaboration with each other. The team also includes members who are experts in numerical modeling of all relevant physics and Jovian space environments to enhance the science return from the investigation. Followings are the participating organizations: [Sweden] Swedish Inst. Space Physics (IRF); Royal Inst. Technology (KTH). [France] Lab. de Physique des Plasmas (LPP); LESIA - Obs. de Paris; CNRS-LPC2E, Univ. d'Orleans; CNRS-IRAP, Univ. Paul Sabatier 9; Univ. de Versailles Saint-Quentin (LATMOS). [Poland] Space Research Centre of the Polish Academy of Sciences. [Czech] Inst. Atmospheric Physics; Astronomical Inst. [UK] Imperial College London; Univ. Sheffield [Austria] Space Research Inst. [Germany] Univ. Cologne. [Japan] Tohoku Univ.; Toyama Pref. Univ.; Kyoto Univ.; Kanazawa Univ.; ISAS/JAXA; Nagoya Univ. [USA] Space Science Lab., UC Berkeley; Univ. Iowa; Johns Hopkins Univ.; NASA/GSFC; Boston Univ.; Univ. Michigan.

RPWI sensors consist of 4 Langmuir probes (LP-PWI) for determination of the vector electric field up to 1.6 MHz and cold plasma properties (including active measurements by LP sweeps and mutual impedance sounding) up to 1.6 MHz, and a tri-dipole antenna system (RWI) for monitoring of radio emissions (80 kHz - 45 MHz).

From Japan, we are planning to provide the RWI preamp and its receiver with the onboard data reductions, modifying from the BepiColombo PWI and ERG PWE developments. Real development already starts from 2014.