1080-1280GHz Schottky Receiver for JUICE-SWI with 1600-2600K DSB Receiver Noise Temperature

A. Maestrini[1*], L. Gatilova[1+2], J. Treuttel[1], Y. Jin[2], A. Cavanna[2], D. Moro Melgar[1], T. Vacelet[1], A. Féret[1], S. Caroopen[1], G. Gay[1], F. Dauplay[1], J-M. Krieg[1], P. De Maagt[3], C. Goldstein[4]

[1]*LERMA, Observatoire de Paris, PSL Research University, CNRS, UMR 8112, Sorbonne Universités, UPMC Univ. Paris 06, F-75014 Paris, France*
[2]*C2N-Marcoussis, Route de Nozay, F-91460 Marcoussis, France*
[3]*ESA-ESTEC, Keplerlaan 1, PO Box 299, NL-2200 AG Noordwijk, The Netherlands*
[4]*Centre National d'Etudes Spatiales, 18 avenue Edouard Belin, F-31401 Toulouse cedex 9, France*
[*]Contact: alain.maestrini@obspm.fr

***Abstract*—**The Sub-millimeter Wave Instrument (SWI) for ESA Jupiter Icy Moons Explorer (JUICE) will be the first planetary instrument to feature 1200GHz and 600GHz heterodyne receivers. SWI will investigate the temperature structure, composition and dynamics of Jupiter's stratosphere and troposphere, and the exospheres and surfaces of the icy moons.

This paper will present the current design and status of SWI 1080-1280GHz Schottky receiver frontend, which is developed at LERMA-Observatoire de Paris in partnership with C2N-Marcoussis (formerly LPN). The receiver specifications and goal were respectively T_rec_DSB≤4000K and T_rec_DSB≤3000K. A double side band receiver noise temperature of T_rec_DSB=1600K has been recorded at 1114GHz at an ambient temperature of 150K, with T_rec_DSB ranging from 1600K to 2570K across the entire band, with an average of 1950K and a standard deviation of 220K. At 301K ambient temperature, T_rec_DSB is ranging from 3280K to 6320K across the entire band, with an average of 3840K. This is believed to be the best performance of a Schottky receiver in this frequency range.