20th International Symposium on Space Terahertz Technology, Charlottesville, 20-22 April 2009

First Light of the TELIS instrument

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***Abstract*— The TELIS (Terahertz and sub-millimeter limb sounder) instrument is a three-channel heterodyne receiver developed for observations of the stratosphere. TELIS is mounted together with the MIPAS-B2 instrument on a balloon platform of the Institute for Meteorology and Climate Research of the University of Karlsruhe (IMK, Germany). TELIS can observe both in the sub-millimeter range (480-650 GHz) and at 1.8 THz, while MIPAS-B2 observes trace-gases in the thermal infrared. Results will be used to refine and constrain numerical chemical transport models.**

The SRON contribution to TELIS is the 480-650 GHz Superconducting Integrated Receiver (SIR) channel. This is a unique superconducting on-chip heterodyne receiver, consisting of a double dipole antenna, a SIS mixer, a flux-flow Local Oscillator, and a superconducting harmonic mixer used for phase locking of the LO-signal. The bandwidth of the Digital Autocorrelator IF-backend of the SIR-receiver channel is 2 GHz, centered at 6 GHz. The lowest noise temperature of the receiver is 120 K DSB, measured over the full IF bandwidth. Although the concept of an integrated receiver has been explored for some years, the actual use of such a receiver for scientific observations so far has not been demonstrated. The first flight campaign with TELIS/MIPAS was in June 2008 from Teresina (Brazil). The SIR channel was operating well during the 2 hour ascent, but a major problem with the TELIS cryostat occurred at flight altitude (40 km) and this prevented scientific data retrieval. A second flight of TELIS is scheduled early 2009 from Kiruna (Sweden). This flight will focus on the Arctic ozone chemistry. The actual flight date depends on the occurrence of favourable meteorological conditions.

In the presentation we will discuss the operation of the SIR-channel in the laboratory and at the Teresina campaign and may include the results of the Kiruna flight.

The work was supported by the projects: RFBR 09-02-00246, 09-02-12172-ofi-m, and Grant for Leading Scientific School 5408.2008.2