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TErahertz and submm LImb Sounder (TELIS)

"Development and characterization a cryogenic THz heterodyne receiver for TELIS"

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In order to investigate atmospheric trace gas distributions associated with, e.g. ozone destruction, TELIS (TErahertz and sum Limb Sounder) has been developed, a new state-of-the-art balloon borne three channel (500, 625, 1800 GHz for RAL, SRON and DLR respectively) cryogenic heterodyne spectrometer. The instrument applies state-of-the-art superconducting heterodyne technology operated at 4K and is designed to be compact and lightweight, while providing broad spectral coverage within the sub-millimeter and far-infrared spectral range, high spectral resolution and long flight duration ($\sim$24 hours duration during a single flight campaign). Measurements with the 1.8 THz receiver will focus on the OH species. Further stratospheric species will be measured in the frequency range 1.8 THz $\pm$40GHz. The cryogenic receiver installed on a 26 cm. diameter optical bench will utilize 2 Martin-Puplett interferometers as single-side-band filter and diplexer, a solid state local oscillator and a hot electron bolometer as mixer. Currently the 1.8 THz channel has been successfully characterized in double-side-band mode and single-side-band mode. The quality assessment of the radiometric accuracy was taken out by measurement of methanol gas sample in a glass cell. Results on sensitivity and radiometric error will be presented.