# Development of a 2 THz Solid-state Radiometer for Atmospheric Sounding.

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Both the interstellar medium and planetary atmospheres are incredibly rich in molecular species with spectral rotational and vibrational signatures that lie in the 1-10 THz frequency range. The atomic oxygen (OI) emission at 2.06 THz (145.525 um) is one of the two brightest emission lines in the terrestrial thermosphere and has been observed from balloon, sounding rocket and orbital platforms [1].

Schottky diode front-end receivers have been demonstrated up to 2.5 THz [2] with a CO2-pumped methanol gas laserlocal oscillator source.However, recent developmentsin Schottky multiplier sources show thatsufficient power can be obtained at 1 THz to drive a 2 THz sub-harmonic mixer. This makes possible the development of a2-THz all solid state front-end heterodyne receiver that can be deployed on CubeSat or similar miniature platforms.

Firstly we will present preliminary development of the 2THz front-end receiver, with a first circuit iteration that features a balanced sub-harmonic mixer similar to previous studies [3], along withnoise temperature measurement system. Secondly we will discuss further circuit development for a second iteration,including a novel bias-able sub-harmonic mixer. This mixerfeatures an anti-parallel pair of diodes that favors a better trade-off between available power and line losses, and was partially addressed in [4].

**References**

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