

## **High-sensitivity Receivers for Heterodyne Submillimeter Spectroscopy**

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In the past decade, the performance of heterodyne detectors and receivers for astronomical and atmospheric research in the submillimeter and far-infrared regime has constantly been improved, and today excellent sensitivity is achieved over a wide frequency range. In the coming years, such receivers will be used in various astronomy and atmospheric research projects from the ground (e.g. at ALMA, the Atacama Large Millimeter Array), space (e.g. HIFI, the Heterodyne Instrument for the Far-Infrared on ESA's Herschel Space Observatory) and balloon (e.g. TELIS, the Terahertz and Submillimeter Limb Sounder). Progress in sensitivity and miniaturization, together with advances in cooling technology, make these receivers increasingly interesting for investigations of the Earth and other planetary atmospheres. The presentation will review the current state-of-the-art technology and performance of high-sensitivity submillimeter detectors and receivers for ground-, balloon- and space-based projects including a single-chip integrated receiver. An outlook into future heterodyne systems ranging as high as 6 THz (50 micron) using new technology such as Hot-Electron-Bolometers (as mixers) and Quantum-cascade-lasers (as local oscillators) will be given.