# Abstracts

## Miniature low-power submillimeter-wave spectrometer for remote sensing in the solar system

*O. Boric-Lubrecke, R.F. Denning, M.A. Jansen and M.A. Frerking. "Miniature low-power submillimeter-wave spectrometer for remote sensing in the solar system." 1998 Transactions on Microwave Theory and Techniques 46.12 (Dec. 1998, Part I [T-MTT]): 2061-2067.*

Mass and power for the next generation of NASA's heterodyne spectrometers must be greatly reduced to satisfy the constraints of future small-spacecraft missions. In this paper, we present a new receiver concept for remote sensing in the solar system, with greatly reduced mass, power, and size compared to instruments implemented in current missions. This spectrometer was originally proposed for operation in the vicinity of the 557-GHz emission from the H/sub 2/O ground-state transition. With the 557-GHz mixer and associated multiplier chain still under development, we prototyped a 220-GHz version of the instrument to verify the receiver concept, and experimentally demonstrated its functionality. The 220-GHz prototype Schottky-diode receiver requires less than 4.8 W, and has a mass of less than 1.1 kg-more than a factor of ten in mass and power reduction compared to current instruments. These significant savings, achieved through minimizing the number of receiver components, do not compromise the functionality necessary, e.g., for a surface-based Mars atmospheric sounding instrument. For the 557-GHz version, we anticipate that the total mass would be about the same as that of the millimeter-wave prototype, while required power would be reduced by about 1.5 W with the use of InP MMIC amplifiers.

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