

## Development of Multiplier Based Sources for Frequencies up to 2 THz

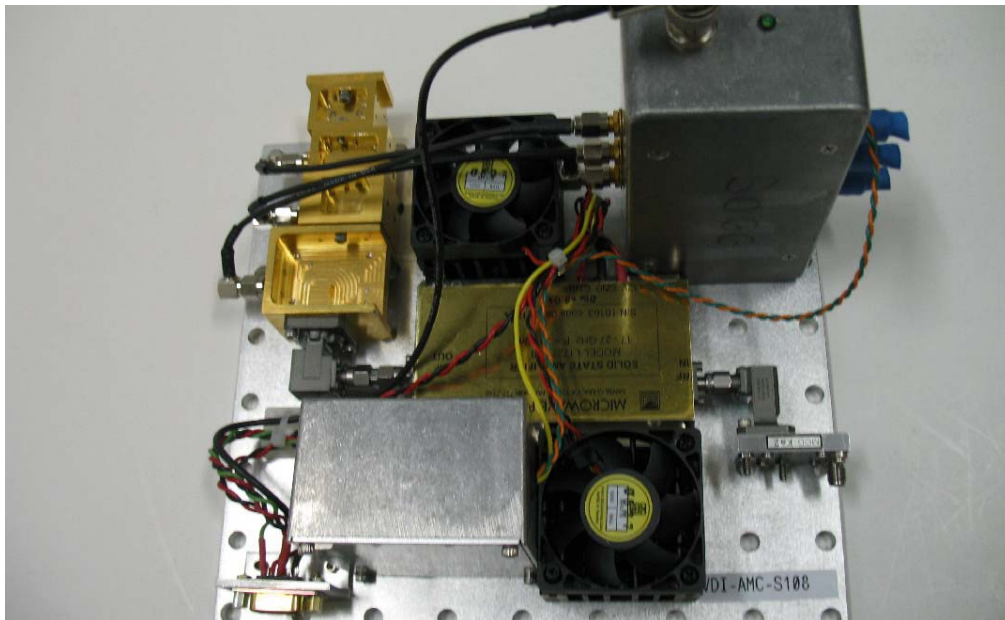
T.W. Crowe, D.W. Porterfield, J.L. Hesler, W.L. Bishop, G.S. Schoenthal,  
D.S. Kurtz and K. Hui

Virginia Diodes Inc., Charlottesville, VA 22902

A primary challenge in creating the next generation of submillimeter-wave receiver systems for space science is generating the required local oscillator power. Broad-band performance and power levels suitable for array receivers are required. Also, the sources must be suitable for use at remote installations. This means they should be compact, reliable, electronically tunable and maintenance free. This talk will focus on our continuing development of terahertz sources with emphasis of “turn-key” operation, enhanced tuning bandwidth and output frequency to 1.9 THz.

Virginia Diodes has developed a series of broadband frequency multipliers based on integrated diode circuits. A tripler to the WR0.5 waveguide band has recently been demonstrated. An amplifier/multiplier chain with this component, shown in Fig. 1, generates 1 – 3 uW of power at room temperature within the 1.8 – 1.9 THz band. Most importantly, it is extremely easy to use and requires no mechanical tuning or user controlled bias adjustments.

This talk will summarize the performance of this system, as well as a range of other terahertz sources that offer exceptional performance as well as unprecedented ease of use.



*Fig. 1: A 1.9 THz amplifier/multiplier chain consisting of a low frequency coaxial input, an input doubler (~13GHz, PMP), a power amplifier (MPI) and a chain of VDI multipliers (x2x2x2x3x3). It generates useful power from 1.8 – 1.9 THz (1-3uW), has no mechanical tuners and requires no user controlled bias adjustments.*