

## DUAL BAND MINIATURIZED SEMI-CONFOCAL FABRY-PEROT SPECTROMETERS FOR H<sub>2</sub>O AND HDO MILLIMETER-WAVE SENSING

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The exploration of icy body composition in the solar system has primarily involved spectroscopic measurements of volatiles through remote sensing, in which materials naturally expelled from the surface enter the exosphere and potentially escape into space. Landed missions on comets have brought focus onto the development of small, sensitive instrumentation capable of similar composition measurements of the nascent surface and near-surface materials. We present an evolution of our compact millimeter-wave cavity spectrometer that is tuned for sensitivity at 80.6 and 183 GHz where HDO and H<sub>2</sub>O exhibit resonance features.

In this presentation we will discuss both a low SWaP (size-weight and power) architecture that uses custom micro-chip transceiver elements that is suitable for maturation to deployable systems and a modular configuration using traditional GaAs based millimeter wave hardware suitable for laboratory studies. New design features for these systems including the quartz based coupler, thermal management, and separate clocking board will be discussed in addition to sensitivity studies and preliminary work detecting sublimated ice samples.