ATMOSPHERIC REMOTE SENSING VIA INFRARED-SUBMILLIMETER DOUBLE RESONANCE

SREE SRIKANTAIAH, JENNIFER HOLT, CHRISTOPHER F. NEESE, *Department of Physics, The Ohio State University, Columbus, OH, USA*; DANE PHILLIPS, *IERUS Technologies, Huntsville, AL, USA*; HENRY O. EVERITT, *Army Aviation and Missile Research Development and Engineering Center, Redstone Arsenal, AL, USA*; FRANK C. DE LUCIA, *Department of Physics, The Ohio State University, Columbus, OH, USA*.

Specificity and sensitivity in atmospheric pressure remote sensing have always been big challenges. This is especially true for approaches that involve the submillimeter/terahertz (smm/THz) spectral region because atmospheric pressure broadening precludes taking advantage of the small Doppler broadening in the region. The Infrared-submillimeter (IR-smm) double resonance spectroscopic technique allows us to obtain a more specific two-dimensional signature as well as a means of modulating the molecular signal to enhance its separation from background and system variation. Applying this technique at atmospheric pressure presents a unique bandwidth requirement on the IR pump laser, and the smm/THz receiver. We will discuss the pump system comprising of a CO2 TEA laser, plasma switch and a free induction decay hot cell designed to produce fast IR pulses on the time scale of atmospheric pressure relaxation and a high bandwidth fast pulse smm/THz receiver. System diagnostics will also be discussed. Results as a function of pressure and pump pulse width will be presented.