TERAHERTZ CHEMICAL ANALYSIS OF EXHALED HUMAN BREATH - BROAD ESSAY OF CHEMICALS

DANIELA R. BRANCO, ALYSSA M. FOSNIGHT, JESSICA R. THOMAS, IVAN R. MEDVEDEV, *Department of Physics, Wright State University, 3640 Colonel Glenn Highway, Dayton, OH 45435, USA*.

Approximately 3000 chemicals are thought to be present in human breath. Of these chemicals, many are considered typical of exhaled air. Yet, others can allude to different disease pathologies. The detection of chemicals in breath could have many practical purposes in medicine and provide a noninvasive means of diagnostics. We have previously reported on detection of ethanol, methanol, and acetone in exhaled human breath using a novel sub-millimeter/THz spectroscopic approach. This paper reports on our most recent study. A tentative list has been made of approximately 20 chemicals previously found in breath using other methods. Though many of these chemicals are only expressed in samples from donors with certain pathologies, at the time of this submission we are able to detect and quantitatively measure acetaldehyde and dimethyl sulfide in the breath of several healthy donors. Additional tentatively identified chemicals have been seen using this approach. This presentation will explain our experimental procedures and present our most recent results in THz breath analysis. Prospects, challenges and future plans will be outlined and discussed.