PROGRESS TOWARDS CHIRPED-PULSE FOURIER TRANSFORM THZ SPECTROSCOPY

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New opportunities are provided by the development of higher power THz frequency multiplier sources, the development of a broadband Chirped-Pulse FTMW spectroscopy technique at microwave[a] and mmWave frequencies, and recently demonstrated heterodyne hot electron bolometer detection technology in the THz frequency region with near quantum noise-limited performance and high spectral resolution.[b] Combining these three technologies and extending the chirped-pulse technique to 0.85 THz enables a host of new applications. NIST is currently pursing applications as a point sensor for greenhouse gases, volatile organic compounds, and potentially human breath. The generation and detection of phase stable chirped pulses at 850 GHz will be demonstrated. A description of the experimental setup and preliminary data will be presented for nitrous oxide.

[a] G.G. Brown, B.C. Dian, K.O. Douglass, S.M. Geyer, S. Shipman and B.H. Pate, Rev.Sci.Instrum. 79 (2008) 053103.

[b] E. Gerecht, D. Gu, L. You, K.S. Yngvesson, IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES. 56, (2008) 1083.