Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Dual coherent frequency-comb infrared spectrometer FRITZ KEILMANN — We demonstrate a new concept of broadband Fourier-transform infrared spectroscopy (FTIR) based on a multi-heterodyne detection principle. Two coherent mid-infrared beams that contain slightly offset harmonic frequency combs are superimposed on a photoconductive detector. The signal contains a radio-frequency harmonic spectrum that replicates the mid-infrared spectrum. The latter can be retrieved by recording the detector signal *vs* time (much as an interferogram known in FTIR) and subsequent Fourier transformation. In our experiment, two 10 fs Ti:sapphire lasers separately generate two mid-infrared beams by difference-mixing in GaSe. The effective radio frequency is chosen by slightly offsetting the pulse repetition rates. We demonstrate an interferogram acquisition duration as short as 1 μs which could be interesting for taking "snapshot" infrared spectra of single transient events such as in high-field magnetospectroscopy or in chemical reactions. We intend to exploit the advantage of the diffraction-limited focusability of this spectrometer for mid-infrared microscopy and for scattering-type near-field microscopy. – F. Keilmann, C. Gohle, and R. Holzwarth, Opt. Lett. **29**, 1542 (2004)

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Date submitted: 30 Nov 2004 Electronic form version 1.4