GENERATION OF WIDELY TUNABLE FOURIER-TRANSFORM-LIMITED PULSED TERAHERTZ RADIATION USING NARROWBAND NEAR-INFRARED LASER RADIATION

JINJUN LIU, CHRISTA HAASE, and FRÉDÉRIC MERKT, *Laboratorium für Physikalische Chemie, ETH-Zürich, 8093 Zürich, Switzerland*.

Widely tunable, Fourier-transform-limited pulses of terahertz (THz) radiation have been generated by optical frequency deference using (i) crystals of the highly nonlinear organic salt 4-N,N-dimethylamino-4$'$-N'-methyl stilbazolium tosylate (DAST), (ii) zinc telluride (ZnTe) crystals, and (iii) gallium phosphide (GaP) crystals. Outputs from two narrowband ($\Delta\nu$ <1 MHz, λ ~800 nm) cw titanium-doped sapphire (Ti:Sa) ring lasers with a well-controlled frequency difference were shaped into pulses using acousto-optic modulators, coupled into an optical fiber, pulse amplified in Nd:YAG-pumped Ti:Sa crystals and used as optical sources to pump the THz nonlinear crystals. The THz radiation was detected over a broad frequency range and its bandwidth was determined to be ~10 MHz. Absorption spectra of gas phase molecules including HF and OCS using the THz source will be presented.