Abstract Submitted
for the NWS09 Meeting of
The American Physical Society

Intense narrow band terahertz generation via type-II DFG in ZnTe JOE TOMAINO, ANDY JAMESON, JEREMY DANIELSON, YUN-SHIK LEE, K. VODOPYANOV — We developed a tabletop source of intense, tunable, and narrowband THz pulses using difference frequency generation (DFG) in a nonlinear crystal. The light source of the experiment was 800-nm, 100-fs pulses from a 1-kHz Ti:sapphire regenerative amplifier (Coherent Inc., Legend). The main portion of the optical power was used to generate strong narrowband THz pulses. A linear chirp was introduced to stretch the optical pump pulses to $\sim$4 ps. An optical setup split the pump beam into two, introduced a relative time delay, made them orthogonally polarized, and eventually recombined them to co-propagate. The two linearly-chirped and orthogonally-polarized optical beams produced narrowband THz radiation via type-II DFG in a 1-mm ZnTe crystal. The THz pulse energy was in the range of a few nJ, and the pulse duration was $\sim$3 ps. The maximum amplitude of the electric field reached $\sim$10 kV/cm. The central frequency of the spectrum is continuously tunable from 0.5 to 2.5 THz with a bandwidth of 0.2-0.5 THz. This technique can be easily integrated into time-resolved studies on terahertz-induced nonlinear effects with a subpicosecond resolution limited only by the transform-limited optical pulse duration.

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Date submitted: 10 Apr 2009 Electronic form version 1.4