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Title:Optimized optical rectification and electro-optic sampling in ZnTe crystals with chirped femtosecond laser pulses
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Abstract:We report on optimization of the intensity of THz signals generated and detected by optical rectification and electro-optic sampling in dispersive, nonlinear media. Addition of a negative prechirp to the femtosecond laser pulses used in the THz generation and detection processes in 1-mm thick ZnTe crystals leads to an increase of the THz intensity of more than 30% at low laser intensity and up to 60% at higher laser intensity. Dispersion compensation in the ZnTe crystal, which becomes significant for laser pulses with durations much less than 100 fs, is responsible for the enhanced generation and detection efficiency at low excitation intensity, and our simulations indicate that two-photon absorption is responsible for the increased efficiency enhancement observed at high excitation intensity.
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