Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Study of the Coherent Phonon-Polariton effect on the Terahertz pulse generation in <110> ZnTe crystal[1] CHIEN-MING TU, JENG-CHUNG CHEN, CHENG-CHUNG CHI, Department of Physics, National Tsing Hua University, Hsinchu, Taiwan — We report a study of the wave form and spectrum of the THz radiation generated by illuminating <110> ZnTe crystal with femto-second optical pulses of 750 nm in wavelength. The co-linearly measured wave form consists of a main W-shaped THz pulse and a trailing quasi monochromatic damped oscillation (QMDO) with a duration of several tens of pico-seconds. In Fourier-transformed spectrum of the measured THz waveform, there are two peaks, one centered at 0.6 THz and the other one at 2.7 THz, which correspond to the main THz pulse and the QMDO respectively. Our calculation of the THz pulse generated by the optical pulse indicates that the QMDO is caused by the phase matching of the optical pulse and the coherent phonon-polariton in ZnTe. We observe that, by increasing the optical pulse width, the duration of the trailing QMDO shrinks in time domain, and the amplitude of the phase-matching component also reduces, both of which are consistent with our calculations. There remain some subtle differences between the experimental results and the theoretical calculations, the origin of which will be discussed.

[1]Supported by the NSC grant 99-2120-M-007-002.

Chien-Ming Tu
Department of Physics, National Tsing Hua University, Hsinchu, Taiwan

Date submitted: 12 Nov 2010 Electronic form version 1.4