

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Experimental observation of THz generation due to Cherenkov Radiation coupled with Phonon-Polariton in Subluminal regime¹ CHIEN-MING TU, Dept. of Physics, JU-CHUN HUANG, Ctr. for Nanotechnology, Materials Science, Microsystems, JENG-CHUNG CHEN, CHENG-CHUNG CHI, Dept. of Physics, National Tsing Hua Univ., Hsinchu, Taiwan — We report an experimental study of the wave form of the THz radiation generated by $\langle 110 \rangle$ ZnTe crystal illuminated with ultrafast optical pulses. The co-linearly measured wave consists of a main THz pulse due to the electro-optical effect and a trailing quasi monochromatic oscillations, with duration at least 42 ps. We have also mapped out a two-dimension radiation profile along the direction parallel to the polarization. As the probe beam moves away from the center position, the amplitude of the main THz pulse reduces much slower than that of the trailing oscillations. The experimental observations agree very well with the theoretical predictions by M. I. Bakunov et al. (PRB 76, 085346 (2007)). Their theory is based on the Cherenkov radiation in subluminal regime within the crystal. The quasi monochromatic oscillations are the result from the phase matching condition between the THz pulse and the coherent phonon-polariton generated by the optical pulses. By virtue of good fitting, we clearly demonstrate the origin of this intriguing THz wave form.

¹supported by the NSC grant 98-2120-M-007-005

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Date submitted: 19 Nov 2009

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