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Title

Terahertz enhancement from terahertz-radiation-assisted large aperture photoconductive antenna

Source

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Abstract

The observation of enhanced terahertz (THz) wave generation from the large aperture photoconductive (PC) antenna excited by both a femtosecond pump beam and a collinearly propagating ZnTe-pregenerated THz wave is reported within this paper. An analysis based on both the calculated and experimental results demonstrated that the superposition acts as the main physical mechanism of this THz enhancement effect due to the dominant contribution from the rapid change in photoexcited carrier density. A prerequisite for the THz enhancement requires that the polarization of the applied bias and the ZnTe-pregenerated THz should be identical in order to have a constructive superposition. Therefore, this observation introduces the possibility of recycling the unused portion of the pump beam to further improve the THz radiation. The enhancement effect could be optimized by changing the thickness of ZnTe, which could affect the photoexcited-free-carrier absorption of THz in the PC antenna and the bandwidth of final enhanced THz radiation. (18 References).