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Title

Reshaped Terahertz waveforms from a large-aperture photoconductive antenna with millimeter scale metal hole and grid combination

Source

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Abstract

Time-domain THz transmission of a metal wire grid is investigated experimentally. The transmission depends on the relative angle () between the polarization of the THz wave and the direction of the wires. When the polarization is parallel to the wires (= 0degree), the grid works as a high-pass filter with a cutoff frequency at 0.3 THz. Meanwhile, when the polarization is perpendicular to the wires (= 90degree), the waveform of THz pulses is only slightly altered after passing through the grid. These results are reproduced accurately in computational simulations of the electromagnetic field. Simulation results indicate that strongly excited surface waves between two adjacent metal rods are responsible for the transmission peak at 0.81 THz, while surface waves slightly excited on the front surface of the grid are responsible for the low transmission at 0.3 THz. Transmission spectra of = 0degree are interpreted qualitatively by applying the concept of effective surface plasmons. (26 References).