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TERAHERTZ GENERATION FROM SURFACES OF ELECTRON AND NEUTRON IRRADIATED SEMICONDUCTORS

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Terahertz generation from semiconductor surfaces is one of the most simple and efficient methods of obtaining terahertz radiation within 0.1-3.5 THz range for terahertz time-domain spectroscopy (THz-TDS). Terahertz pulse arises from ultrafast current transient produced by non-equilibrium charge carriers excited by femtosecond laser pulse and accelerated by surface built-in field or by diffusion process. This process is complex and depends on different fundamental properties of semiconductor crystal. It is still difficult to extract the semiconductor properties from terahertz emission data. On the other hand, a qualitative characterization can be performed. In the present study, we test the terahertz emission from semiconductors (InAs, GaAs, GaSe, InP, InSb) with important parameters, like carrier lifetimes or mobilities, differing by orders of magnitude. We perform also simple modeling of the terahertz emission spectra. One of the ways to change these parameters is a high-energy particle irradiation. In this work, the electron- and neutron-irradiated III-V and III-VI semiconductors are compared. Examples of terahertz spectra emitted from surface of electron irradiated GaSe are demonstrated on figures below.