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THz-emission mechanisms in impurity compensated GaSb RICARDO ASCAZUBI, CARL SHNEIDER, INGRID WILKE, ROBINSON PINO, PARTHA DUTTA, Rensselaer Polytechnic Institute — Narrow band gap semiconductors are strong sources of femtosecond optically excited THz radiation. They are also attractive materials for compact and lightweight time-domain THz spectroscopy and imaging systems powered by femtosecond fiber lasers with emission wavelengths at 1.55μm. Here, we report optically excited THz emission from high purity, Tellurium doped GaSb, a typical narrow band gap semiconductor. In contrast to previous work, we investigate the influence of the majority and minority carrier concentrations on the strength of the THz emission. Strong enhancement of THz emission in GaSb is observed as a result of compensation of native acceptors by Te donors. Surface field acceleration and photo-Dember effect are identified as THz emission mechanisms and modeled in dependence of the majority and minority carrier type and concentrations. THz emission from p-type GaSb is dominated by the photo-Dember effect whereas THz emission from n-type GaSb is dominated by surface field acceleration. The doping conditions, under which THz emission is maximized, are identified for both mechanisms. These results suggest a re-examination of the relative THz emission strengths of different III-semiconductors as reported previously.

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