

Superlattice frequency multiplier for generation of sub-terahertz radiation

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We report on a GaAs/AlAs superlattice frequency multiplier. It delivered continuously tunable cw-radiation at the 3rd harmonic frequency ($\sim 300\text{GHz}$, power $\sim 100\mu\text{W}$) of a microwave pump field with a conversion efficiency of about 4%; also at higher harmonics, radiation was observed. The nonlinear electron transport properties of the superlattice were due to Bragg reflections of miniband electrons at the superlattice planes. The problem of impedance matching to the waveguide system is discussed. The presented superlattice frequency multiplier seems to be a promising candidate for small, room temperature operated solid-state cw radiation sources at sub-terahertz and terahertz frequencies.