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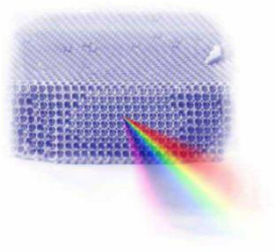

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Modeling of optical properties of novel terahertz photonics quantum well heterostructures

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Abstract. In this contribution, we present our recent work on modeling intersubband transitions in the conduction band of semiconductor-based quantum well structures [1], [2]. Particularly interesting are possibilities offered by ZnO/ZnMgO and La-doped BaSnO3/BaO perovskite-oxide for the realization of room temperature oxide-based THz quantum well optoelectronic devices due to their advantageous physical and chemical properties [3], [4]. The electronic structure is calculated self-consistently by solving the Schrödinger–Poisson system of equations. A significant change of the transition energy due to the depolarization shift is also considered in cases when high doping is present. The charge-induced coherence due to the strong dipole-dipole Coulomb interaction between intersubband transitions leads to the formation of multisubband plasmons and a complete quantum model [5] based on the dipole representation must be used to calculate absorption spectra.

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