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Influence of layer thickness and external bias variation on intersubband absorption in n-doped BaSnO₃ symmetric quantum wells

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The novel and promising BaSnO₃/BaO perovskite-oxide material system has recently attracted a lot of attention due to its many advantages and application potential for optoelectronic devices. Its prominent features include a wide band gap, small electron effective mass, and a very high room-temperature mobility, which makes it attractive for numerous purposes. Here we focus on the calculation of intersubband absorption in La-doped BaSnO₃ symmetrical double quantum well (DQW) and triple quantum well (TQW) structures. We analyze the dependence of the fractional absorption on the thickness of the well layers, as well as the effects of an external electric field applied along the growth direction on optical transitions. The latter effect is very important for practical application in e.g. electro-optical light modulators. The electronic structure is calculated self-consistently by solving the Schrödinger-Poisson system of equations where the exchange correlation effects are also taken into account through the modification of the total effective potential.