

Conductivity of semiconductor nanostructures has its maximum in terahertz spectral range. Linear response is described in reasonable detail. With high intensity light sources it is also needed to be concerned with nonlinear response.

In this thesis, there is firstly described already existing quantum model of linear conductivity which is using perturbation theory. This model is then extended by adding another perturbations, getting us quantum model for calculating nonlinear conductivity of arbitrary order.

Model is then applied for calculation of third order nonlinear conductivity spectra for cubic nanocrystal. There is described spectra for varying parametres, such as temperature, volume, electron density or scattering rate.

In the end it is compared with semiclassical computation using Monte-Carlo simulation.