

Abstract of the diploma thesis

**Fluorescence of two- and three-level atoms near  
spherical and spheroidal nanoparticles**

Alexander Lobov

The resonance fluorescence of a two- and three-level atoms interacting with a plasmonic metallic nanoparticle of spherical or spheroidal form under the action of the incident laser field is studied in detail. In this setting, the resonance fluorescence spectrum of the atom depends on the intensity of the incident electromagnetic field, as well as on the radiative relaxation rate, which depends on the distance between the atom and the nanoparticle.

In order to study how the nanoantenna affects the resonance fluorescence spectrum of the atom nearby we first calculated the distribution of the electric field intensity of the nanoantenna under action of an external field and then the radiative decay rate of the atom in the vicinity of the nanoantenna. With the help of these data we then investigated how the resonance fluorescence spectrum depends on the distance between the atom and nanoantenna, as well as analyzed the spectra dependence on the geometric parameters of the nanoantenna.

Scientific adviser

Dr. Yu. Vladimirova