Abstract

Optical trapping is a very versatile technique which is be used to confine and manipulate small objects, and to precisely measure the force acting on any object which is of the order of pN and displacement that of the order of nm. Initially it was believed that trapping of metal nanoparticles is extremely difficult. Later, in 1994, Steve Block et. al. showed that trapping of metals is possible due to its high polarizability. However, most of the studies on optical trapping has been done on dielectric particles and the trapping behavior of metallic particles has not been as extensively explored as the former. This thesis is mostly based on the theoretical investigation of the optical trapping of metallic and metal-dielectric hybrid nanoparticles under ultrafast pulsed excitation. The calculations are performed by incorporating non-linear effects into account because of the high peak power of pulsed excitation.