

**Near-field interaction of atoms, molecules and dielectric particles in laser light**

V. G. Minogin

Institute of Spectroscopy, Russ. Ac. of Sci., 142190 Troitsk, Moscow region, Russia

minogin@isan.troitsk.ru

**Summary**

Two microscopic particles irradiated by light field influence each other by the forces caused by the dipole-dipole interaction. The interaction changes also the resonance frequencies of the particles. We show that the dipole forces between atoms, molecules or dielectric particles irradiated by laser light play an important role at distances between the particles about or less the light wavelength. We discuss the properties of the near-field forces, including their dependence on direction and polarization of the laser light. We conclude that the near-field forces can be responsible for formation of dimers in dense atomic gases. The near-field forces can be also used for control the motion of dielectric particles on micro and nanometer scale.