INDUCED OPTICAL BISTABILITY IN SMALL METAL AND METAL COATED PARTICLES WITH NONLINEAR DIELECTRIC FUNCTIONS

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S u m m a r y

The theoretical and numerical study of the enhancement of the amplitude of the incident electromagnetic radiation in small metal ellipsoidal particles and spherical dielectric particles covered by a metal shell with nonlinear dielectric functions is carried out. If the frequency of the external radiation approaches the frequency of surface plasmons of a metal, the local field in the particle considerably increases. At intense incident electromagnetic fields (laser radiation), it is necessary to consider the nonlinear part of the dielectric functions of a metal and a dielectric. This results in the induced optical bistability (IOB) when one value of the amplitude of the incident field initiates three values of the local field in a particle. The domains of IOB are specified in the case where the radiation wavelength is much larger than the typical size of particles. The range of external fields and the IOB frequency are specified. A decrease of the IOB domain and an increase of the critical fields with increase in the damping of plasmon vibrations are discussed. The results of numerical computations for typical small silver particles are presented graphically.