Calculating the interaction force between the light beam and arbitrary-shape microparticles

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Abstract

The article describes a method for calculating the forces acting on a microparticle in a light field. The adequacy of the method is verified on the basis of comparison with experimental data.

Keywords: light beam, arbitrary-shape microparticles, microparticle.

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References

[1] Ashkin A, et al. Observation of a single-beam gradient force optical trap for dielectric particles. Opt Lett 1986; 11(5): 288-290.

[2] Svoboda K, Block SM. Optical trapping of metallic Rayleigh particles. Opt Lett 1994; 19(13): 930-932.

[3] Allen L, Eberly JH. Optical resonance and two-level atoms. New York: Dover Publications; 1987.

[4] Kotlyar VV, Nalimov AG. Calculation of light pressure on a round dielectric cylinder using a fast iterative algorithm and based on an analytical solution. Computer Optics 2005; 27: 105-111.

[5] Ashkin A, Dziedzic JM. Optical levitation by radiation pressure. Appl Phys Lett 1971; 19: 283.

[6] Nieminen TA, Rubinsztein-Dunlop H, Heckenberg NR. Calculation and optical measurement of laser trapping forces on non-spherical particles. J Quant Spectrosc Radiat Transf 2001; 70: 627-637.