Calculating the pressure force of the non-paraxial cylindrical Gaussian beam exerted upon a homogeneous circular-shaped cylinder

V.V. Kotlyar[1,2], A.G. Nalimov[1,2]
[1]Image Processing Systems Institute of RAS
[2]Samara State Aerospace University (SSAU)

Abstract:

Forces exerted upon a dielectric cylinder of infinite length and arbitrary, or circular, cross-section by the non-paraxial cylindrical Gaussian beam are considered. The projections of the vector of the light force pressure exerted upon a dielectric cylinder of arbitrary and circular cross-section are expressed analytically. In particular, the pressure force is expressed through the coefficients of decomposition of the non-paraxial Gaussian beam into the cylindrical functions. Using numerical examples, a possibility to optically trap a circular-shaped cylinder in two oppositely directed Gaussian beams or a single non-paraxial Gaussian beam is demonstrated.

Keywords: non-paraxial Gaussian beam, circular-shaped cylinder, circular cross-section, optically trap

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Access full text (in Russian)

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