Title:	Alternate analytic formulation of optical force on a dielectric sphere in the ray optics limit
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Abstract:	In the past, the optical force on a micrometer-sized dielectric sphere in a single-beam gradient laser trap was formulated by considering 2D distribution of rays for a plane-wave excitation. However, laser beams usually have a Gaussian transverse intensity profile, which, upon tight focusing, leads to a 3D optical trap. Here, we systematically formulate a generalized ray/geometric optics formalism for estimating force (and potential) for both flat-top and Gaussian laser beams using 2D distribution of light rays as well as 3D distribution of light cones. We also compare our method with the exact Mie theory. In addition, we present a detailed discussion on the nature of force (and potential) considering the optical Kerr effect under high-repetition-rate ultrafast pulsed excitation.
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