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Title:	Theoretical investigation on optical Kerr effect in femtosecond laser trapping of dielectric microspheres
Authors:	De, A.K. (/jspui/browse?type=author&value=De%2C+A.K.)
Keywords:	optical Kerr femtosecond laser dielectric microspheres
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Abstract:	Stable trapping of individual dielectric nanoparticles under high-repetition-rate ultrafast pulsed excitation has been demonstrated and theoretically explained based on repetitive instantaneous trapping as well as optical nonlinearity assisted trapping. Here we estimate the force exerted on a micron-sized spherical dielectric particle including optical Kerr effect. Using geometric optics approximation, we show how inclusion of optical Kerr effect results in significant change of the force curves along axial direction under femtosecond pulsed excitation compared with continuous-wave excitation. The results show excellent agreement with previous experimental findings. Most importantly, similar to the optical trapping of nanoparticles under ultrafast pulsed excitation, we show that the efficiency of trapping of micron-sized particles is also governed by the barrier height (and not the absolute depth) of the axial trapping potential.
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