Title:	Exploring the physics of efficient optical trapping of dielectric nanoparticles with ultrafast pulsed excitation
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Abstract:	Stable optical trapping of dielectric nanoparticles with low power high-repetition-rate ultrafast pulsed excitation has received considerable attention in recent years. However, the exact role of such excitation has been quite illusive so far since, for dielectric micron-sized particles, the trapping efficiency turns out to be similar to that of continuous-wave excitation and independent of pulse chirping. In order to provide a coherent explanation of this apparently puzzling phenomenon, we justify the superior role of high-repetition-rate pulsed excitation in dielectric nanoparticle trapping which is otherwise not possible with continuous-wave excitation at a similar average power level. We quantitatively estimate the optimal combination of pulse peak power and pulse repetition rate leading to a stable trap and discuss the role of inertial response on the dependence of trapping efficiency on pulse width. In addition, we report gradual trapping of individual quantum dots detected by a stepwise rise in a two-photon fluorescence signal from the trapped quantum dots which conclusively proves individual particle trapping
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