Modified Relativistic Dynamics in Regions of Extremely Small Accelerations: Velocity and Acceleration Dependence of Time

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Parametric study of radiation force on nonlinear microspheres (e.g. polys and fused quartz) was considered using a 1064 nm Nd:YAG diode-pumpe laser. Other experimental parameter (e.g. back focal power, numerical ape size of the microsphere) were also included in the optimization process. Near the beam focus, optical trapping force behaves linearly with microsphere displacement where trapping sti®ness is the constant of proportionality.

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$$\vec{F} = m\frac{d^2\vec{r}}{dt^2} \equiv m\vec{a}$$