Erratum: Optically induced forces and torques: Interactions between nanoparticles in a laser beam [Phys. Rev. A 72, 033816 (2005)]

D. S. Bradshaw and D. L. Andrews

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We wish to correct some minor errors in our recent paper, arising from an ambiguity between colocated Cartesian frames of reference. In Eq. (3.1), angular factors are referred to a Cartesian frame where Z is identified with the molecular axis, though tensor components are referred to the previously described laboratory frame in which Z is the inter-particle director. Resolving into a common frame of reference and then proceeding, the laser-induced force expression of (3.3) is properly written as

$$
\begin{aligned}
F_z = {} & \left(\frac{I}{4\pi\varepsilon_0^2 cR^4}\right)(\{\alpha_\perp^2[\sin^2\phi(3-\cos^2\theta)-2]+\alpha_\parallel^2\sin^2\phi\cos^2\theta\} \\
& \times\{3\hat{R}_z\cos kR\cos(\mathbf{k}\cdot\mathbf{R})+kR[3\hat{R}_z\sin kR\cos(\mathbf{k}\cdot\mathbf{R})+\hat{k}_z\cos kR\sin(\mathbf{k}\cdot\mathbf{R})]-k^2R^2[\hat{R}_z\cos kR\cos(\mathbf{k}\cdot\mathbf{R}) \\
& -\hat{k}_z\sin kR\sin(\mathbf{k}\cdot\mathbf{R})]\}-\{\alpha_\perp^2\sin^2\phi\sin^2\theta+\alpha_\parallel^2\sin^2\phi\cos^2\theta\}\{k^2R^2\hat{R}_z\cos kR\cos(\mathbf{k}\cdot\mathbf{R}) \\
& +k^3R^3[\hat{R}_z\sin kR\cos(\mathbf{k}\cdot\mathbf{R})+\hat{k}_z\cos kR\sin(\mathbf{k}\cdot\mathbf{R})]\}).
\end{aligned}
$$

The short-range result for a pair of *spherical* nanoparticles thus vanishes on taking a rotational average $\langle F_z^0\rangle=0$ instead of the result given as (3.6). There is no optical binding force under these specific conditions. Effecting a similar correction for the polar contributions, Eq. (3.9) should read

$$
F_z^0=\left(\frac{3I\hat{R}_z}{4\pi\varepsilon_0^2 cR^4}\right)\{[\alpha_\parallel^2+\mu_\parallel(\beta_\parallel-\beta_{\perp_2})]\sin^2\phi\cos^2\theta+\mu_\parallel\beta_{\perp_2}+\alpha_\perp^2[\sin^2\phi(3-\cos^2\theta)-2]\}.
$$

Results (3.10)–(3.19) are all correct. In Eqs. (4.5)–(4.8), cos ϕ replaces sin ϕ and vice versa. All the graphical results, and their interpretations, are correct.

