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Size-dependent optical forces on dielectric microspheres in hollow core photonic crystal fibers: erratum

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Abstract: The beam shape coefficients for cylindrical vector modes are of great importance for other researchers to reproduce our results, however they were accidentally reported incorrectly in our recently published manuscript [Opt. Express **30**(14), 24407 (2022)]. This erratum reports the correct form for the two expressions. Two typographical errors in auxiliary equations are also reported and two labels in particle time of flight probability density function plots are fixed.

The beam shape coefficients, originally reported in equations 10 of our manuscript [1], should read as following:

$$G_{pq}^{\mathrm{TM}}[+\mathrm{TM}] = \frac{4\pi i^{p-q+1}}{\sqrt{p(p+1)}} \frac{\partial Y_p^{q*}(\alpha,\phi_0)}{\partial \cos\alpha} J_{q-m}(\chi_{mn}\rho_0) e^{im\phi_0} e^{-i\beta_{mn}z_0}$$
$$G_{pq}^{\mathrm{TE}}[+\mathrm{TM}] = \frac{4\pi q i^{p-q}}{\sqrt{p(p+1)}} \frac{Y_p^{q*}(\alpha,\phi_0)}{\sin^2\alpha} J_{q-m}(\chi_{mn}\rho_0) e^{im\phi_0} e^{-i\beta_{mn}z_0}. \quad (1)$$

In equations 3 of our paper [1], the definition of the angular momentum operator $\mathbf{L}$ is missing a minus sign: it should read

$$\mathbf{L} = -i\mathbf{r} \times \nabla. \quad (2)$$

In equations 7 of our manuscript [1], an index in the definition of the auxiliary vector function $\mathbf{A}_{mn}(\rho)$ was accidentally given a wrong name: the definition should read

$$\mathbf{A}_{mn}(\rho) = iJ'_m(\chi_{mn}\rho)\hat{\rho} - \frac{mJ_m(\chi_{mn}\rho)}{\chi_{mn}\rho}\hat{\phi}. \quad (3)$$

The units used for the normalization of the probability density functions for the times of flight, f_{TOF} on the right y axis of figures 6b,d of our manuscript, were reported incorrectly. Figure 6 should look as in Fig. 1 of this erratum.

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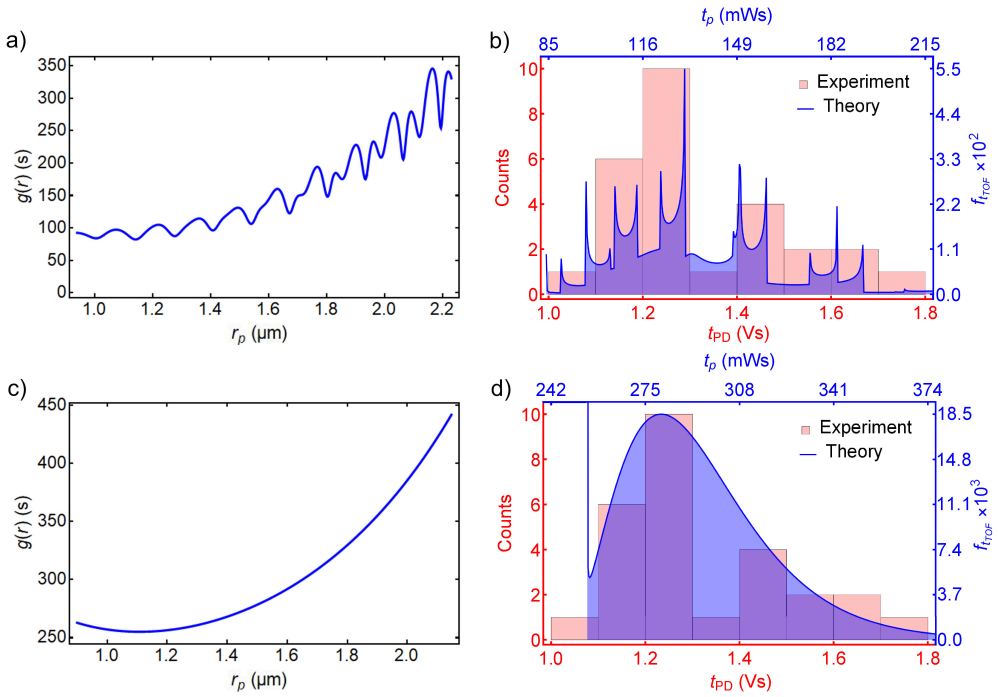

Fig. 1. Time of flight, $g(r)$, as a function of microparticle radius r_p for Lorenz-Mie (a) and ray optics (c) models, respectively, for an 8ε range around the mean value. In this range, the drag force is dominant over the radiation pressure contribution, resulting in longer times of flight for increasing particle sizes for both models. Calculations are for a 50 mW laser beam at 1064 wavelength pushing silica microspheres in a HC-PCF of core radius a = 4.7 μm, length 70.4 mm. Histograms of time of flight multiplied by average voltage reading on the photodiode before the launch event for 3.17 μm particles. 26 data points, 8 bins. Experimental data in pink with the theoretical probability distribution function overlayed in blue for b) Lorenz-Mie and d) ray optics models.

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Data availability. Data underlying the results presented in this paper are not publicly available at this time but may be obtained from the authors upon reasonable request.

References

1. P. S. Kincaid, A. Porcelli, A. A. R. Neves, E. Arimondo, A. Camposeo, D. Pisignano, and D. Ciampini, "Size-dependent optical forces on dielectric microspheres in hollow core photonic crystal fibers," Opt. Express **30**(14), 24407–24420 (2022).