Erratum: Theory of the interaction forces and the radiative heat transfer between moving bodies [Phys. Rev. B 78, 155437 (2008)]

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In this paper in Sec. IV in Eq. (27) some additional terms were overlooked. These additional terms do not change the conclusions of the article, but they have important significance for the completeness of the theory. The correct form of this equation with these terms is given by

$$F_z=\sigma_{zz}=-\frac{\hbar}{4\pi^3}\,\mathrm{Re}\int_0^\infty d\omega\int d^2q\frac{k_z}{\Delta}e^{2ik_zd}\{(q^2-\beta kq_x)^2[R_{1p}R'_{2p}D_{ss}+R_{1s}R'_{2s}D_{pp}]-\beta^2k_z^2q_y^2[R_{1p}R'_{2s}D_{sp}+R_{1s}R'_{2p}D_{ps}]\}$$
$$\times[1+n_1(\omega)+n_2(\omega')]-\frac{\hbar}{16\pi^3}\int_0^\infty d\omega\int_{q<\omega/c}d^2q\frac{k_z}{|\Delta|^2}[(q^2-\beta kq_x)^2+\beta^2k_z^2q_y^2]\{(q^2-\beta kq_x)^2[(1-|R_{1p}|^2)(1+|R'_{2p}|^2)|D_{ss}|^2$$
$$-(1\leftrightarrow2,\omega\leftrightarrow\omega')]+\beta^2k_z^2q_y^2[(1-|R_{1p}|^2)(1+|R'_{2s}|^2)|D_{sp}|^2-(1\leftrightarrow2,\omega\leftrightarrow\omega')]+(p\leftrightarrow s)\}(n_1(\omega)-n_2(\omega'))$$
$$+\frac{\hbar}{4\pi^3}\int_0^\infty d\omega\int_{q>\omega/c}d^2q\frac{|k_z|}{|\Delta|^2}[(q^2-\beta kq_x)^2+\beta^2k_z^2q_y^2]e^{-2|k_z|d}\{(q^2-\beta kq_x)^2[\mathrm{Im}\,R_{1p}\,\mathrm{Re}\,R'_{2p}|D_{ss}|^2-(1\leftrightarrow2,\omega\leftrightarrow\omega')]$$
$$-\beta^2k_z^2q_y^2[\mathrm{Im}\,R_{1p}\,\mathrm{Re}\,R'_{2s}|D_{sp}|^2-(1\leftrightarrow2,\omega\leftrightarrow\omega')]+(p\leftrightarrow s)\}(n_1(\omega)-n_2(\omega')). \tag{27}$$

Correspondingly, Eqs. (28)–(30) which follow from Eq. (27) should be also corrected. At $T_1=T_2=0$ K, Eq. (27) takes the form

$$F_z=-\frac{\hbar}{4\pi^3}\,\mathrm{Re}\left\{\int_0^\infty d\omega\int d^2q-\int_{-\infty}^\infty dq_y\int_0^\infty dq_x\int_0^{q_xV}d\omega\right\}\frac{k_z}{\Delta}e^{2ik_zd}\{(q^2-\beta kq_x)^2[R_{1p}R'_{2p}D_{ss}+R_{1s}R'_{2s}D_{pp}]$$
$$-\beta^2k_z^2q_y^2[R_{1p}R'_{2s}D_{sp}+R_{1s}R'_{2p}D_{ps}]\}+\frac{\hbar}{4\pi^3}\int_{-\infty}^\infty dq_y\int_0^\infty dq_x\int_0^{q_xV}d\omega\frac{|k_z|}{|\Delta|^2}[(q^2-\beta kq_x)^2+\beta^2k_z^2q_y^2]e^{-2|k_z|d}$$
$$\times\{(q^2-\beta kq_x)^2[\mathrm{Im}\,R_{1p}\,\mathrm{Re}\,R'_{2p}|D_{ss}|^2-(1\leftrightarrow2,\omega\leftrightarrow\omega')]-\beta^2k_z^2q_y^2[\mathrm{Im}\,R_{1p}\,\mathrm{Re}\,R'_{2s}|D_{sp}|^2-(1\leftrightarrow2,\omega\leftrightarrow\omega')]+(p\leftrightarrow s)\}. \tag{28}$$

If in Eq. (27) one neglects the terms of the order β^2, then, as in the case of friction, the contributions from the waves with p- and s- polarization will be separated. In this case Eq. (27) reduces to

$$F_z=-\frac{\hbar}{4\pi^3}\,\mathrm{Re}\int_0^\infty d\omega\int d^2qk_z\left(\frac{1}{R_{1p}^{-1}R_{2p}'^{-1}e^{-2ik_zd}-1}+\frac{1}{R_{1s}^{-1}R_{2s}'^{-1}e^{-2ik_zd}-1}\right)[1+n_1(\omega)+n_2(\omega')]$$
$$-\frac{\hbar}{16\pi^3}\int_0^\infty d\omega\int_{q<\omega/c}d^2qk_z\left\{\frac{[(1-|R_{1p}|^2)(1+|R'_{2p}|^2)-(1\leftrightarrow2,\omega\leftrightarrow\omega')]}{|D_{pp}|2}+(p\leftrightarrow s)\right\}(n_1(\omega)-n_2(\omega'))$$
$$+\frac{\hbar}{4\pi^3}\int_0^\infty d\omega\int_{q>\omega/c}d^2q|k_z|e^{-2|k_z|d}\times\left\{\frac{[\mathrm{Im}\,R_{1p}\,\mathrm{Re}\,R'_{2p}-(1\leftrightarrow2,\omega\leftrightarrow\omega')]}{|D_{pp}|^2}+(p\leftrightarrow s)\right\}(n_1(\omega)-n_2(\omega')) \tag{29}$$

For a rarefied body, similarly as in Sec. 3 in our paper for $d\ll\hbar/k_BT$ from (27) we get the van der Waals interaction between a small particle and plane surface:

$$F_z = \frac{\hbar}{\pi^2}\,\mathrm{Im}\int_0^\infty d\omega \int d^2q \frac{q^2 e^{-2qd}}{q^2-\beta^2 q_y^2}\{q^2[R_p\alpha_E' + R_s\alpha_H'] + \beta^2 q_y^2[R_p\alpha_H' + R_s\alpha_E']\}[1 + n_1(\omega) + n_2(\omega')]$$
$$+ \frac{\hbar}{\pi^2}\int_0^\infty d\omega \int d^2q \frac{q^2}{q^2-\beta^2 q_y^2} e^{-2qd} \times \{q^2[\mathrm{Im}\,R_p\,\mathrm{Re}\,\alpha_E' - \mathrm{Re}\,R_p\,\mathrm{Im}\,\alpha_E'] + \beta^2 q_y^2[\mathrm{Im}\,R_p\,\mathrm{Re}\,\alpha_H' - \mathrm{Im}\,R_s\,\mathrm{Re}\,\alpha_E']$$
$$+ (p \leftrightarrow s, E \leftrightarrow H)\}(n_1(\omega) - n_2(\omega')). \tag{30}$$

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