Erratum: Casimir effect for gauge scalars: The Kalb-Ramond case [Phys. Rev. D 72, 105012 (2005)]

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In this paper a mistake has been made in the calculation of the propagator of the Kalb-Ramond field with the given boundary conditions. To correct it, the expression (25) must have its sign changed. It must read as below:

$$\bar{D}^{\mu\nu,\lambda\rho}(x,y) = -\frac{1}{4}\int\frac{d^3p_\perp}{(2\pi)^3}\frac{1}{L}\Lambda(p_\perp,x^3,y^3)\epsilon^{3\alpha\mu\nu}\epsilon^{3\beta\lambda\rho}\left(\frac{p_\alpha p_\beta}{L^2}\right)e^{-p_\perp(x_\perp-y_\perp)}. \tag{25}$$

As a consequence, Eq. (31) must also suffer an overall change in sign:

$$\mathcal{E} = \frac{E}{A} = \frac{i}{2^3}\int\frac{dp_\perp^3}{(2\pi)^3}\frac{p_0^2}{L}a\frac{e^{iLa}}{e^{iLa}-e^{-iLa}}, \tag{31}$$

so that Eq. (34) becomes

$$\mathcal{E} = -\frac{\pi}{2^7 3^2 5}\frac{1}{a^3}, \tag{34}$$

and the expression for the force (35) comes out as follows:

$$F = -\frac{\partial\mathcal{E}}{\partial a} = -\frac{\pi}{2^7 15}\frac{1}{a^4}. \tag{35}$$

The array (36) must be corrected to

$$\mathcal{E} = \frac{1}{4}\mathcal{E}_{\text{scalar},DD} = \frac{1}{4}\mathcal{E}_{\text{scalar},NN} = -\frac{1}{4}\frac{7}{8}\mathcal{E}_{\text{scalar},DN} = \frac{1}{8}\mathcal{E}_{EM,CC} = \frac{1}{8}\mathcal{E}_{EM,PP} = -\frac{1}{8}\frac{7}{8}\mathcal{E}_{EM,CP}. \tag{36}$$

With these corrections, some points raised in the paper must be changed. We considered the same boundary conditions for the Kalb-Ramond field on two parallel planes and, contrary to what is discussed in the paper, we are led to an atractive Casimir force. A similar result happens for other celebrated bosonic fields (scalar and electromagnetic ones), where we have attractive forces if the same boundary conditions are imposed on the planes.

All the discussions concerning the magnitude of the Casimir forces for the bosonic fields presented in the paper are still valid.

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