Erratum: Dipole radiation in a one-dimensional photonic crystal: TE polarization [Phys. Rev. E 63, 056613 (2001)]

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The application of the normalization condition given in Eq. (20) is incomplete because it excludes the contributions of the δ functions in the position-dependent dielectric function. The correct equation is as follows:

$$\cdots+\int_{-\infty}^{\infty}dy\,dz\int_{-d}^{0}dx[\epsilon_0+gd\,\delta(x+d)]\mathbf{a}_{\mathbf{k}'}^{(-1)*}\cdot\mathbf{a}_{\mathbf{k}}^{(-1)}+\int_{-\infty}^{\infty}dy\,dz\int_{0}^{d}dx[\epsilon_0+gd\,\delta(x)]\mathbf{a}_{\mathbf{k}'}^{(0)*}\cdot\mathbf{a}_{\mathbf{k}}^{(0)}$$
$$+\int_{-\infty}^{\infty}dy\,dz\int_{d}^{2d}dx[\epsilon_0+gd\,\delta(x-d)]\mathbf{a}_{\mathbf{k}'}^{(1)*}\cdot\mathbf{a}_{\mathbf{k}}^{(1)}+\cdots$$
$$=\delta(\mathbf{k}-\mathbf{k}').$$

As a consequence, Eqs. (21) and (22) should include the factor $[\epsilon_0+gd\,\delta(x)]$ inside the integral, and the factor ϵ_0 outside the integral should be deleted. The term $(g/\epsilon_0)|A+B|^2$ should be added to the left side of Eq. (23). The expression $(\sin Kd)$ in the denominator of Eq. (24) should be changed to $[(1+g/\epsilon_0)\sin Kd]$; in the denominator of Eq. (25), $(\sinh|K|d)$ should be replaced by $[(1+g/\epsilon_0)\sinh|K|d]$. The expression $[(1-\alpha/Kd)\sin Kd]$ in the denominators of Eqs. (31) and (32) has to be replaced by $[(1+g-\alpha/Kd)\sin Kd]$. The equation following Eq. (34) and the right side of Eq. (35) should be divided by $(1+g)$. Finally, in the integrand of Eq. (36), there should be the additional factor:

$$\frac{(1-\alpha/Kd)\sin Kd+\alpha\cos Kd}{\left(1-\dfrac{\alpha}{Kd}+g\right)\sin Kd+\alpha\cos Kd}.$$

Figures 2–4 should consequently be corrected as done below. The original Fig. 2 suffers changes only in the region of

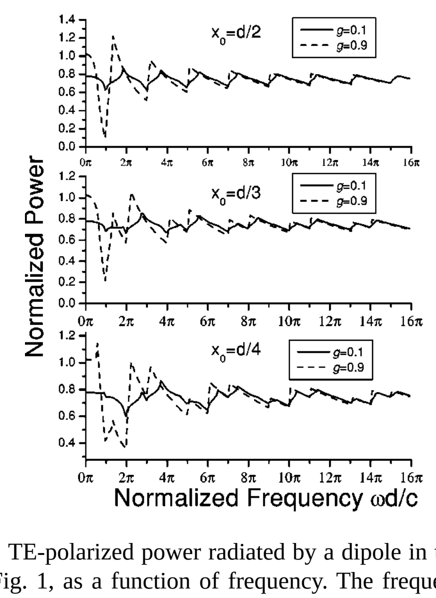

FIG. 2. TE-polarized power radiated by a dipole in the configuration of Fig. 1, as a function of frequency. The frequency is normalized with c/d and the power is normalized with that emitted in free space, $\mu^2\omega^4/3c^3$. The dipole is taken to be parallel to the barriers (ψ=0), located midway between two barriers (top), at one-third of the separation (middle), and at one-fourth of the separation (bottom) from either side. Two grating strengths are considered: g=0.1 (weak modulation) and g=0.9 (strong modulation). Discontinuities in the slope occur at the band edges (for $k_{\parallel}=0$, namely, axial propagation).

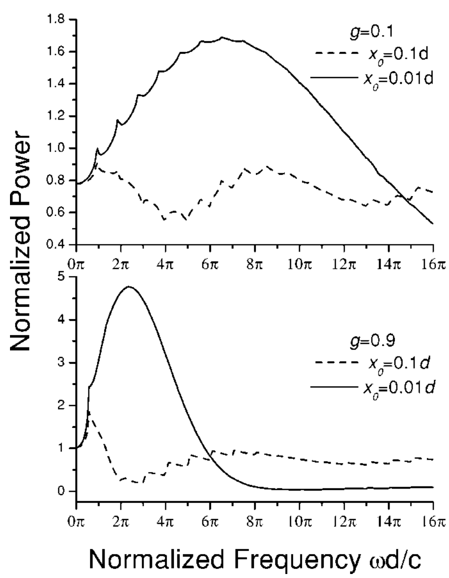

FIG. 3. As Fig. 2, for dipole positions very close to a barrier. The peaks correspond to strong enhancement, which is greater the closer the dipole is to a barrier, and the stronger the modulation (grating strength) is.

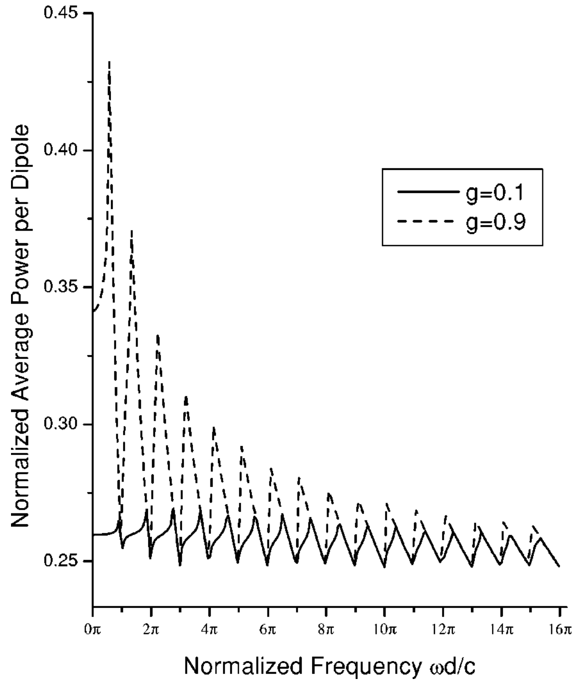

FIG. 4. Power spectrum for a gas of dipoles, for two values of the grating strength.

relatively low frequencies; here the power is reduced. While the behavior shown in the original Fig. 3 is still correct qualitatively, the power peaks are strongly reduced. In Fig. 4 the power emitted by a gas of dipoles shows an oscillating behavior, instead of the linear increase observed in the article. In conclusion, the contribution of the evanescent field is much weaker than that reported in the article.