ERRATA

Erratum to: Analysis of the Purcell Effect in the Waveguide Mode by S -Quantization

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In [1], we unfortunately made a mistake in calculations of the Purcell coefficient for a plane dielectric waveguide (see Fig. 4b in [1]). The correct dependence of the mode Purcell factor was obtained using the S -quantization formalism. This dependence for the TE polarization along with its analytical estimates in the case of a dipole that is placed in the center of a planar waveguide with thickness $L = 300$ nm and the refractive index $n = 2.0$, with the waveguide being bound by semi-infinite media with the refractive indices $n_0 =$

Fig. 1. The corrected frequency dependence of the mode Purcell factor for the first TE polarized mode (solid line) and its analytical estimates (dashed lines) that were obtained using expressions (1a) and (1b) in the case of a dipole placed in the center of a planar waveguide with a thickness of 300 nm and a refractive index of 2.0, with the waveguide being bound by semi-infinite media with refractive indices of 1.0.

1.0, is presented in Fig. 1. Asymptotic estimates for the Purcell coefficient can be obtained using approximate values for the mode “width” and the density of states.

Using these expressions and formula (36) from [1], we can obtain estimates for the maximum and minimum values of the mode Purcell factor in the case of the dipole placed in the center of the waveguide:

$$F_p^{\max} = \frac{\pi n \langle n \rangle \frac{\omega L}{c}}{1 + n \langle n \rangle \left(\frac{\omega L}{c} \right)^2}, \quad (1a)$$

$$F_p^{\min} = \frac{\pi n_0^2 \langle n \rangle \frac{\omega L}{c}}{n + 2n^2 \langle n \rangle \left(\frac{\omega L}{c} \right)^2}, \quad (1b)$$

where $\langle n \rangle = (n + n_0)/2$. These estimates are presented in Fig. 1.

We can see that these dependences are qualitatively consistent with those reported in [1]; however, the maximum value of the Purcell coefficient is smaller than that obtained in [1].

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REFERENCES

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