Erratum: Resonant-state expansion applied to planar waveguides [Phys. Rev. A 89, 053832 (2014)]

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The original paper contains errors in Figs. 2(b) and 3 regarding the contribution to the transmission of different resonant states and the cuts, whereas the total transmission is correct. Also, Fig. 2(b) of the original paper includes the leaky-mode (LM) and the antiwaveguide- (AWG-) mode components, suggesting that they contribute to the total transmission in the frequency domain. However, these modes are on a different Riemann sheet of complex frequency ω as compared to the waveguide (WG) and Fabry-Pérot (FP) modes. In the calculation of the transmission, one can choose any of the two Riemann sheets where the analytic continuation of the transmission $t(\omega)$ is defined. We choose the Riemann sheet containing the WG and FP modes and show in Fig. 2(b) their contributions along with the component due to the cuts which are displayed in Fig. 1 of the original paper.

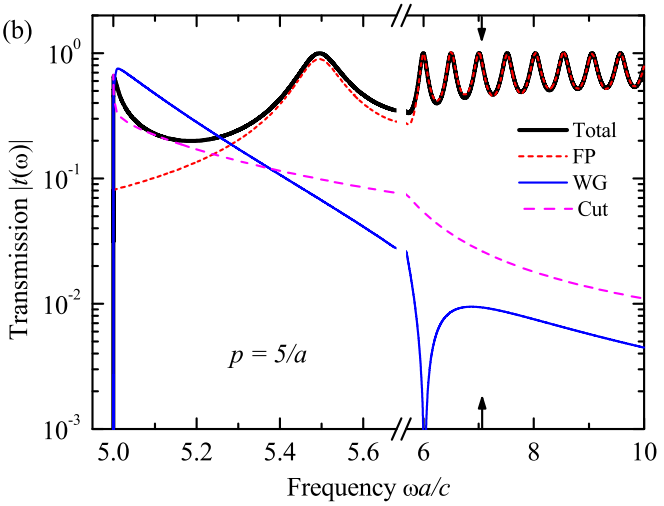

FIG. 2. (b) Transmission $|t(\omega)|$ of a homogeneous dielectric slab with $\epsilon_s = 9$ as a function of the light frequency ω for a fixed in-plane wave vector $pa = 5$ along with partial contributions to the transmission of different types of modes and the cut shown in Fig. 1 of the original paper. The black vertical arrows indicate the frequency for which $\theta = \pi/4$.

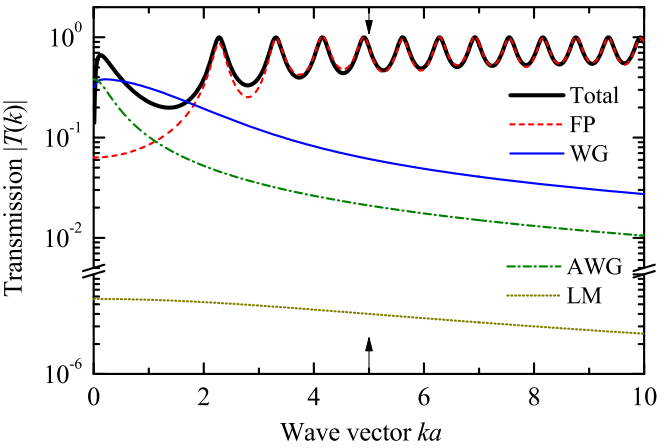

FIG. 3. Transmission $|T(k)|$ of a homogeneous dielectric slab with $\epsilon_s = 9$ and $pa = 5$ and partial contributions of different modes as functions of the normal component k of the wave vector in vacuum. The vertical arrows indicate the wave vector at which $\theta = \pi/4$.

The LM and AWG modes do not contribute to the transmission on this sheet and thus are omitted from the corrected plot of Fig. 2(b). These modes do contribute, however, in the k representation, due to the absence of a branch cut on the complex k plane since the transmission $T(k)$ is a single-valued function, see the corrected Fig. 3.

The corrected plots show that the WG-mode contribution to the transmission was substantially underestimated in the original paper in both $t(\omega)$ and $T(k)$ and that the WG modes have a significant off-resonant contribution even dominating at some frequencies, which only reinforces the conclusion of the original paper about their role in the transmission. The minimum seen in Fig. 2(b) in the WG-mode contribution at around $\omega = 6c/a$ is due to the fact that this component in the transmission is purely real and changes the sign at that point. This change in the sign can be understood as an interference effect of WG modes of even and odd parities.

We note that the reported corrections do not affect other parts of the original paper. In particular, they leave intact all the conclusions of the original paper and have no influence on the results related to the resonant-state expansion.

The authors thank Sam Neale for identifying the errors and providing the data displayed in Figs. 2(b) and 3 of this Erratum.