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Title:Adding metallic layers outside terahertz antiresonant reflecting waveguides: The influence on loss spectra

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Abstract: Spectral effects of adding metallic layers outside the terahertz (THz) antiresonant reflecting hollow waveguides are investigated in this work. We first examine the one-dimensional case, i.e., the slab-type hollow waveguide. Numerical results indicate that, with metallic coating outside the dielectric claddings, the loss spectrum shifts half-period for the TE mode, but not for the TM mode. Then, we investigate the situation where the metallic layers are moveable off the claddings and calculate the amount of the spectral shift for the TE mode. Finally, the two-dimensional cylindrical hollow waveguide, i.e., the recently proposed THz pipe waveguide, with metallic coating is inspected. It is found that the loss spectrum of the TE01 mode shifts half-period and that of the TM01 mode remains unmoved; while for the HE11 and HE21 modes, their periods become half of the original ones owing to the hybrid-mode nature.

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