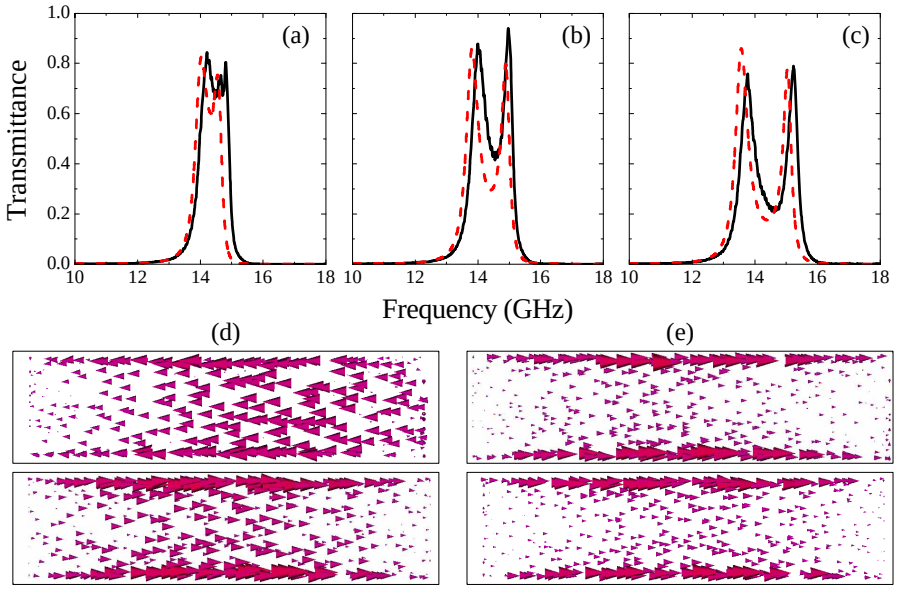


Fig. 4. (a), (b), (c) As in Fig. 3, but for nonzero wire longitudinal displacement, $\Delta_x =$ 1, 2, 3 mm, respectively. (d), (e) Representative (simulated) surface current distributions on the wires for $\Delta_x = 2$ mm, at the resonance frequencies of 13.82 GHz and 14.89 GHz, respectively.

array case (which, as shown in [14], may also exhibit comparable transmittance levels). Our actual interest in the paired-array design is due to the possibility (illustrated in [17]) of exciting and tuning (jointly or separately) both *electric*- and *magnetic*-type resonances (which appear *merged* in the example in Fig. 3). For instance, Fig. 4 illustrates some representative responses obtained by longitudinally displacing the wires by the quantity $\Delta_x$ [see Fig. 1(b)] as a tuning parameter. In the transmittance responses [Figs. 4(a)–4(c)], *two* resonance peaks are now visible, with their frequency separation increasing up to nearly 1.5 GHz (i.e., about 10%) for higher values of $\Delta_x$, and with only mild variations of the peak transmittance levels (always around 80%). From the representative ($\Delta_x = 2$mm) surface current distributions shown in Figs. 4(d) and 4(e), we note that the lower frequency resonance is attributable to an anti-symmetric (i.e., magnetic-type) mode, while the higher-frequency one stems from a symmetric (i.e., electric-type) mode. The above experimental results, again in very good agreement with the simulations, clearly indicate the practical feasibility of a *pass-band-type* design for cut-wire-induced enhanced transmission as proposed in [17].

## 4. Conclusions

In conclusion, we have experimentally verified the potentials of single and paired cut-wire arrays in enhancing the transmission of TE-polarized fields through subwavelength slits in a thin metallic screen. Our results, in very good agreement with the full-wave numerical predictions, evidence a remarkable robustness of these phenomena with respect to fabrication tolerances and experimental imperfections (misalignments, edge effects, etc.), and confirm the intriguing design potentials envisaged in the previous numerical studies.

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