

Supplementary Materials for

Structural dispersion–based reduction of loss in epsilon-near-zero and surface plasmon polariton waves

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Published 11 October 2019, *Sci. Adv.* **5**, eaav3764 (2019)

DOI: 10.1126/sciadv.aav3764

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Fig. S3. Magnetic field distributions for the structural dispersion–based SPP propagation, with Ag waveguide modeled following the material parameters given in (34).

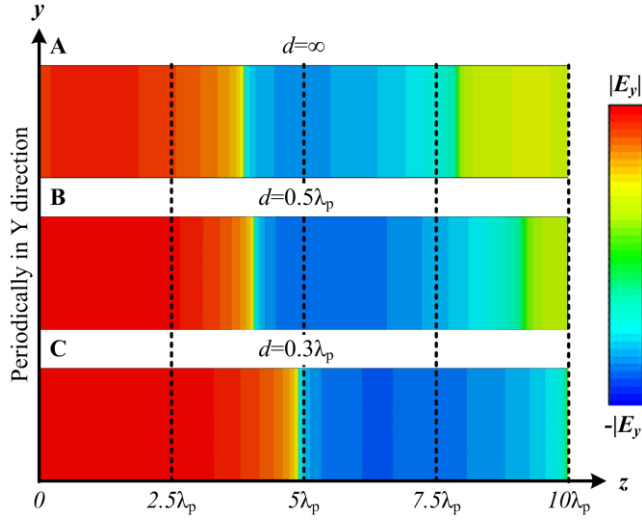


Fig. S1. Electric field distributions of the guided wave in structural dispersion–based ENZ medium. Snapshots of E_y distributions at the middle mathematical plane in the structure of Fig. 3(A) in the main text. (A) $d = \infty$ at $\omega_{ENZ} \approx \omega_p$, (B) $d = 0.5\lambda_p$ at $\omega_{ENZ} \approx 1.41\omega_p$, (C) $d = 0.3\lambda_p$ at $\omega_{ENZ} \approx 1.93\omega_p$. The electric fields in (A)-(C) correspond to the magnetic fields in Figs. 3(B)-3(D) in the main text.

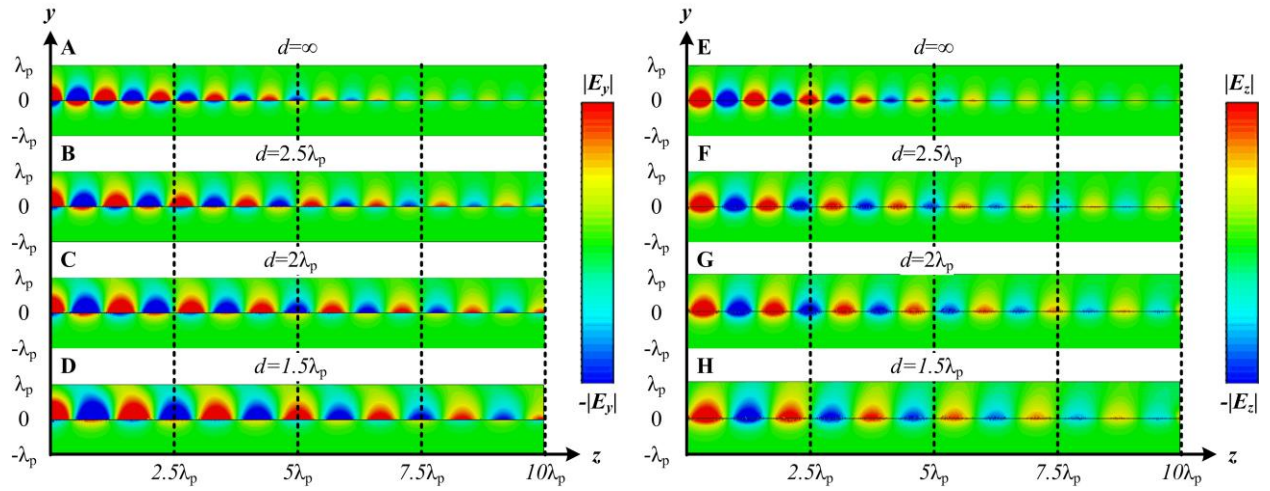


Fig. S2. Electric field distributions for the structural dispersion–based SPP propagation. Snapshots of E_y and E_z distributions in the middle mathematical plane at $\omega = 0.6\omega_p$ for the structure of Fig. 5(A) in the main text: E_y for (A) $d = \infty$, (B) $d = 2.5\lambda_p$, (C) $d = 2\lambda_p$, and (D) $d = 1.5\lambda_p$; E_z for (E) $d = \infty$, (F) $d = 2.5\lambda_p$, (G) $d = 2\lambda_p$, and (H) $d = 1.5\lambda_p$. The electric fields in (A)-(D) and (E)-(H) correspond to the magnetic fields in Figs. 5(B)-5(E) in the main text.

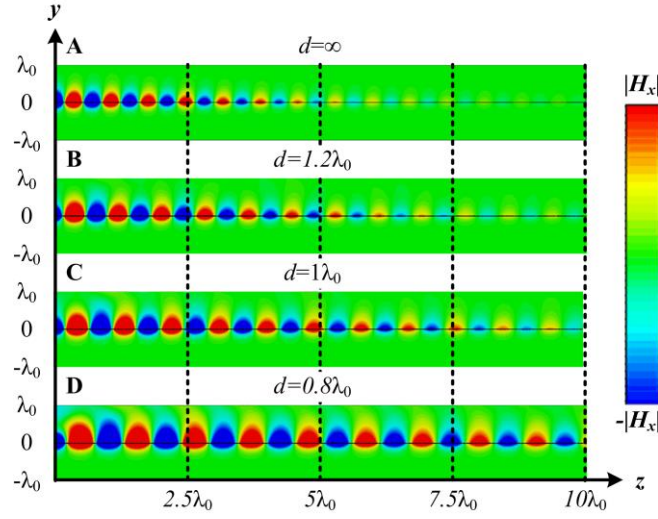


Fig. S3. Magnetic field distributions for the structural dispersion–based SPP propagation, with Ag waveguide modeled following the material parameters given in (34). Snapshots of H_x distributions in the middle mathematical plane at 28 THz for the structure of Fig. 5(G) in the main text, the Drude model of Ag is $\varepsilon_{Ag} = \varepsilon_\infty - \frac{\omega_p^2}{\omega(\omega + i\gamma)}$, where $\varepsilon_\infty = 5$, $\omega_p = 1.36 \times 10^{16}$ rad/s, $\gamma = 5.88 \times 10^{13}$ rad/s. (A) $d = \infty$, (B) $d = 1.2\lambda_0$, (C) $d = 1\lambda_0$, and (D) $d = 0.8\lambda_0$.