Chapter 27

Surface Electromagnetic Waves Guided by Non-metallic Interfaces

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Abstract Surface electromagnetic waves guided by interfaces with metal are called surface plasmon-polariton (SPP) waves, and are much more famous than their counterparts that are guided by interfaces formed by dielectric materials. The surface wave electromagnetic waves can be guided if at least one of the partnering dielectric materials is periodically nonhomogeneous normal to the direction of propagation, and/or one of the partner is anisotropic. The surface can still exist if both partnering dielectric materials are isotropic and homogeneous, provided that at least one of them is lossy. These surface waves find applications in optical sensing of changes in the refractive index of fluids, and could potentially be used for on-chip communication.

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