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## Characterizing Surface Plasmon Polaritons Propagation at Lossy Interfaces

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We characterize the propagation of surface plasmon polaritons (SPPs) at planar lossy interfaces by investigating the behavior of the energy flux and field intensity at the interface. For interfaces between dispersive and nondispersive linear, homogeneous and isotropic materials with positive, zero, and negative permittivity and permeability, a narrow transition frequency window separates propagating SPPs from leaky SPPs. We derive conditions on the permittivity and permeability corresponding to whether the SPPs are propagating or leaky. Ascertaining propagation characteristics of surface plasmon polaritons is important to check the viability of a given study or application. As an application we show that in frequency regions where one material has a double-negative refractive index, the SPPs are leaky, rather than propagating.

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