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Title:Surface polaritons with arbitrary magnetic and dielectric materials: New regimes, effects of negative index, and superconductors

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Abstract:A surface magnon-polariton can be excited by both p- and s-polarized light if at least one of the layers is a magnetic material. We present general expressions of the tangential wave vectors of s- and p-polarized light at an interface of two media. Analysis reveals additional new regimes of surface polariton resonances with magnetic materials for s- and p-polarized light. The tangential wave vectors are found to be equal in magnitude to the normal wave vectors at surface polariton resonances. The spatial distributions of the fields at resonant enhancement and the spectra of the tangential wave vectors are studied for different dielectric permittivities and magnetic permeabilities of the two media. If one of the media has dispersive dielectric function and permeability function, additional surface polariton resonance peaks appear for both s- and p polarizations. For a medium with a superconductor, the tangential component increases asymptotically at lower frequencies, providing subwavelength capability at the terahertz regime. © 2012 Optical Society of America.

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