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Optical transmission through metallic bilayers with subwavelength apertures ZSOLT MARCET, KWANGJE WOO, DAVID TANNER, Department of Physics, University of Florida, DASTIN CARR, Sandia National Laboratories, HO BUN CHAN, Department of Physics, University of Florida — The optical transmission through a periodical array of subwavelength apertures in a metal film can be strongly enhanced by resonance of the incident light with surface plasmon polaritons and/or diffracted evanescent waves. The excitation of surface waves is accompanied by a dramatic enhancement of the local electromagnetic field on the metal surfaces. We have fabricated subwavelength structures consisting of two layers of metal. The metal layers are positioned sufficiently close to each other such that the evanescent fields of the surface plasmons generated in the first layer excite surface plasmons in the second layer. In some cases the two metal layers are laterally displaced such that no direct line of sight exists through the structure. Nevertheless, the transmission through a number of these devices remains remarkably high at resonance, comparable to the single layer value. We will discuss the dependence of the optical transmission on various sample parameters, including metal layer thickness, separation, lateral shift and incident angle of light.

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