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Nonresonant Broadband Funneling of Light via Ultrasubwavelength Channels[1] GANAPATHI SUBRAMANIA, Sandia National Laboratories, Albuquerque, NM, USA, STAVROULA FOTEINOPOULOU, School of Physics, University of Exeter, Exeter, UK, IGAL BRENER, Sandia National Laboratories, Albuquerque, NM, USA — Efficient control of light-matter interaction, which is key to many photonics applications such as detectors, sensors and novel light sources, can be achieved by enhancing and funneling light efficiently through deep subwavelength channels. Thus far, this has been accomplished by exciting the structural surface plasmon resonances of perforated nanostructured metal films, a phenomenon known as extraordinary optical transmission. The resonant nature of the phenomenon makes it inherently narrowband. Here, we introduce a new paradigm structure consisting of double-grooved metallic structure that possesses all the capabilities of extraordinary optical transmission platforms, yet operates nonresonantly and across broadband (Phys. Rev. Lett. 107, 163902(2011)). As a result, our proposed platform demonstrates efficient ultrabroadband funneling of optical power confined to an area as small as $\sim (\lambda/500)^2$, where optical fields are enhanced, thus exhibiting functional possibilities beyond resonant platforms. We explain the nonresonant mechanism underlying this phenomenon with a simple quasistatic picture that shows excellent agreement with our numerical simulations.

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