

Abstract Submitted
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Making metals transparency for white light by surface plasmons¹ RU-WEN PENG, National Laboratory of Solid State Microstructures and Department of Physics, Nanjing University, Nanjing 210093, China, XIAN-RONG HUANG, Advanced Photon Source, Argonne National Laboratory, Argonne, Illinois 60439, USA, REN-HAO FAN, JIA LI, QING HU, MU WANG, National Laboratory of Solid State Microstructures and Department of Physics, Nanjing University, Nanjing 210093, China, NATIONAL LABORATORY OF SOLID STATE MICROSTRUCTURES COLLABORATION, ARGONNE NATIONAL LABORATORY COLLABORATION — We demonstrate both experimentally and theoretically that metallic gratings consisting of narrow slits become transparent for extremely broad bandwidths under oblique incidence. This phenomenon can be explained by a concrete picture in which the incident wave drives free electrons on the conducting surfaces and part of the slit walls to form surface plasmons (SPs). The SPs then propagate on the slit walls but are abruptly discontinued by the bottom edges to form oscillating charges that emit the transmitted wave. This picture explicitly demonstrates the conversion between light and SPs and indicates clear guidelines for enhancing SP excitation and propagation. Making structured metals transparent may lead to a variety of applications. References: Xian-Rong Huang, Ru-Wen Peng, and Ren-Hao Fan, Phys. Rev. Lett. (2010)105, 243901; and Ren-Hao Fan, Ru-Wen Peng, Xian-Rong Huang, Jia Li, Qing Hu, and Mu Wang, manuscript prepared(2011).

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