

Abstract Submitted  
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**An experimental study of transmission through a plasmonic hole<sup>1</sup>**

HYUNGJIN MA, JUN XU, NICHOLAS FANG, University of Illinois at Urbana-Champaign — We report the observation of electric dipole contribution in transmission through an isolated subwavelength hole. Near-field scanning optical microscope is employed in an interferometric way to determine both the phase and the amplitude of light that is transmitted through a subwavelength hole in a thin metal film. The transmitted light has a larger amplitude and a longer phase delay than the predictions by Bethe's theory of diffraction. The measured radiation profile further shows the existence of electric dipole lying in the plane of the metal surface which was not considered in Bethe's theory. This additional contribution of electric dipole might explain the role of surface plasmon in the extraordinary optical transmission.

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Hyungjin Ma  
University of Illinois at Urbana-Champaign

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