

Abstract Submitted
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Subwavelength Focusing and Guiding of Surface Plasmon Polaritons U. WELP, V. VLASKO-VLASOV, L. YIN, A. RYDH, J. PEARSON, S.-H. CHANG, S.K. GRAY, Argonne National Laboratory, G.C. SCHATZ, Northwestern University, D.E. BROWN, C.W. KIMBALL, Northern Illinois University — It is found experimentally that subwavelength holes in thin metal films are versatile sources for the launching of surface plasmon polaritons (SPP). We use near field scanning optical microscopy to image the evanescent electromagnetic fields around individual holes and in hole arrays. For an arc-shaped hole array fabricated with focused ion beam machining into a Cr/Ag bilayer we show that SPP can be focused to a spot with subwavelength width. Finite-difference time-domain calculations give a quantitative account of the observed SPP patterns. Furthermore, we show that the high SPP intensity in the focal spot can be launched onto a 250 nm wide metal strip guide. This work was supported by the U.S. Department of Energy under Grant Nos. W-31-109-ENG-28, DEFG02-91-ER45439 and DEFG02-03-ER15487.

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