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Hyperbolic surface polaritons in hexagonal boron nitride SIYUAN

DAI, University of California, San Diego, YAFANG YANG, QIONG MA, Massachusetts Institute of Technology, KENJI WATANABE, TAKASHI TANIGUCHI, National Institute for Materials Science, Japan, PABLO JARILLO-HERRERO, Massachusetts Institute of Technology, MICHAEL FOGLER, D. N. BASOV, University of California, San Diego — Hexagonal boron nitride (hBN) is a natural hyperbolic material ($\epsilon_z \epsilon_{xy} < 0$) which supports volume-confined hyperbolic polaritons (HPs). In this work, we report on the observation of hyperbolic surface polaritons (HSPs) confined along sidewalls of the hBN slab. We have systematically studied the wavelength, damping and momentum-frequency dispersion of the HSPs by infrared nano-imaging using the scattering-type scanning near-field optical microscopy. We investigate the reflection, transmission and scattering of HSPs at the hBN slab corner with various angles. The surface confined nature of HSPs further allows the propagation steering through engineering of the hBN slab geometry.

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