

Abstract Submitted
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Achieving sub-diffraction imaging through bound surface states in negative-refracting photonic crystals at the near-infrared ROHIT CHATTERJEE, Optical Nanostructures Laboratory, Solid-State Science and Mechanical Engineering, Columbia University, New York, NICOLAE PANOIU, Department of Electronic and Electrical Engineering, University College London, London, KAI LIU, ZACHARY DIOS, Optical Nanostructures Laboratory, Solid-State Science and Mechanical Engineering, Columbia University, New York, MING BIN YU, MY THE DOAN, The Institute of Microelectronics, Singapore, LAURA KAUFMAN, Department of Chemistry, Columbia University, New York, RICHARD OSGOOD, Department of Applied Physics and Applied Mathematics, Columbia University, New York, CHEE WEI WONG, Optical Nanostructures Laboratory, Solid-State Science and Mechanical Engineering, Columbia University, New York — We report the observation of imaging beyond the diffraction limit due to bound surface states in negative refraction photonic crystals. We achieve an effective negative index figure-of-merit $[-\text{Re}(n)/\text{Im}(n)]$ of at least 380, $\sim 125\times$ improvement over recent efforts in the near-infrared, with a 0.4 THz bandwidth. Supported by numerical and theoretical analyses, the observed near-field resolution is 0.47λ , clearly smaller than the diffraction limit of 0.61λ . Importantly, we show this sub-diffraction imaging is due to resonant excitation of surface slab modes, allowing evanescent wave amplification.

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