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Manipulation of Terahertz Wavefront with Magnetically Tunable Metasurface[1] YONGZHENG WEN, JI ZHOU, State Key Laboratory of New Ceramics and Fine Processing, School of Materials Science and Engineering, Tsinghua University, Beijing 100084, China — Recently, numerous researches have proved the electromagnetic properties of the metasurface can be externally tuned with optical, electrical and thermal signals. The effect of magnetostatic field on the metasurface, however, is relatively lack of study. Here, a metasurface potentially capable of manipulating the wavefront of terahertz (THz) wave with the external magnetostatic field is proposed, which consists of the doped InAs cut-wire resonator with large Hall coefficient. With the external magnetic field varying from 0Gs to 3000Gs, the simulated resonant frequency of the metasurface shifts from 2.25THz to 1.87THz, and the phase increases from -181 to -89 at 2THz. With proper distribution of the megnetostatic field, the phase of the transmitted THz wave can thus be spatially configured, leading to effective manipulation of THz wavefront. With the same illuminance of a plane wave at 2THz, the metasurface distributed with linear-like magnetic field bends the THz wave to an angle about 10, while the one with the hyperbolic-like distribution focuses the plane wave with the focal length of 0.5mm. The simulations perfectly verify the proposed magnetic manipulation of THz wavefront with the metasurface.

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