Chiral metamirrors for spin-selective absorption and beam deflection

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***Abstract*—Chiral metasurfaces are planar optical structures that break mirror symmetries and are recently proposed to achieve efficient manipulation on spin photons. Here, we discuss the mechanism of spin-selective absorption and wavefront control in chiral metasurfaces. By combining the resonant modes of two chiral meta-atoms, we design and construct a chiral metamirror that absorbs only the left-handed circularly waves over a broad frequency range. The measured results show a bandwidth of 5.1%, almost 96% larger than that of the narrowband metamirror. Asymmetric absorption of circularly polarized waves is highly enhanced by covering the metallic surface with an array of bianisotropic resonators. Furthermore, dispersionless phase discontinuities are introduced by adjusting the orientation of the chiral meta-atoms, thus providing spin-selective modulation of waves in the momentum space. We expect our findings could pave an avenue towards spin-selective meta-devices.**

Keywords—chiral; metasurfaces; absorption; beam deflection;