Bending Self-collimated One-way Light in Gyromagnetic Photonic Crystals by Gradient Magnetic Field

*Qing-Bo Li, Zhen Li, and Rui-xin Wu**

School of Electronic Science and Engineering, Nanjing University, China

**Email of Presenting Author: rxwu@nju.edu.cn*

We theoretically demonstrate that electromagnetic waves can self-collimate and propagate unidirectionally in photonic crystals fabricated using semi-cylindrical ferrite rods in magnetized states. In these states, the parity and time-reversal symmetries of such photonic crystals are broken, resulting in a self-collimated one-way body wave within the photonic crystals. The propagation direction of the self-collimated one-way wave beams can be tuned using a bias magnetic field. Therefore, in a gradient magnetic field, the self-collimated one-way body wave is bent. Further, by applying the bias magnetic field in a complex configuration, the self-collimated one-way wave beam can be bent into arbitrary trajectories within the photonic crystal, providing a new avenue for controlling wave beams.