Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Exciting Reflectionless, Unidirectional Edge Mode in Bianisotropic Meta-waveguide Using Rotating Dipole Antenna.[1] BO XIAO, THOMAS ANTONSEN, EDWARD OTT, STEVEN ANLAGE, Univ of Maryland-College Park, TZUHSUAN MA, GENNADY SHVETS, University of Texas Austin — Electronic chiral edge states in Quantum Hall Effect systems has attracted a lot of attention in recent years because of its unique directionality and robustness against scattering from disorder. Its electromagnetic counterpart can be found in photonic crystals, which is a material with periodic dielectric constant. Here we present the experimental results demonstrating the unidirectional edge mode inside a bi-anisotropic meta-waveguide [1] (BMW) structure. It is a parallel plate waveguide with metal rods placed in a hexagonal lattice. Half of the rods are attached to the top plate while the other half are attached to the bottom plate creating a domain wall. The edge mode is excited by two loop antennas placed perpendicular to each other within one wavelength, generating a rotating magnetic dipole that couples to the left or right-going mode. The transmission measurement are taken along the BMW boundary and shows high transmission only around the edge, thus confirming the presence of an edge mode. We also demonstrated that very high directivity can be achieved when the input amplitude and phase of the two loop antennas are tuned properly. [1] T. Ma, A. B. Khanikaev, S. H. Mousavi, And G. Shvets, Phys. Rev. Lett. 114, 127401 (2015).

[1]This work is funded by the ONR under Grants No. N00014130474 and N000141512134, and the Center for Nanophysics and Advanced Materials (CNAM).

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Date submitted: 06 Nov 2015 Electronic form version 1.4