CONTROL ID: 2889051

TITLE: All-optical binary switch based on photonic topological states

Abstract Body: Topological photonics is an incipient research area where the well-developed theory and applications of the so-called topological insulators is applied to photonic systems [1]. In this sense, specially designed ring waveguides have shown the ability to propagate edge states scattering-free under defects on the structure [2]. In the present work, we proposed numerically the application of photonic topological states coupled, in a set of ring waveguides, to a binary switch with potential applications in on-chip Si based devices. We show that the materials and dimensions of the device can be implemented by conventional fabrication methods, and that the ON/OFF states are clearly distinguished by a ratio of ~ -7 dB. Further discussion on the proposed device shows the potential application to logical gates based on topological edge states.

[1] L. Lu, et al. Nature Photon. 8, 821–829 (2014).

[2] G. Q. Liang, Phys. Rev. Lett. 110, 203904 (2013).

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UNIT: 13.0 SUPERLATTICES, NANOSTRUCTURES, AND OTHER ARTIFICIALLY STRUCTURED MATERIALS (DCMP/DMP)

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