Experimental Characterization of the Deterministic Interface States in Two-dimensional Photonic Crystals

Yuting Yang[1], Xueqin Huang[2], Zhi Hong Hang[1]*

[1]*College of Physics, Optoelectronics and Energy & Collaborative Innovation Center of Suzhou Nano Science and Technology, Soochow University, Suzhou 215006, China*

[2]*Department of Physics, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong*

**Email of Presenting Author: zhhang@suda.edu.cn*

The study of interface/surface states in photonic crystals provides new approaches to control the flow of light. In this work, a new type of interface states in two-dimensional photonic crystals is experimentally realized and characterized. The existence of this type of interface states is solely dependent on the reflection properties of the bulk photonic crystals without any surface/interface decorations. Our experimental results have excellent agreement to numerical simulations and the propagation properties of these measured interface states indicate that this new type of interface states will be a good candidate for future optical waveguiding applications. This type of deterministic interface states also exists at the boundary between a dielectric photonic crystal and its “inverted” partner as long as a common gap can be found above the lowest band, which is also experimentally characterized.