

Controlling Photons in Conformal Transformation Optical Waveguides

(5 Dec 2016)

Hui LIU

Nanjing University

Transformation optics (TO) has been used to propose various novel optical devices. With the help of metamaterials, several intriguing designs, such as invisibility cloaks, have been implemented. However, as the basic units should be much smaller than the working wavelengths to achieve the effective material parameters, and the sizes of devices should be much larger than the wavelengths of illumination to work within the light-ray approximation, it is a big challenge to implement an experimental system that works simultaneously for both geometric optics and wave optics.

In this talk, by using a gradient-index micro-structured optical waveguide, the speaker and his research group realize a device of conformal transformation optics (CTO) and demonstrate its self-focusing property for geometry optics and Talbot effect for wave optics. In addition, the Talbot effect in such a system has a potential application to transfer digital information without diffraction. Our findings demonstrate the photon controlling ability of CTO.