

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Whispering gallery modes in deformed microcavities via transformation optics¹ JUNG-WAN RYU, Center for Theoretical Physics of Complex Systems, Institute for Basic Science, YUSHIN KIM, Department of Mechanical Engineering, Korea Advanced Institute of Science and Technology, SOO-YOUNG LEE, INBO KIM, JAE-HYUNG HAN, HEUNG-SIK TAE, MUHAN CHOI, School of Electronics Engineering, Kyungpook National University, BUMKI MIN, Department of Mechanical Engineering, Korea Advanced Institute of Science and Technology — In dielectric cavities with rotational symmetry, very long-lived modes, so called Whispering Gallery Modes (WGMs), can be formed by total internal reflection. The ultra-high Q-factor of WGMs is of great merit in cutting-edge photonic devices, however their isotropic emission due to the rotational symmetry is a serious drawback in applications requiring directional light sources. Here, we have shown that, utilizing transformation optics, optical mode properties such as Q-factor and emission directionality can be tailored at will. The Q-spoiling problem inevitably involved for emission directionality is resolved by restoring WGMs in two dimensional deformed dielectric cavities. The restored WGMs retain the ultra-high Q factor even in considerably deformed cavities and exhibit the emission directionality as well.

¹We were supported by Project Code (IBS-R024-D1).

Jung-Wan Ryu
Center for Theoretical Physics of Complex Systems, Institute for Basic Science

Date submitted: 11 Nov 2016

Electronic form version 1.4