Washington University in St. Louis

SCHOOL OF ENGINEERING & APPLIED SCIENCE

Preston M. Green Department of Electrical & Systems Engineering

Seminar Announcement

Jan Wiersig
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Otto-von-Guericke University Magdeburg, Germany

Thursday, May 11, 2017
Green Hall, Room 0120
3:00 P.M.

Optical Microdisk Cavities with Weak Boundary Deformation

Abstract: Dielectric optical microcavities are important for a wide range of research areas and applications, such as ultra-low threshold lasers and single-photon sources. Microdisks are prominent examples of such cavities as they support whispering-gallery modes with high Q-factors (long photon lifetimes in the cavity). Breaking the rotational symmetry of a disk by deforming its boundary is useful for applications as well as for fundamental studies on ray-wave correspondence in open systems.

In this talk I will discuss microdisks with a weak boundary deformation. First, I will introduce and study the inverse problem of deformed microcavities where the far-field emission pattern is given and the corresponding cavity deformation has to be determined. Second, I will study the reduction of the Q-factor due to the deformation (Q-spoiling) in the context of resonance-assisted tunneling in nearly-integrable quantum systems. Finally, I will present an extension of the perturbation theory for weakly deformed microdisks with mirror reflection symmetry to the general, nonsymmetric case.

Bio: Dr. Jan Wiersig is a professor in the institute for theoretical physics at the Otto-von-Guericke University Magdeburg, Germany. His research interests are in the broad areas of light-matter interactions in semiconductor micro- and nanostructures, quantum optics in the solid state, wave chaos in optical microcavities, and non-Hermitian effects in optical systems. He has published 105 papers in peer-reviewed journals, including Physical Review Letters, Nature, Nature Physics, and Reviews of Modern Physics, etc.

Host: Dr. Lan Yang