



复旦大学物理系 物质科学报告

Time: 2:00pm, Tuesday, 2019.10.22

Location: Room C108, Jiangwan Physics Building

Title: Optical Absorption and Thermal Radiation at Subwavelength Scale

Speaker: Min Qiu

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Abstract: The ability to control optical absorption and thermal emission facilitates a wide range of applications including infrared detectors, thermophotovoltaics, radiative cooling and infrared camouflage. For optical absorption, different methods have been proposed to realize narrowband absorbers with high quality factor for sensing and broadband absorbers for energy harvesting. For thermal emission, the dynamic control of the emissivity has been an attractive research topic recently. Incorporating with materials such as semiconductor quantum wells, graphene and phase change materials, the emissivities of thermal emitters can be continuously tuned. Here, we will discuss some progresses in both optical absorption enhancement and thermal emission control. First, both plasmonic and dielectric nanostructures are proposed to realize narrowband and broadband optical absorbers. Next, dynamic control of the emissivities of thermal emitters with zero static power consumption based on phase-change material $\text{Ge}_2\text{Se}_2\text{Te}_5$ (GST) are illustrated. Finally, we introduce some inspiring applications of thermal emission control, such as thermal camouflage and thermal management.

Min Qiu received B.Sc. degree in Physics from the Zhejiang University, Hangzhou, China, in 1995, and Ph.D. degree in Condense Matter Physics from the same university in 1999. He received his second Ph.D. degree in Electromagnetic Theory from Royal Institute of Technology (KTH), Stockholm, Sweden, in 2001. In 2001 he joined the School of Information and Communication Technology, KTH, as an assistant professor. He became an associate professor in 2005, and a full professor (Professor of Photonics) in 2009. He was the recipient of the Individual Grants for the Advancement of Research Leaders (INGVAR) from the Swedish Foundation for Strategic Research (SSF) in 2004, and also held a Senior Researcher Fellowship from Swedish Research Council. Since 2010, he became a distinguished professor at Zhejiang University, China, where he was the Director of State Key Laboratory of Modern Optical Instrumentation, Zhejiang University. In 2014, he received the National Science Fund for Distinguished Young Scholars. Prof. Min Qiu is the chair professor of Photonics and Vice President for Research, Westlake University, Hangzhou, China, since 2018.

His research interests include nanofabrication technology, nanophotonics, and green photonics. He is currently leading a project on solar thermal energy utilization through the National Key Research and Development Program of China (No. 2017YFA0205700). He is an author or co-author of more than 200 international refereed journal papers. For his contributions on nanophotonic devices, Prof. Qiu is elected to Fellow of the Institute of Electrical and Electronics Engineers (IEEE) in 2015, Fellow of the Optical Society of America (OSA) and Fellow of the International Society for Optics and Photonics (SPIE) in 2013.