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국문 강연제목: 양자의공학을 위한 광학 메타물질

영문 강연제목: Optical Metamaterials for Quantum Biomedical Devices

Abstract:

Metamaterials or metasurfaces - materials that are engineered to have properties that are not found in natural materials - allow us to overcome physical limitations. Metasurface science is further not only expanding field of optics and photonics by providing ultra-compact and multifunctional flat optical devices, also resolves challenging problems in diverse sectors like healthcare, optical display, imaging, and military affairs. In this talk, I will introduce metasurface-enhanced multiplexed nanospectroscopy and molecular diagnostics. First, we report metasurfaces-driven hyperspectral imaging via multiplexed plasmon resonance energy transfer to probe biological light-matter interactions, which can detect quantum biological electron transfer. Second, we demonstrate a fast metaphotonic PCR device composed of a metamaterial perfect absorber that can rapidly go through thermocycling steps using a single infrared LED for quantitative studies of quantum enzymology.

Brief Biosketch:

Inki Kim is an Assistant Professor in Department of Biophysics, Institute of Quantum Biophysics (IQB) at Sungkyunkwan University (SKKU). He received his Ph.D degree (with Chang Kun Soo Memorial Award) in Mechanical Engineering at Pohang University of Science and Technology (POSTECH), and B.S. degree (with highest honor) in Mechanical Engineering at Ulsan National Institute of Science and Technology (UNIST). He has published 60+ peer-reviewed articles in journals such as Nature Nanotechnology, Nature Communications, Science Advances, Advanced Materials, Materials Today, and Light: Science and Applications. Currently his research interests are metamaterials, metasurfaces, plasmonics, nanofabrications, bionanophotonics, quantum biophysics, and quantum-integrated medical devices.