THE DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING PRESENTS:

JIE YAO

NOVEL OPTICAL MATERIAL PLATFORMS FOR NANOPHOTONICS

ABSTRACT

Light is one of the most important carriers of energy and information. Optical materials play important roles in the future development of technologies that are based on the generation, transmission and processing of light. In this talk, I will introduce our recent efforts in 2 research directions on optical materials. One is the investigation of optical materials for novel metaphotonic applications. By introducing materials with different optical responses to the design of metamaterials, we are now able to achieve a much wider range of optical functionalities. For example, by utilizing a phase change material vanadium dioxide to construct a completely reconfigurable “meta-canvas”, we can easily write and erase a metaphotonic structure on the “canvas” and such processes can be repeated for at least hundreds of times.

The other is the exploration of new materials with fundamentally new optical responses and their optoelectronic and nanophotonic applications, such as van der Waals materials with semiconducting properties. We have discovered giant optical transmission tuning and room-temperature high-polarization valleytronic behaviors in different van der Waals materials. I will discuss their unique performances and the physics behind those behaviors.

BIOGRAPHY

Prof. Jie Yao obtained his PhD from the University of California, Berkeley in 2010 and did postdoctoral research at Stanford University after that. He joined the Department of Materials Science and Engineering at UC Berkeley as an assistant professor in 2013. His research interests are mainly focused on optical materials and nanophotonics, including the exploration of new material platforms, such as 2D materials, phase changing materials, etc., for nanophotnic applications. Prof. Yao has won the CAREER award from the National Science Foundation and Early Career award from SPIE. He is also a recipient of the Hellman Fellowship from the Hellman Foundation and Bakar Fellowship from the Bakar Fellow program at UC Berkeley.

MAY 20, 2019

WCH 205/206

11:10 A.M. - 12:00 P.M.

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