Imaging Based on Optical Metalenses

SPEAKER: Shuming Wang, Nanjing University
Time: 2:00-3:00pm, Wednesday, October 23, 2019
Venue: Room 264, Geography Building, Zhongbei Campus, ECNU

Abstract:

Most of information from the outside world is obtained through our eyes. To achieve the best imaging and displaying of our colorful world is the ultimate dream of human-being in all ages, which is also the main issue of Optics. Among different obstacles, the chromatic aberration directly brought from the intrinsic material property and phase accumulation at different wavelengths may be the most severe problem in a full-color optical system. Here, by introducing the phase division approach and simultaneously employing the geometric phase and resonant phase, we have successfully demonstrated the broadband achromatic metalens for full-color imaging. We further introduced the achromatic metalens array to achieve a better imaging with both large NA value and large size of the lens system at the same time. Moreover, the depth of every object in the scene can be reconstructed slice by slice from a series of rendered images with different depths of focus. Full-color, achromatic light field cameras could find applications in a variety of fields such as robotic vision, self-driving vehicles and virtual and augmented reality. Some further progress based on metasurfaces have also been extended to other imaging region, such as spectral imaging, and even to the non-classical region.

Biography:

Shuming Wang, associate professor for National Laboratory of Solid State Microstructures, School of Physics, Nanjing University, specializes in nanophotonics, metasurfaces (metamaterials), plasmonics, and quantum optics. Shuming Wang has received the excellent youth project from National Natural Science Foundation of China and the Forth Jiangsu Youth Optical Science and Technology Award. Prof. Wang has authored more than 60 research publications such as Nat. Nanotechnology, Nat. Communications, Phys. Rev. Lett, with more than 1000 citations.