

Photonic probes for optical trapping and manipulation

Jinan University, China

Baojun Li

Email: baojunli@jnu.edu.cn

Photonic probes, designed to emit or collect light in the close proximity of a sample, have been extensively used to trap and manipulate objects. However, the available probes, constructed from artificial materials, are incompatible and invasive when interfacing with biological systems. In this talk, the author will mainly present biocompatible photonic probes for sub-wavelength probing of localized fluorescence from single-cell in human blood. The photonic probes were built on a tapered fiber tip by trapping a dielectric sphere-shaped particle as a microlens or a living sphere-shaped cell and a chain of rod-shaped living cells as a high-aspect-ratio nanoprobe. Light propagating along the probes can be focused into a small spot with a minimum full width at half maximum of around 200 nm. By using the probes, both micro- and nano-objects can be trapped and manipulated, localized fluorescent signals from the surfaces of single cell can be detected, and real-time optical imaging of intracellular microstructures can be observed. Moreover, the probes were further used for neural stimulation.



Short Bio:

Baojun Li received his Ph.D. from Xi'an Jiaotong University in China in 1998. After that, he worked in the Fudan University, China, as a Postdoctoral Fellow till 2000. From 2000 to 2002, he worked in the Singapore-MIT Alliance and Center for Optoelectronics, National University of Singapore, first as a Postdoctoral Fellow, then as a Research Fellow. From April to October 2002, he worked in the Institute of Materials Research and Engineering in Singapore as a Research Fellow. In October 2002, he joined the Sun Yat-Sen University (SYSU) in China as a full Professor and served as a Director for the Research Laboratory of Optoelectronic Integration. From May to November 2009, he worked in the University of Oxford as a senior visiting scholar. Then, he came back to the SYSU and

served as a Dean for the School of Physics and Engineering. In November 2016, he moved to the Jinan University in Guangzhou, China, where he founded the Institute of Nanophotonics and the Guangdong Provincial Key Laboratory of Nanophotonic Manipulation.