Photonics beyond diffraction limit:

Plasmon waveguide, cavities and integrated laser circuits

Xiang Zhang

University of California at Berkeley (xzhang@me.berkeley.edu)

I will discuss recent development in scaling down photonics. First I will present theoretical and experimental investigation of passive low loss waveguide using hybrid plasmon design. We propose a new optical cavity design approach using indefinite medium that has a drastically different scaling law than conventional microcavities, and discuss its experimental demonstrations. Finally we will show an active plasmonic laser circuit that integrated with 5 tiny cavities that multiplexed into a single waveguide-an effort towards integrated photonics at nano-scale.

Short Bio (http://xlab.me.berkeley.edu/index.html)

Xiang Zhang is the Ernest S. Kuh Chaired Professor at University of California, Berkeley and the Director of NSF Nano-scale Science and Engineering Center (SINAM). He is a member of US National Academy of Engineering (NAE) and fellow of APS, OSA, AAAS and SPIE. His group's research in optical metamaterials was selected by *Times Magazine* as "Top 10 Scientific Discoveries in 2008". Xiang Zhang was a recipient of NSF CAREER Award; SME Dell K. Allen Outstanding Young Engineer Award, ONR Young Investigator Award, MIT's Rohsenow Lecturer, Stanford's William Reynold Memorial Lecturer and MRS Fred Kavli Distinguished Lecturer. He received his BS/MS in physics in Nanjing University, China, and Ph.D from UC Berkeley in 1996 and was on faculty at Pennsylvania State University and University of California, Los Angeles (UCLA) prior joining the Berkeley faculty in 2004.