



Special Seminar

Thursday, August 3, 2023

1 pm

WSI, Seminar room S 101

“Semiconductor plasmonic nanolasers: Progress and prospects”

Miniaturization of semiconductor lasers has been a constant trend of development since the demonstration of the first semiconductor lasers 60 plus years ago. Such miniaturization has benefited greatly from the emergence of both new gain materials and new mechanisms of light confining light confinement (cavities). The most recent confluence of these ideas led to the first demonstration of plasmonic nanolasers or spasers. The field has developed significantly since these initial demonstrations and new ideas of design and new experimental results have emerged constantly. This talk will survey the most recent development in the fabrication and demonstration of such nanolasers and overview the existing problems. We will also present recent progress in understanding the physics of nanolaser such as the issue of laser threshold, photon statistics and laser linewidth. An interesting recently development is the spectral line-shape of a nanolaser. The talk will end with personal perspectives about future challenges and prospects.



Bio: Cun-Zheng Ning is Currently Chair Professor and Dean of College of Integrated Circuits and Optoelectronic Chips at Shenzhen Tech University. He was Professor at Tsinghua University and the Director of Tsinghua International Center for Nano-Optoelectronics from 2014 to 2022 and a Full Professor at Arizona State University from 2006 to 2021. He is widely recognized as a leading figure in semiconductor nanolasers. He has published widely on topics such as nonlinearity and geometric phases in lasers, semiconductor optoelectronic devices, microscopic optical processes in semiconductors, semiconductor nanowires, 2D materials, plasmonics, and nanolasers. His team demonstrated world's first electrical-injection plasmonic nanolaser and their room-temperature operation. He was also the inventor of white lasers and demonstrated the first monolithic white laser. His many achievements have been reported worldwide in radio, TV, news media and tech magazines. MIT Technology Magazine recognizes that their “nanolasers were the first to break the wavelength constraints on the size of lasers”. The first white laser demonstration by his group has won “The Best of Tech in 2015” and the “Top 10 Engineering Achievements” by Popular Science magazine. For his many technical contributions, he has won several awards including NASA Awards, NASA Space Act Patent Awards, CSC Technical Excellence Award, and IEEE/Photonics Society Distinguished Lecturer Award, and Humboldt Research Award. Dr. Ning is a Fellow of the Optical Society (OSA), IEEE, and the Electromagnetic Academy, and a member of US National Academy of Invention.

Prof. Cun-Zheng Ning
Shenzhen Tech University
China