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**Short Course Title**

Fundamentals of QDs and their Application to Displays.

**Abstract**

The quantum dots (QDs) reviewed in this short course are chemically synthesized colloidal QDs. They are semiconducting nanocrystals, also known as artificial atoms. Their size is only a few nanometers, which is close to or smaller than their electron Bohr radius. Strong quantum confinement effect will occur, which is reflected by the fact that the emitted color of the QD is directly dependent on the size of the QD. With years of study, the start-of-the-art synthesized QDs are known for their high quantum yield and narrow emission bandwidth, making it suitable for practical applications for displays, though there is still some distance for lighting. In this course, besides reviewing the fundamentals of QDs, we will introduce the development of applying QD to displays, which include the photoluminescence (PL) and electroluminescence (EL). In PL, we will explain the application of QD as the backlight of LCD; we will introduce QD Tube, QD enhancement film (QDEF), QD on-chip and QD color filter applications. We will also discuss the remaining issues in the QD-LCD backlight. In EL, we will discuss about the device structure and operating mechanism, ways to improve the device performance and degradation issue etc. We will also explain about the inkjet printing of the color pixel patterning of the QLED.

**Speaker Biography**

Dr. Xiao Wei Sun is presently a Chair Professor in the Southern University of Science and Technology, Shenzhen, China. He is also the Head of the Department of Electrical and Electronic Engineering. Before joining Southern University of Science and Technology, he had been working at Nanyang Technological University, Singapore as a Full Professor. He was the Director of Microelectronics Center at Nanyang Technological University. He was awarded the Nanyang Award for Research and Innovation in 2009, the 1000 Talent Award by the Chinese Government in 2012, and the Jacques Beaulieu Excellence Research Chair of INRS (Institut national de la recherchescientifique), Quebec, Canada in 2013. He is an Academician of the Asia-Pacific Academy of Materials. He is the fellow of several academic societies including Society for Information Display (SID), Optical Society of America (OSA), SPIE, and Institute of Physics (IoP, UK). He is a Distinguished Lecturer of IEEE Nanotechnology Council. He is the Chair of the IEEE Nanotechnology Council Guangdong Chapter. He is the founder and President of the Society for Energy Photonics, a non-profitable organization promoting photonics technologies to solve energy crisis and combat global warming and climate change. His main research presently is on semiconductor nanocrystals for power-saving high-quality displays and lighting. Professor Sun has authored over 400 peer-reviewed journal publications, and delivered numerous invited talks. His H-index is 67.