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**TOPIC:**
Photonic Semiconductor Nanostructures: Optical Properties and Applications

**ABSTRACT:**

Efficiency, integration and functionality, and small foot-prints are some of the key requirements on future generation semiconductor photonic components. Photonic semiconductor nanostructures have the potential to meet these demands by employing their unique geometrical and physical properties to control light propagation and confinement and tailor light-matter interaction.

This talk gives an overview of our research on semiconductor NPs focusing on their optical properties and top-down fabrication technologies. We discuss different routes for top-down NP fabrication including combinations of self-assembly of colloidal silica particles for masking, dry etching, solution synthesis, and generation and transfer printing of substrate-free nanostructures. Methods to modify III-V NP's shape to obtain nanocones and nanofrustra arrays are discussed. The utility of such structures for broadband antireflection is experimentally demonstrated, and validated by finite-difference time-domain calculations. We discuss potential applications of transfer printing technology for integrating III-V nanostructures on Si for added functionality in Si-photonics. Finally, recent results on second harmonic generation in GaP NWs, Si-NP array biosensors, hierarchical ZnO NWs/Si structures and periodic arrays of ZnO NW bundles will be presented.

**PROFILE:**

Professor Srinivasan Anand is at the Department of Materials and Nano Physics, School of Information and Communication Technology, KTH-Royal Institute of Technology. He has over 25 years of experience in the field of semiconductors including nanostructures and nano-structured materials. His current research focuses on photonic semiconductor nanostuctures to address the challenges in next generation photonic components. His expertise and research interests include point defects in III-V materials; Photonic semiconductor nanostructures including photonic crystals and their applications; nanowires and quantum dots; Nanofabrication methods and high resolution characterization techniques. In these fields

he has authored or co-authored 220 publications in international journals and conferences. He is co-inventor on three patents. He is and has been the project leader of several national, Nordic and EU projects (as node coordinator); and has an extensive network of collaborations both in academia and industry. He was a co-founder of Comlase AB and PhoXtal communications AB; and served as a consultant for Comlase AB (2001-2002) and as board member of PhoXtal Holding AB, 2003.