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Nanostructures for control of nansocale light-matter interaction

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Abstract

Nanoscale structures are quite important for manipulating and controlling light at the subswavelength scales at optical frequencies. Many nanophotonic structures such as photonic crystals, plasmonic crystals and metamaterials are being studied to fundamentally alter the emission behavior of light sources. This consists of substantially enhancing or totally suppressing it in some or all direction or guiding and bending it within in few wavelengths. These capabilities are important for many advanced nanophotonics applications such as solid state lighting, low threshold lasing, non-classical light sources and optical communications. In this presentation we will discuss two and three dimensional photonic crystals composed of different key material systems utilized in modern nanophotonics including silicon, titanium dioxide, and III-nitrides and how they can be utilized to create nanophotonic devices. In addition we will also discuss where appropriate plasmonic and metamaterials for such purposes. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Biography

Ganapathi Subramania obtained his Ph.D. from Iowa State University in Applied Physics and Electrical Engineering in 2000 followed by post-doctoral research at MIT till 2001. He is currently a senior member of technical staff at the Advanced Material Sciences organization at Sandia National Laboratories. His area of interest is in light-matter interaction in nanophotonic structures such as photonic cystals, plasmonic crystals and metamaterials. He has over 25 publications in this area and currently also serves as the organizing chair for Active Photonics Materials conference for SPIE Optics and Photonics Conference.