Old Dominion University
Department of Physics

Colloquium

Tuesday, February 12, 2019

"Room-temperature High-speed Control of Quantum Emitters with Plasmonic Nanostructures"

Simeon Bogdanov
Purdue University

Abstract:
Quantum technologies simultaneously require an accurate control over the elementary quantum systems and a robust protection from the interactions with their environment. Fast propagation speed and low decoherence rates arguably make photons the best candidates for realizing quantum networks. However, the operation bandwidth of the devices required for photonic quantum information processing is limited because of photons' relatively weak interaction with matter. As a result, the bitrate of most today's photonic quantum networks is limited to the kHz range. Enhancing light-matter interaction is possible using dielectric resonators but the speed of the resulting devices will be eventually limited by the high quality factors. Plasmonic materials used along with the conventional dielectric photonic circuitry allow to dramatically enhance light-matter interaction with significantly weaker constraints on both the operating wavelength range and the achievable bitrate. We outline present and future directions in the development of a platform for room-temperature high-speed integrated quantum photonics and the application of machine-learning techniques for quantum optical measurements.

Presentation: OCNPS 200 @ 3:00 pm
Refreshments: OCNPS Atrium @ 2:30 pm
All interested persons are cordially invited to attend.