

Speaker: Prof. Alberto Marino (Univ. of Oklahoma)

Title: Towards Quantum Enhanced Plasmonic Sensors

About the lecture:

One of the long standing goals of quantum optics has been to use the quantum properties of light to enhance the sensitivity of sensors. In this talk I will describe our work towards this goal based on the interface between quantum states of light, known as twin beams, and plasmonic sensors. I will start by giving an overview of the source that we use to generate entangled twin beams, namely, four-wave mixing in an atomic vapor cell. I will describe the entanglement and spatial properties of the beams generated with this source. I will then present our recent study of the interface between these quantum states of light and localized surface plasmons. In particular, I will show that the transfer of entanglement from multi-spatial mode photons to plasmons and back to photons is a coherent process that preserves the entanglement properties and spatial quantum information of the light. Finally, I will present preliminary results on the use of plasmonic structures consisting of an array of triangular nanoholes as sensors and show that a sensitivity enhancement of these plasmonic sensors is possible through the use of quantum states of light.

Brief bio:



Alberto Marino is an Assistant Professor at the University of Oklahoma. His research focuses on experimental quantum optics, with particular emphasis on its applications to quantum information science and quantum metrology. Before arriving to the University of Oklahoma, he held a postdoctoral position and then an Assistant Research Scientist position at the Joint Quantum Institute (NIST/University of Maryland). He obtained an M.S. and a Ph.D. in optics from the Institute of Optics at the University of Rochester.

November 11th (Fri), 12-1pm @ BRK 2001