Abstract for an Invited Paper
for the SES19 Meeting of
the American Physical Society

Robust Multiphoton Quantum Technologies[1]

OMAR MAGANA-LOAIZA, Louisiana State University, Department of Physics and Astronomy

The emerging field of quantum photonics exploits quantum properties of light to dramatically improve the performance of protocols for metrology, and information processing. Unfortunately, the challenges involved in the preparation and characterization of photonic states with multiple particles, impose practical limitations to realistic quantum technologies. In this talk, I will report on our recent results on the preparation, manipulation and characterization of quantum states with multiple photons. I will describe how the manipulation of the quantum electromagnetic fluctuations of a pair of vacuum states leads to a novel family of nonclassical multiphoton states with tunable mean photon numbers and degrees of correlations. Our technique enables the demonstration of a quantum state of light with up tp ten photons, exhibiting nearly Poissonian statistics, that constitutes an important step towards the generation of entangled lasers . In addition, I will describe the potential of these states and photon number resolving measurements to perform quantum phase estimation. The last part of my talk will be devoted to discuss the possibility of observing exceptional points of any order in multiphoton quantum networks.