UNIVERSITY OF MIAMI
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University of Miami, Physics Department Colloquium

Date: Wednesday, Oct 4, 2023
Time: 4:00 pm – 5:00 pm
Location: Wilder Auditorium – Rm 112, Knight Physics Building

Quantum-assisted Optical Interferometry and Other Applications of Quantum Optics with Fast Time Stamping of Single Photons

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Abstract

The highest resolutions in astronomical imaging are achieved through interferometry, the process of combining wave information from multiple separate telescopes. I will review the standard techniques of single-photon amplitude (Michelson) interferometry and two-photon (Hanbury Brown & Twiss) intensity interferometry, and then visit recent ideas for how they can be improved in the optical through the use of quantum networking and entanglement distribution. A proposed new technique of two-photon amplitude interferometry requires spectral binning and picosecond time-stamping of single photons with a product of resolutions close to the Heisenberg Uncertainty Principle limit. I will report on the first bench□top results of such fast spectrometers along with future improvements for detector systems and quantum methods. I will also review other applications of similar imaging detectors in quantum information science, material and life sciences.