Physics Colloquium, University of South Florida
3:00 pm, Friday, Nov. 16th, 2018, ISA 2023
☞☞*Refreshment available* ☜☜

Generation of indistinguishable single-mode photons by spectral engineering

Dr. Franco Wong

Research Laboratory of Electronics, Massachusetts Institute of Technology, Boston, MA

In a prototypical quantum network with multiple quantum nodes, single photons in a well-defined single-spatiotemporal mode are highly desirable for implementing measurement-based quantum information processing and networking applications. In this talk, I describe our efforts in crafting spectrally entangled biphotons into unentangled, indistinguishable single photons. By customizing the interaction in pulsed spontaneous parametric downconversion to have a Gaussian joint spectral function together with a transform-limited Gaussian pump, we demonstrate near-unity spectral purity in heralded single photons at telecom wavelength. Quantum interference between two independently generated heralded photons shows visibility of 98.4% with an implied purity of 99.2%.

Franco Wong received the B.S. in Mechanical Engineering and B.A. in Physics from the University of Rochester in 1977, and his M.S. and Ph.D. in Applied Physics from Stanford University in 1979 and 1983, respectively. From 1984 to 1986, he did his postdoctoral research with Dr. John L. Hall at JILA on precision measurement techniques. He joined MIT in 1986 as a Research Scientist at the Research Laboratory of Electronics and was promoted to Senior Research Scientist in 2003. His research interests center on quantum and nonlinear optics, currently focusing on the generation and application of entangled light for quantum communication and quantum information processing. Dr. Wong holds several U.S. patents in areas of nonlinear optical devices. Dr. Wong is a Fellow of the Optical Society of America.