SEMINAR NOTICE

Preston M. Green Department of Electrical and Systems Engineering

QUANTUM NANOPHOTONICS: ENGINEERING STRONG ATOM-PHOTON INTERACTION WITH APPLICATIONS IN PHYSICS AND ENGINEERING

PhD Preliminary Research Examination

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Abstract: The field of quantum nanophotonics has recently been attracting a great deal of interest. In quantum nanophotonics, fermionic degrees of freedom such as atoms or quantum dots are coupled to traditional nanophotonic systems. As the fermionic components can only absorb a finite number of photons at a time, the interplay between the fermionic and photonic degrees of freedom can fundamentally alter the transport properties of photons and their correlations.

In many conventional photonic systems, however, atom-photon interactions are too weak to realize efficient devices at ultra-low power levels. We show that through proper design, strong atom-photon interaction can be created to produce efficient devices operating down to the single-photon power level. Specific applications include efficient single-photon frequency conversion using a Sagnac interferometer and long-term storage of photons using an atom near a photonic boundary. We also show that strong photon-photon interactions can be created, allowing us to use one photon to control another.

DATE: Thursday, May 9, 2013
TIME: 2:00 p.m.
PLACE: Green Hall, Room 0120

Thesis advisor:
Dr. Jung-Tsung Shen

This seminar is in partial fulfillment
of the Doctor of Philosophy degree

Washington University in St. Louis
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