

# Joint CQSE and CASTS Seminar

Weekly Seminar  
Jan. 6, 2012 (Friday)

TIME Jan. 6, 14:30 ~ 15:30  
TITLE From Cavity QED to Quantum Transport  
SPEAKER Prof. Yueh-Nan Chen  
Department of Physics, National Cheng Kung University  
PLACE Rm716, CCMS & New Physics Building, NTU

## Abstract

A key ingredient of cavity QED is the coupling between the discrete energy levels of an atom and photons in a single-mode cavity. The addition of periodic ultrashort laser pulses allows one to use such a system as a source of single photons—a vital ingredient in quantum information and optical computing schemes. Here we analyze and time-adjust the photon-counting statistics of such a single-photon source and show that the photon statistics can be described by a simple transport-like non-equilibrium model. We then show that there is a one-to-one correspondence of this model to that of non-equilibrium transport of electrons through a double quantum dot nanostructure, unifying the fields of photon-counting statistics and electron-transport statistics. This correspondence empowers us to adapt several tools previously used for detecting quantum behavior in electron-transport systems (e.g., super-Poissonian shot noise and an extension of the Leggett-Garg inequality) to single-photon-source experiments.

