

Joint CQSE and CASTS Seminar

Weekly Seminar
Mar. 9, 2012 (Friday)

TIME Mar. 9, 14:30 ~ 15:30
TITLE Counting particles – what is it useful for in physics?
SPEAKER Prof. Yung-Fu Chen
Department of Physics, National Central University
PLACE Rm716, CCMS & New Physics Building, NTU

Abstract

Counting is a practice of finding the number of units in a collection, and often a method of understanding or characterizing a system. In this talk I will introduce two counters that count quantum particles. First, I will describe a photon counter based on current-biased Josephson junctions to detect single photons in microwave frequency range. The detector exploits the resonant absorption of a single microwave photon by a junction to produce a measurable “click”. The detection scheme is readily scalable to a parallel configuration that would allow the number-resolved detection of microwave photons, and could be applied to probe the state of the light field in microwave cavities. Second, I will illustrate an electron counter by utilizing reflectometry on radio-frequency single-electron transistors. We expect the realized electron counters are sensitive to single electrons, have counting speeds of 100 MHz or higher, and are easily integrated on chips. With the counters we plan to explore full counting statistics of electrons in various mesoscopic conductors, such as superconductor normal-metal hybrids and one-dimensional conductors.

