# Joint CQSE and CASTS Seminar

## Weekly Seminar
## Oct. 6, 2017 (Friday)

TIME Oct. 6, 2017, 14:30 ~ 15:30
TITLE Counting Photons and Atoms
SPEAKER Prof. Yi-Wei Liu
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PLACE Rm716, CCMS & New Physics Building, NTU


**Abstract**

1) The progress of ultra-high sensitive, NICE-OHMS, spectroscopy technique is reported. The sensitivity can reach to detecting a single molecule per cm3, and allow us to study the interaction of light with one single quantum system in the future. Unlike the conventional single-atom detection by fluorescence, the absorption signal provides an alternative aspect of investigation. A 1.28μm quantum dot laser locked to a cavity with a finesses of 1.1×10^5 and cavity lifetime of 15 μsec is with the equivalent absorption length of 4.5 km. Our apparatus is tested with a weak N_2O transition to observe the Doppler-free saturation signal.

2) The accuracy and reliability of utilizing Hanbury-Brown-Twiss interferometer to derive the second order correlation function g(2) and the coherence time was investigated. We found that the significance of the high order correction is related to the factor I¯τc, which is the overlapping of the photon wave packets. A novel technique was also demonstrated to measure the coherence time τc of a light source using the random phase modulation. This method is particularly suitable for a weak light source with a long coherence time.