

# Joint CQSE and CASTS Seminar

Weekly Seminar  
Nov. 21, 2014 (Friday)

TIME Nov. 21, 14:30 ~ 15:30  
TITLE Quantum invisible cloaks for core-shell nano-particles  
SPEAKER Prof. Ray-Kuang Lee  
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PLACE Rm716, CCMS & New Physics Building, NTU

## Abstract

Based on the scattering cancellation, we provide a method not only making a nanoparticle nearly invisible, but also hiding its interior region from the outside probing matter wave. By applying the interplay among the nodal points of partial waves along with the concept of streamline in fluid dynamics for probability flux, a quantum invisible cloak to the electron transport in a host semiconductor is demonstrated by simultaneously guiding the probability flux outside a hidden region and keeping the total scattering cross section negligible. As the probability flux vanishes in the interior region, one can embed any materials inside a multiple core-shell nanoparticle without affecting physical observables from the outside. Our results reveal the possibility to design a protection shield layer for fragile interior parts from the impact of transport electrons.

Ref. J.Y. Lee and R.-K. Lee, *Phy. Rev. B* 89, 155425 (2014).

