

# Joint CQSE and CASTS Seminar

Weekly Seminar  
May 25, 2012 (Friday)

TIME May 25, 14:30 ~ 15:30  
TITLE Effects of edge potential on an armchair-graphene open boundary and nanoribbons  
SPEAKER Prof. Chon-Saar Chu  
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PLACE Rm716, CCMS & New Physics Building, NTU

## Abstract

Pseudospin flipping is found to be the key process leading to the formation of an edge-potential-induced edge state at an armchair-graphene open boundary and nanoribbons. At an open boundary, the edge potential  $U_0$  is shown to turn on pseudospin-flipped (intravalley) scattering even though  $U_0$  does not post an apparent breaking of the AB site (basis atoms) symmetry. For a valley-polarized incident beam, the interference between the pseudospin-conserving (intervalley) and -nonconserving (intravalley) processes in the scattering state leads to a finite out-of-plane pseudospin density. This two-wave feature in the evanescent regime leads to the formation of the edge state. The physical origin of the edge state is different from that for the Tamm states in semiconductors. For an armchair-graphene nanoribbon with a gapless energy spectrum, applying  $U_0$  to both edges opens up an energy gap. Both edge states and energy gap opening exhibit distinct features in nanoribbon conductance.

Reference: Phys. Rev. B 85, 155444 (2012).

