

# Spin-polarized transport through ferromagnetic graphene microstructures with Fermi velocity modulation

Thursday, June 9, 2016 2:30 PM (15 minutes)

Chaiyawan Saipaopan 1, Wachiraporn Choopan 2 and Watchara Liewrian 1\*

1 Theoretical and Computational Science Center (TaCS), Science Laboratory Building, Department of Physics, Faculty of Science, King Mongkut's University of Technology Thonburi, Bangmod, Thungkru, Bangkok, Thailand 10140

2 General Education Section, Christian University of Thailand, Donyaihohm District Nakhonpathom, Thailand 73000

\*E-mail: watchara.liewrian@mail.kmutt.ac.th

## Abstract

Theoretical and numerical modeling of a graphene-based spin-filter spintronic with Fermi velocity engineering are investigated. These graphene-based spintronic devices will open up new ways for creating a new generation of electronic devices which are smaller, faster and consumes less electric power. The spin filtering is a key issue for spintronic applications. The influence of velocity barrier (VB) on the spin transport of massless Dirac particles in ferromagnetic graphene are theoretically studied in a NG/FG/VB/NG junction. It consists of a ferromagnetic graphene region (FG) which is deposited by metallic gate and the velocity barrier is located on the left side of the ferromagnetic graphene where the propagation of massless Dirac fermion through a VB region of graphene with a position-dependent velocity. By biasing the FG region with the gate voltage ( $U$ ), spin conductance is oscillating as function of Fermi velocity and its phase is shifted by varying  $U$  on ferromagnetic graphene. This system may be used as a tunable spin-polarized source.

Keywords : Graphene: Magnetic tunnel junction: Dirac equation: Spin polarization: Velocity modulation

**Primary author:** Mr SAIPAOPAN, Chaiyawan (Department of Physics, Faculty of Science, King Mongkut's University of Technology Thonburi, Bangmod, Thungkru, Bangkok, Thailand 10140)

**Co-authors:** Ms CHOOPAN, Wachiraporn (General Education Section, Christian University of Thailand, Donyaihohm District Nakhonpathom, Thailand 73000); Dr LIEWRIAN, watchara (Theoretical and Computational Science Center (TaCS), Science Laboratory Building, Department of Physics, Faculty of Science, King Mongkut's University of Technology Thonburi, Bangmod, Thungkru, Bangkok, Thailand 10140)

**Presenter:** Mr SAIPAOPAN, Chaiyawan (Department of Physics, Faculty of Science, King Mongkut's University of Technology Thonburi, Bangmod, Thungkru, Bangkok, Thailand 10140)

**Session Classification:** Session XXVI

**Track Classification:** Condensed Matter Physics