

# IBS CINAP Seminar

**November 2, 2018, 11:00AM**

Room 86120 (N Center), Sungkyunkwan University, Suwon

## Theoretical Modeling of Tunneling Nanodevices through graphene/TMD van der Waals Heterostructures

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Since the first isolation of graphene, physical properties of 2D crystals including transition metal dichalcogenides(TMDs) have gained great deal of interests from both theoretical and experimental research. Particularly, a vertical stack of graphene and TMDs have been regarded as a promising platform for various nanodevices exploiting extraordinary transport properties of encapsulated graphene. In this talk, a theoretical approach to modeling vertical transport through various Van der Waals heterostructures is introduced, showing how it is practically applied to actual devices. Also, a wide range of possible device designs based on the theoretical model are presented, covering field-effect transistors, spintronic devices, gas sensors, and thermoelectric devices.

### Biography

#### History

- 2017. 09 ~ *present* Assistant Professor, Department of Physics Education, Chosun University (Korea)
- 2016. 04 ~ 2017. 08 Research Fellow, Center for Theoretical Physics of Complex Systems, Institute for Basic Science (Korea)
- 2014. 02 ~ 2016. 03 Postdoctoral Researcher, EU Graphene Week Participant, Department of Materials Science and Engineering, University of Ioannina (Greece)
- 2013. 09 ~ 2014. 01 Postdoctoral Researcher, Institute for Quantum Systems, Chungnam National University (Korea)
- 2011. 03 ~ 2013. 08 Ph.D student, Department of Physics, Chungnam National University (Korea)
- 2009. 03 ~ 2011. 02 Ms.S student, Department of Physics, Chungnam National University (Korea)
- 2002. 02 ~ 2008. 08 B.S student, Department of Physics, Chungnam National University (Korea)

#### Interest in..

- ✓ Quantum transport in graphene and related 2D materials
- ✓ Physics in graphene-based nano devices, covering electronics, spintronics, and optoelectronics
- ✓ Plasmonics in graphene and metamaterials
- ✓ Topological matters and their transport properties

#### Award

- ✓ IOP best poster award in Graphene Week 2017 (as a co-presenter)
- ✓ University presidential citation for excellent doctoral student (Chungnam National University)
- ✓ Best oral presentation award in Korean Physical Society Meeting

#### Teaching

- ✓ Solid State Physics, Spring 2018 (Dept. Phys. Edu., CU)
- ✓ Differential and Integral Calculus, Spring 2018 (Dept. Phys. Edu., CU)
- ✓ Classical Mechanics, Fall 2017-Fall 2018 (Dept. Phys. Edu., CU)
- ✓ General Physics, Fall 2017-Fall 2018 (Dept. Phys. Edu., CU)
- ✓ Mathematics for Physics, Fall 2017-Fall 2018 (Dept. Phys. Edu., CU)
- ✓ Practices & Exercises of Physics, Fall 2017-Fall 2018 (Dept. Phys. Edu., CU)
- ✓ Practices & Exercises of Classical Mechanics, 2011-2013 (Dept. Phys., CNU)
- ✓ Practices & Exercises of Classical Electrodynamics, 2011-2013 (Dept. Phys., CNU)