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Education and Academic Employment

2017.7-(present) **Assistant Professor**

Dept. of Physics, POSTECH, Pohang, Republic of Korea

2014.8-2017.6 **Postdoctoral researcher**

Dept. of Physics, Harvard University, Cambridge, MA 02138, USA

Advisor: Prof. Philip Kim

2014.2–2014.7 **Postdoctoral researcher**

Dept. of Physics, POSTECH, Pohang, Republic of Korea

Advisor: Prof. Hu-Jong Lee

2007.9–2014.2 Ph. D. in Physics

Dept. of Physics, POSTECH, Pohang, Republic of Korea

Advisor: Prof. Hu-Jong Lee

2003.3–2007.8 B. S. in Chemistry and Physics (double major)

Dept. of Chemistry, POSTECH, Pohang, Republic of Korea

Research field

- Topological superconductivity of superconductor-quantum Hall heterostructures
- Majorana edge states in a quantum anomalous Quantum Hall system of MBE-grown magnetically doped 2D topological insulators
- Relativistic electronic optics phenomena in high-quality graphene
- Quantum transport and macroscopic quantum phenomena of a superconductor/graphene hybrid nano-device
- Development of ultrabroad-bandwidth single-photon detection technology based on graphene Josephson junction

Publication list

2018

Gil-Ho Lee, and Hu-Jong Lee, “Proximity coupling in superconductor-graphene heterostructures,” *Reports on Progress in Physics*, *in press* (2018).

Sagar Bhandari, **Gil-Ho Lee**, Kenji Watanabe, Takashi Taniguchi, Philip Kim and Robert M. Westervelt, “Imaging Andreev Reflection in a Graphene Device under Magnetic Field,” *2D Materials*, **5** 021003 (2018).

Debaleena Nandi, Inti Sodemann, Kevin Shain, **Gil-Ho Lee**, Ko-Fan Huang, Cui-Zu Chang, Yunbo Ou, S. P. Lee, J. Ward, Jagadeesh S. Moodera, Philip Kim, Amir Yacoby, “Logarithmic singularities and quantum oscillations in magnetically doped topological insulators,” *Physical Review B* **97**, 085151 (2018).

Jinho Park, Jae Hyeong Lee, **Gil-Ho Lee**, Yositake Takane, Ken-Ichiro Imura, Takashi Taniguchi, Kenji Watanabe, Hu-Jong Lee “Short Ballistic Josephson Coupling in Planar Graphene Junctions with Inhomogeneous Carrier Doping” *Physics Review Letters* **120**, 077701 (2018)

2017

Minsoo Kim, Geon-Hyoung Park, Jongyun Lee, Jae Hyeong Lee, Jinho Park, Hyunwoo Lee, **Gil-Ho Lee**, and Hu-Jong Lee, “Strong Proximity Josephson Coupling in Vertically Stacked NbSe₂-Graphene-NbSe₂ van der Waals Junctions,” *Nano Letters* **17** (10) 6125-6130 (2017).

Evan D. Walsh, Dmitri K. Efetov, **Gil-Ho Lee**, Mikkel Heuck, Jesse Crossno, Thomas A. Ohki, Philip Kim, Dirk Englund, and Kin Chung Fong, “Graphene-Based Josephson-Junction Single-Photon Detector,” *Physical Review Applied* **8**, 024022 (2017).

Gil-Ho Lee, Ko-Fan Huang, Dmitri K. Efetov, Di S. Wei, Sean Hart, Takashi Taniguchi, Kenji Watanabe, Amir Yacoby, and Philip Kim, “Inducing superconducting correlation in quantum Hall edge states,” *Nature Physics* **13**, 693-698 (2017)

Sagar Bhandari, **Gil-Ho Lee**, Philip Kim, Robert M. Westervelt, “Analysis of Scanned Probe Images for Magnetic Focusing in Graphene,” *Journal of Electronic Materials* doi:10.1007/s11664-017-5350-y (2017).

2016

Joon Young Park, **Gil-Ho Lee**, Janghyun Jo, Austin K. Cheng, Hosang Yoon, Kenji Watanabe, Takashi Taniguchi, Miyoung Kim, Philip Kim, and Gyu-Chul Yi, “Molecular beam epitaxial growth and electronic transport properties of high

quality topological insulator Bi₂Se₃ thin films on hexagonal boron nitride,” *2D Materials* **3**, 035029 (2016).

Sagar Bhandari, **Gil-Ho Lee**, Anna Klales, Kenji Watanabe, Takashi Taniguchi, Eric Heller, Philip Kim, Robert M. Westervelt, “Imaging Cyclotron Orbits of Electrons in Graphene,” *Nano Letters* **16**, 1690-1694 (2016).

2015

Gil-Ho Lee, Geon-Hyoung Park, and Hu-Jong Lee, “Observation of negative refraction of Dirac fermions in graphene,” *Nature Physics* **11**, 925-929 (2015).

Gil-Ho Lee, Dongchan Jeong, Kee-Su Park, Yigal Meir, Min-Chul Cha, and Hu-Jong Lee, “Continuous and reversible tuning of the disorder-driven superconductor–insulator transition in bilayer graphene,” *Scientific Reports* **5**, 13466 (2015).

Minsoo Kim, Dongchang Jeong, **Gil-Ho Lee**, Yun-Sok Shin, Hyun-Woo Lee, and Hu-Jong Lee, “Tuning Locality of Pair Coherence in Graphene-based Andreev Interferometers,” *Scientific Reports* **5**, 8715 (2015).

Gil-Ho Lee, Sol Kim, Seung-Hoon Jhi, and Hu-Jong Lee, “Ultimately short ballistic vertical graphene Josephson junctions,” *Nature Communications* **6**, 6181 (2015).

2014

Jae Hyeong Lee, **Gil-Ho Lee**, Joonbum Park, Janghee Lee, Seung-Geol Nam, Yun-Sok Shin, Jun Sung Kim, and Hu-Jong Lee, “Local and nonlocal Fraunhofer-like pattern from an edge-stepped topological surface Josephson current distribution,” *Nano Letters* **14**, 5029-5034 (2014).

2013

Jae-Hyun Choi*, **Gil-Ho Lee***, Sunghun Park*, Dongchan Jeong, Jeong-O Lee, H.-S. Sim, Yong-Joo Doh, and Hu-Jong Lee, “Complete gate control of supercurrent in graphene *p–n* junctions,” *Nature Communications* **4**, 2525 (2013).

Gil-Ho Lee and Hu-Jong Lee, “Josephson Coupling Realized in Graphite-Based Vertical Junction,” *Applied Physics Express* **6**, 025102 (2013).

2011

Gil-Ho Lee, Dongchan Jeong, Jae-Hyun Choi, Yong-Joo Doh, and Hu-Jong Lee, “Electrically Tunable Macroscopic Quantum Tunneling in a Graphene-based Josephson Junction,” *Physical Review Letters* **107**, 146605 (2011).

Dongchan Jeong, **Gil-Ho Lee**, Yong-Joo Doh, and Hu-Jong Lee, “Gate-tunable Supercurrent in Graphene-based Josephson Junction,” *Progress in Superconductivity* Vol.13 No.1 pp.47-51 (2011).

Dongchan Jeong, Jae-Hyun Choi, **Gil-Ho Lee**, Sanghyun Jo, Yong-Joo Doh, and Hu-Jong Lee, "Observation of supercurrent in PbIn-graphene-PbIn Josephson junction," *Physical Review B* **83**, 094503 (2011).

2010

Gil-Ho Lee and Hu-Jong Lee, "Switching dynamics in a short and a long natural Josephson junction of $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+d}$ single crystals," *Physica C* **470**, S815 (2010).

Gil-Ho Lee, Yong-Duk Jin, and Hu-Jong Lee, "Current distribution of collective thermal depinning of Josephson vortices in naturally stacked Josephson junctions," *Physical Review B* **81**, 174508 (2010).

Yong-Duk Jin, **Gil-Ho Lee**, and Hu-Jong Lee, "Non-collective Josephson-vortex motion induced by pancake-vortex pinning in stacked Josephson junctions," *Journal of Superconductivity and Novel Magnetism* **23**, 1071 (2010).

2009

Yong-Duk Jin, Hu-Jong Lee, A. E. Koshelev, **Gil-Ho Lee**, and Myung-Ho Bae, "Coexisting multiple dynamic states generated by magnetic field in $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$ stacked Josephson junctions," *Europhysics Letters* **88**, 27007 (2009).

Patent list

2015

Gil-Ho Lee, and Hu-Jong Lee, "MULTILAYER DEVICE HAVING INTRINSIC LAYERED-TYPE SINGLE CRYSTAL MATERIAL AND METHOD FOR PREPARING THE SAME", 2015, Republic of Korea Patent No. 10-1564438