

# Junhyun Lee

## Curriculum Vitae

Harvard University  
Department of Physics  
17 Oxford Street  
Cambridge, MA 02138

Phone: (857) 756-7890  
Email: junhyunlee@fas.harvard.edu  
Homepage: <http://www.junhyunlee.org/>

## Education

- Harvard University** Cambridge, MA  
Ph.D. Candidate in Physics, expected May 2016  
Advisor: Subir Sachdev
- Harvard University** Cambridge, MA  
A.M. in Physics, May 2012
- Seoul National University** Seoul, Republic of Korea  
B.S. in Physics and Mathematics, Feb. 2010

## Research Interests

Theoretical Condensed Matter Physics

*Strongly correlated electron systems*

Quantum phase transitions in frustrated quantum magnets and cuprate superconductors

Topological phases including spin liquids, quantum Hall systems, Weyl and Dirac semimetals

*Matrix product states and tensor networks*

Density matrix renormalization group calculations in condensed matter systems

## Publications

**Junhyun Lee**, Steven R. White, and Subir Sachdev, "Fractionalized Fermi liquids in the quantum dimer model," *in preparation*

Eun-Gook Moon, **Junhyun Lee**, and Yong Baek Kim, "Interplay between Coulomb interaction and disorder in Dirac semimetals," *submitted*

**Junhyun Lee** and Subir Sachdev, "Wess-Zumino-Witten Terms in Graphene Landau Levels," *Physical Review Letters* **114**, 226801 (2015) [Editors' Suggestion]

**Junhyun Lee** and Subir Sachdev, "Deconfined criticality in bilayer graphene," *Physical Review B* **90**, 195427 (2014)

**Junhyun Lee**, Philipp Strack, and Subir Sachdev, "Quantum criticality of reconstructing Fermi surfaces," *Physical Review B* **87**, 045104 (2013)

Myoung-Sun Heo, Yonghee Kim, Kihwan Kim, Geol Moon, **Junhyun Lee**, Heung-Ryoul Noh, M. I. Dykman, and Wonho Jhe, "Ideal mean-field transition in a modulated cold atom system," *Physical Review E* **82**, 031134 (2010)

## Scholarships and Awards

Certificate of Distinction in Teaching, Harvard Derek Bok Center for Teaching and Learning (2015)  
An Wang Fellowship, Harvard University (2011)  
Purcell Fellowship, Harvard University (2010 - 2011)  
STX Scholarship for Overseas Studies, STX Foundation (2010-2015)  
Scholarship for Overseas Graduate Studies, Korea Foundation for Advanced Studies (declined) (2009)  
Republic of Korea Presidential Science Scholarship, Korea Science and Engineering Foundation (2003-2010)

## Invited Talks

Condensed Matter Physics Seminar, UNIST, Ulsan, Korea (Jun. 2015)  
“Wess-Zumino-Witten Terms in Graphene Landau Levels”  
Condensed Matter Physics Journal Club, Seoul National University, Seoul, Korea (Jun. 2015)  
“Wess-Zumino-Witten Terms in Graphene Landau Levels”  
Condensed Matter Physics Seminar, KAIST, Daejeon, Korea (Jun. 2015)  
“Wess-Zumino-Witten Terms in Graphene Landau Levels”  
Condensed Matter Physics Journal Club, Korea Institute for Advanced Study, Seoul, Korea (Jun. 2015)  
“Wess-Zumino-Witten Terms in Graphene Landau Levels”  
Condensed Matter Group Seminar, Sungkyunkwan University, Suwon, Korea (Jun. 2015)  
“Wess-Zumino-Witten Terms in Graphene Landau Levels”  
Harvard CMT Kids talk, Harvard University, Cambridge, MA (Apr. 2015)  
“Wess-Zumino-Witten Terms in Graphene Landau Levels”  
Condensed Matter Physics Seminar, Seoul National University, Seoul, Korea (Aug. 2013)  
“Quantum criticality of reconstructing Fermi surfaces in antiferromagnetic metals”

## Conferences and Contributed Talks

Gordon Research Conference on Topological Correlated Matter, Hong Kong, China (Jun. 2015)  
APS March Meeting, San Antonio, TX (Mar. 2015)  
Contributed talk : Wess-Zumino-Witten Terms in Graphene Landau Levels  
Gordon Research Conference on Correlated Electron Systems, South Hadley, MA (Jun. 2014)  
APS March Meeting, Denver, CO (Mar. 2014)  
Contributed talk : Possible deconfined critical transition in bilayer graphene  
APS March Meeting, Baltimore, MD (Mar. 2013)  
Contributed talk : Quantum criticality of reconstructing Fermi surfaces in antiferromagnetic metals

The 19th International Conference on Magnetism, Busan, Korea (Jul. 2012)

Contributed talk : Coupled Fermi-Bose renormalization group flow for a two-flavor spin-fermion model close to its antiferromagnetic quantum critical point

Gordon Research Conference on Correlated Electron Systems, South Hadley, MA (Jun. 2012)

Contributed poster: Coupled Fermi-Bose renormalization group flow for a two band model close to its antiferromagnetic quantum critical point

APS DAMOP Meeting, Charlottesville, VA (May 2009)

Contributed talk : On the microscopic theoretical approach of spontaneous symmetry breaking in parametrically driven cold atomic system

## Academic Activities

Visitor at Perimeter Institute for Theoretical Physics, Waterloo, ON, Canada (Aug. 2015)

Summer School on Emergent Phenomena in Quantum Materials, Ithaca, NY (Aug. 2015)

Poster presentation: Wess-Zumino-Witten Terms in Graphene Landau Levels

Visitor at Perimeter Institute for Theoretical Physics, Waterloo, ON, Canada (Aug. 2014)

Boulder School for Condensed Matter and Materials Physics: Modern Aspects of Superconductivity, Boulder, CO (Jul. 2014)

Poster presentation: Deconfined criticality in bilayer graphene

Boston University Center for Computational Science Workshop on Field Theoretic Computer Simulations for Particle Physics and Condensed Matter, Boston, MA (May 2014)

APCTP Workshop on Bad Metal Behavior and Mott Quantum Criticality, Pohang, Korea (Jul. 2013)

Theory Winter School on Unconventional Superconductivity, Tallahassee, FL (Jan. 2013)

Princeton Summer School on Condensed Matter Physics, Princeton, NJ (Jul. 2012)

CIFAR Quantum Materials Summer School, Toronto, On, Canada (May 2012)

Korean Physical Society Summer School on Condensed Matter Physics, Taean, Korea (Jun. 2011)

APCTP-KIAS Joint Workshop on Quantum Entanglement and Dynamics in Correlated Many-Body Systems, Pohang, Korea (May 2010)

KIAS Winter School on Quantum Information and Atomic Physics, Seoul, Korea (Feb. 2009)

APCTP Summer Institute for Theoretical Physics, Pohang, Korea (Aug. 2006)

## Teaching Experience

*Physics 262: Statistical Physics*, Harvard University

Fall 2015, Teaching Fellow for Professor Erel Levine

*Physical Sciences 3: Electromagnetism, Circuits, Waves, Optics and Imaging*, Harvard University

Spring 2015, Teaching Fellow for Doctor Logan McCarty and Louis Deslauriers

Certificate of Distinction in Teaching awarded by Derek Bok Center for Teaching and Learning

*Physics 253a: Quantum Field Theory 1*, Harvard University

Fall 2014, Grader for Professor Matthew Schwartz

*Physics 15c: Wave Phenomena*, Harvard University

Spring 2014, Teaching Fellow for Professor Joao Guimaraes da Costa

*Physics 253a: Quantum Field Theory 1*, Harvard University

Fall 2013, Grader for Professor Matthew Reece

*University Physics*, Seoul National University

Fall 2009, Undergraduate tutor

Last updated: January 2, 2016