Myungchul Oh

Assistant Professor,
Department of Semiconductor Engineering,
Department of Electrical Engineering,
Graduate School of Quantum Information Science, POSTECH, Pohang, Korea
Adjunct Professor,
Department of Physics, POSTECH, Pohang, Korea
IBS-POSTECH Fellow,
Center for van der Waals Quantum Solid, IBS, Pohang, Korea

EDUCATION

Ph. D. Physics, Seoul National University, Korea — Feb. 2018
M. S. Physics, Seoul National University, Korea — Feb. 2014
B. S. Physics, Seoul National University, Korea (Summa cum laude) — Feb. 2012
B. S. Electrical Communications Engineering,
Korea Advanced Institute of Science and Technology (KAIST), Korea. — Feb. 2006

RESEARCH EXPERIENCE

Assistant Professor, POSTECH, Pohang, Korea — May. 2023 –
Department of Semiconductor Engineering
Department of Electrical Engineering
School of Quantum Science and Technology
Adjunct Professor, POSTECH, Pohang, Korea
Department of Physics

Postdoctoral Research Associate, Princeton University, NJ. — Jun. 2018 – May. 2023
Department of Physics

Postdoctoral Researcher, Seoul National University, Seoul, Korea — Mar. 2012 – May. 2018
Institute of Applied Physics, Department of Physics and Astronomy

Visiting Scientist, National Institute of Standards and Technology, Gaithersburg, MD
Center for Nanoscale Science and Technology — Oct. 2015 – Dec. 2015

Graduate Student, Seoul National University, Seoul, Korea — Jun. 2012 – Feb. 2018
Department of Physics and Astronomy,

PUBLICATIONS

Kevin P Nuckolls*, Michael G Scheer*, Dillon Wong*, **Myungchul Oh***, Ryan L Lee, Jonah Herzog-Arbeitman, Kenji Watanabe, Takashi Taniguchi, Biao Lian, Ali Yazdani, “Spectroscopy of the Fractal Hofstadter Energy Spectrum”, ***Nature*** *in press* (2025)

Cheng Chen*, Kevin P Nuckolls*, Shuhan Ding, Wangqian Miao, Dillon Wong, **Myungchul Oh**, Ryan L Lee, Shanmei He, Cheng Peng, Ding Pei, Yiwei Li, Chenyue Hao, Haoran Yan, Hanbo Xiao, Han Gao, Qiao Li, Shihao Zhang, Jianpeng Liu, Lin He, Kenji Watanabe, Takashi Taniguchi, Chris Jozwiak, Aaron Bostwick, Eli Rotenberg, Chu Li, Xu Han, Ding Pan, Zhongkai Liu, Xi Dai, Chaoxing Liu, B Andrei Bernevig, Yao Wang, Ali Yazdani, Yulin Chen, "Strong electron–phonon coupling in magic-angle twisted bilayer graphene", ***Nature*** 636, 342-347 (2024)

Sangjun Jeon* and **Myungchul Oh***, "Resolving exotic quantum states using scanning tunneling microscopy", ***Current Applied Physics***, 68, 58-70 (2024)

Kevin P. Nuckolls*, Ryan L. Lee*, **Myungchul Oh***, Dillon Wong*, Tomohiro Soejima*, Jung Pyo Hong, Dumitru Călugăru, Jonah H. Arbeitman, B. Andrei Bernevig, Kenji Watanabe, Takashi Taniguchi, Nicolas Regnault, Michael P. Zaletel, and Ali Yazdani, "Quantum textures of the many-body wavefunctions in magic-angle graphene", ***Nature*** 620, 525-532 (2023)

Dumitru Călugăru, Nicolas Regnault, **Myungchul Oh**, Kevin P. Nuckolls, Dillon Wong, Ryan L. Lee, Ali Yazdani, Oskar Vafek, and B. Andrei Bernevig, "Spectroscopy of Twisted Bilayer Graphene Correlated Insulators", ***Physical Review Letters*** 129, 117602 (2022)

Myungchul Oh*, Kevin P. Nuckolls*, Dillon Wong*, Ryan L. Lee, Xiaomeng Liu, Kenji Watanabe, Takashi Taniguchi and Ali Yazdani, "Evidence for unconventional superconductivity in twisted bilayer graphene", ***Nature*** 600, 240–245 (2021)

Kevin P. Nuckolls*, **Myungchul Oh***, Dillon Wong*, Biao Lian, Kenji Watanabe, Takashi Taniguchi, B. Andrei Bernevig and Ali Yazdani, "Strongly correlated Chern insulators in magic-angle twisted bilayer graphene", ***Nature*** 588, 610–615 (2020)

Dillon Wong*, Kevin P. Nuckolls*, **Myungchul Oh*,** Biao Lian*, Yonglong Xie, Sangjun Jeon, Kenji Watanabe, Takashi Taniguchi, B. Andrei Bernevig and Ali Yazdani, "Cascade of electronic transitions in magic-angle twisted bilayer graphene", ***Nature*** 582, 198–202 (2020)

Dillon Wong*, Sangjun Jeon*, Kevin P. Nuckolls*, **Myungchul Oh***, Simon C. J. Kingsley, and Ali Yazdani, "A modular ultra-high vacuum millikelvin scanning tunneling microscope", ***Review of Scientific Instruments*** 91, 023703 (2020)

Minjun Lee, **Myungchul Oh**, Hoyeon Jeon, Sunwouk Yi, Inhae Zoh, Chao Zhang, Jungseok Chae and Young Kuk, "Selective resolution of phonon modes in STM-IETS on clean and oxygen-adsorbed Cu(100) surfaces", ***Surface Science*** 689, 121451 (2019)

Minjun Lee, Sungmo Kang, **Myungchul Oh**, Jungseok Chae, Jaejun Yu and Young Kuk, "Superstructures of Se adsorbates on Au(111): Scanning tunneling microscopy and spectroscopy study", ***Surface Science*** 685, 19-23 (2019)

Sungmin Kim*, Sunwouk Yi*, **Myungchul Oh***, Bo Gyu Jang, Woohyun Nam, Yong-Chan Yoo, Minjun Lee, Hoyeon Jeon, Inhae Zoh, Hanho Lee, Chao Zhang, Kee Hoon Kim, Jungpil Seo, Ji Hoon Shim, Jungseok Chae and Young Kuk "Surface reconstruction and charge modulation in $BaFe_2As_2$ superconducting film", ***Journal of Physics: Condensed Matter*** 30(31), 315001(2018)

Chao Zhang, Hoyeon Jeon, **Myungchul Oh**, Minjun Lee, Sungmin Kim, Sunwouk Yi, Hanho Lee, Inhae Zoh, Yongchan Yoo, and Young Kuk, “Note: Development of a wideband amplifier for cryogenic scanning tunneling microscopy.”, ***Review of Scientific Instrument***, 88(6), 066109 (2017)

**** These authors contributed equally to the work.***

PRESENTATIONS

Invited Speaker, “Visualizing quantum textures of correlated phases in magic-angle twisted bilayer graphene”, The 13th International Conference on Advanced Materials and Devices, Jeju, Korea, Dec. 2023

Invited Speaker, “Distinguishing ground state wavefunction of correlated insulator in twisted bilayer graphene”, The Korean Physical Society Fall Meeting, Changwon, Korea, Oct. 2023

Invited Speaker, “Visualizing quantum textures of correlated phases in magic-angle twisted bilayer graphene”, The Korean Ceramic Society Fall Meeting, Seoul, Korea, Oct. 2023

Invited Speaker, “Visualizing Quantum Textures of Correlated Phases in a Twisted Bilayer Graphene”, 4th International Workshop on Scanning Probe Microscopy, Jeonju, Korea, Aug. 2023

Invited Speaker, ““Visualizing Quantum Textures in Unconventional Superconductors and their Parent Phases in Twisted Bilayer Graphene”, The International Workshop on Recent Progress in Superconductivity, Yongpyeong, Korea, Aug. 2023

Invited Speaker, “Visualizing Complex Quantum Matter in Two-dimensional Systems & Their Stacks”, 11th International Conference on Materials for Advanced Technologies, Singapore, Jun. 28, 2023

Invited Speaker, “Spectroscopic evidence for unconventional superconductivity in magic-angle twisted bilayer graphene”, KAIX Future of Physics Workshop, KAIST, Daejeon, Korea, Dec 27, 2022

Invited Speaker (Virtual), “Spectroscopic evidence for unconventional superconductivity in magic-angle twisted bilayer graphene”, The 20th International Symposium on the Physics of Semiconductors and Applications, Korea, July 21, 2022

Seminar (Virtual), “Spectroscopic evidence for unconventional superconductivity in magic-angle twisted bilayer graphene”, National High Magnetic Field Laboratory, FL, April 8, 2022

Condensed Matter Seminar, “Spectroscopic evidence for unconventional superconductivity in magic-angle twisted bilayer graphene”, University of California at Berkeley, Berkeley, CA, March 28, 2022

Speaker, “Spectroscopic evidence for unconventional superconductivity in twisted bilayer graphene”, APS March Meeting, Chicago, IL, March 15, 2022

Invited Speaker (Virtual), “Cascade of electronic transitions and strongly correlated topological phases in magic-angle twisted bilayer graphene”, Korea Physical Society Spring Meeting, Korea, April 23, 2021

Speaker, “In-situ transport measurement in a variable temperature STM”, 20th International Vacuum Congress, Busan, Korea, August, 2016

Poster, “Atomic-Resolution Frequency-Modulation Atomic Force Microscope using a Length-Extension Resonator”, International Conference on Nanoscience + Technology, Vail, CO, July 23, 2014