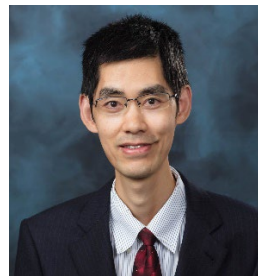


Liangbo Liang

Senior Research & Development Staff
Center for Nanophase Materials Sciences (CNMS)
Oak Ridge National Laboratory (ORNL)
(865) 576-5134
liangl1@ornl.gov
[Publications](#)



Education

Rensselaer Polytechnic Institute (RPI), U.S.A.	Physics	Ph.D., 2014
Wuhan University, China	Physics	B.S., 2008

Research Areas

Theoretical Condensed Matter Physics; Computational Physics; First-principles Density Functional Theory; Many-body GW Method; Quantum Materials; Nanomaterials

1. Theoretical research on diverse properties of quantum materials and nanomaterials, including their electronic, magnetic, optical, vibrational, thermal, thermoelectric, piezoelectric, photovoltaic properties, etc.
2. Developing and applying computational packages for quantum modeling of various experimental techniques, such as scanning tunneling microscopy/spectroscopy, Raman spectroscopy, photoluminescence spectroscopy, etc.
3. Close collaborations with experimentalists across the world to explain and guide experimental measurements on diverse systems ranging from molecules to nanomaterials to strongly correlated materials.

Research Projects

CNMS Theme Science: “Heterogeneities in Quantum Materials”.

CNMS In-house Research: “Integration of Accurate Theoretical/Computational Approaches with Experimental Techniques for the Understanding of Quantum Materials and Nanomaterials”.

Professional Experience

Senior Research Staff, Center for Nanophase Materials Sciences, ORNL	2025–Present
Research Staff, Center for Nanophase Materials Sciences, ORNL	2018–2025
Eugene Wigner Fellow/Research Staff Associate, Center for Nanophase Materials Sciences, ORNL	2015–2018
Postdoctoral Research Associate, Department of Physics, RPI (Supervisor: Dr. Vincent Meunier)	2014–2015
Graduate Research Assistant, Department of Physics, RPI (Advisor: Dr. Vincent Meunier)	2010–2014

Professional and Synergistic Activities

Member and the Treasurer of the Executive Committee of the APS Mid-Atlantic Section	2023–Present
Co-organizer of 2024 Annual Meeting of the APS Mid-Atlantic Section	2024
Invited Talk at 2024 CNMS User Meeting Quantum Workshop	2024
Early Career Editorial Board Member with Journal "Carbon Trends" of Elsevier	2023–Present
Co-organizer of 2023 Annual Meeting of the APS Mid-Atlantic Section	2023
Organized 2023 CNMS User Meeting Workshop “Novel Materials for Neuromorphic Computing”	2023
Invited Talk at the 8th NANO Boston Conference	2022
Invited Talk at the 7th NANO Boston Conference	2021
Invited Talk at the 3rd International Conference on Advances in Functional Materials (AAAFM-UCLA)	2021
Invited Talk at the seminar series "Theory Talks" at Lawrence Berkeley National Laboratory	2021
Invited Talk at the GrapheneForUS 2019 International Conference	2019
Invited Talk at 2019 CNMS User Meeting	2019
Invited Talk at the Fifth Wuhan University International Forum (China)	2018
Invited Talk at Graphene Week 2017 (Greece)	2017
Invited Talk at 2017 CNMS-SNS User Meeting Workshop	2017
Program Coordinator for International Phosphorene Symposium	2015
Referee to journals: Nature, Nature Nanotechnology, Nature Materials, Nature Communications, ACS Nano, Nano Letters, Physical Review Letters, Nanoscale, Carbon, Scientific Reports, Small, Nanotechnology, 2D Materials, etc.	
Reviewer for proposals: DOE, ORNL LDRD, ORNL/UTK JDRD, NSF CAREER	

Honors and Awards

ORNL Supplemental Performance Award	2025
CNMS Division Award: Most Notable CNMS User Project	2023

UT-Battelle/ORNL Award: Outstanding Scholarly Output Team Award	2020
CNMS Division Award: Distinguished Scientific Paper	2017
CNMS Division Award: Outstanding Scientific or Technical Contribution	2017
CNMS Division Award: Most Notable CNMS User Project	2016
Eugene Wigner Fellowship of Oak Ridge National Laboratory	2015
Outstanding Reviewer - Journal Carbon	2015
Hillard Huntington Award for Outstanding Graduate Student (for top one of the Department at RPI)	2014
First Prize of the National Scholarship (for top one of the class at Wuhan University)	2007
Samsung Scholarship (for top one of the Department at Wuhan University)	2006

Selected Publications

(120+ publications in total with 14,000+ citations, h-index=48 from Google Scholar/43 from Web of Science, including papers in high-impact journals such as Nature Nanotechnology, Nature Communications, Science Advances, Physical Review Letters, Nano Letters, ACS Nano, JACS, Advanced Materials, PNAS, Nanoscale, Angewandte Chemie, npj 2D Materials, etc.)

1. X. Kong, P. Ganesh, **L. Liang***, “First-principles study of the magneto-Raman effect in van der Waals layered magnets”, *npj 2D Materials and Applications*, 8, 82 (2024). [**Corresponding author*]
2. S. Yang, **L. Liang***, Y. Lee, Y. Gu, J. Fatheema, S. Kutagulla, D. Kim, M. Kim, S. Kim, D. Akinwande, “Volatile and Nonvolatile Resistive Switching Coexistence in Conductive Point Hexagonal Boron Nitride Monolayer”, *ACS Nano*, 18, 4, 3313–3322 (2024). [**Co-lead author*]
3. Y. Pai, C. Marvinney, G. Pokharel, J. Xing, H. Li, X. Li, M. Chilcote, M. Brahlek, L. Lindsay, H. Miao, A. Sefat, D. Parker, S. Wilson, J. Gardner, **L. Liang***, B. Lawrie, “Angular-Momentum Transfer Mediated by a Vibronic-Bound-State”, *Advanced Science*, 2304698 (2023). [**Corresponding author*]
4. X. Kong, W. Luo, L. Li, M. Yoon, T. Berlijn, **L. Liang***, “Floquet band engineering and topological phase transition in 1T’ transition metal Dichalcogenides”, *2D Materials*, 9, 025005 (2022). [**Corresponding author*]
5. P. Joshi, R. Li, J. Spellberg, **L. Liang***, S. King*, “Nanoimaging of the Edge-Dependent Optical Polarization Anisotropy of Black Phosphorus”, *Nano Letters*, 22, 8, 3180 (2022). [**Co-corresponding author*]
6. X. Wang, J. Cao, H. Li, Z. Lu, A. Cohen, A. Haldar, H. Kitadai, Q. Tan, K. Burch, D. Smirnov, W. Xu, S. Sharifzadeh, **L. Liang**, X. Ling, “Electronic Raman scattering in the 2D antiferromagnet NiPS₃”, *Science Advances*, 8 (2), eabl7707 (2022).
7. X. Kong, T. Berlijn, **L. Liang***, “Thickness and spin dependence of Raman modes in magnetic layered Fe₃GeTe₂”, *Advanced Electronic Materials*, 2001159 (2021). [**Corresponding author*]
8. X. Kong, H. Yoon, M. J. Han, **L. Liang***, “Switching interlayer magnetic order in bilayer CrI₃ by stacking reversal”, *Nanoscale*, 13, 16172 (2021). [**Corresponding author*]
9. R. Ge*, X. Wu*, **L. Liang***, S. Hus, Y. Gu, E. Okogbue, H. Chou, J. Shi, Y. Zhang, S. Banerjee, Y. Jung, J. Lee, D. Akinwande, “A Library of Atomically Thin 2D Materials Featuring the Conductive-Point Resistive Switching Phenomenon”, *Advanced Materials*, 33, 2007792 (2021). [**Co-lead author*]
10. S. Hus, R. Ge, P. Chen, **L. Liang**, G. Donnelly, W. Ko, F. Huang, M. Chiang, A. Li, D. Akinwande, “Observation of single-defect memristor in an MoS₂ atomic sheet”, *Nature Nanotechnology*, 16, 58–62 (2021).
11. W. Luo, A. Oyedele, Y. Gu, T. Li, X. Wang, A. Haglund, D. Mandrus, A. Piretzky, K. Xiao, **L. Liang***, X. Ling*, “Anisotropic Phonon Response of Few-Layer PdSe₂ under Uniaxial Strain”, *Advanced Functional Materials*, 2003215 (2020). [**Co-corresponding author*]
12. G. Nguyen, A. Oyedele, A. Haglund, W. Ko, **L. Liang***, A. Piretzky, D. Mandrus, K. Xiao, A. Li*, “Atomically Precise PdSe₂ Pentagonal Nanoribbons”, *ACS Nano*, 14, 1951 (2020). [**Co-corresponding author*]
13. J. Zhang, X. Li, K. Xiao, B. Sumpter, A. Ghosh, **L. Liang***, “The role of mid-gap phonon modes in thermal transport of transition metal dichalcogenides”, *Journal of Physics: Condensed Matter*, 32, 025306 (2019). [**Corresponding author*]
14. **L. Liang**, E. C. Girão, V. Meunier, “Modeling the Kondo effect of a magnetic atom adsorbed on graphene”, *2D Materials*, 6, 035038 (2019).
15. N. Mao, X. Wang, Y. Lin, B. Sumpter, Q. Ji, T. Palacios, S. Huang, V. Meunier, M. Dresselhaus, W. Tisdale, **L. Liang***, X. Ling*, J. Kong*, “Direct Observation of Symmetry-Dependent Electron-Phonon Coupling in Black Phosphorus”, *Journal of the American Chemical Society*, 141, 18994 (2019). [**Co-corresponding author*]
16. W. Zhu*, **L. Liang***, R. Roberts, J. Lin, D. Akinwande, “Anisotropic Electron-Phonon Interactions in Angle-Resolved Raman Study of Strained Black Phosphorus”, *ACS Nano*, 12, 12512 (2018). [**Co-lead author*]

17. A. Piretzky, A. Oyedele, K. Xiao, A. V. Haglund, B. Sumpter, D. Mandrus, D. B. Geohegan, **L. Liang***, “Anomalous interlayer vibrations in strongly coupled layered PdSe₂”, *2D Materials*, 5, 035016 (2018). [**Corresponding author*]
18. G. D. Nguyen, **L. Liang***, Q. Zou, M. Fu, A. Oyedele, B. Sumpter, Z. Liu, Z. Gai, K. Xiao, A. Li*, “3D imaging and manipulation of subsurface selenium vacancies in PdSe₂”, *Physical Review Letters*, 121, 086101 (2018). [**Co-corresponding author*]
19. **L. Liang***, A. Piretzky, B. Sumpter, V. Meunier, “Interlayer bond polarizability model for stacking-dependent low-frequency Raman scattering in layered materials”, *Nanoscale*, 9, 15340 (2017). [**Corresponding author*]
20. **L. Liang**, J. Zhang, B. Sumpter, Q. Tan, P. Tan, V. Meunier, “Low-Frequency Shear and Layer-Breathing Modes in Raman Scattering of Two-Dimensional Materials”, *ACS Nano*, 11, 11777 (2017).
21. C. Ma, **L. Liang***, Z. Xiao, A. Piretzky, W. Lu, V. Meunier, J. Bernholc, A. Li*, “Seamless staircase electrical contact to semiconducting graphene nanoribbon”, *Nano Letters*, 17, 6241 (2017). [**Co-corresponding author*]
22. **L. Liang**, V. Meunier, “Atomically Precise Graphene Nanoribbon Heterojunctions for Excitonic Solar Cells”, *The Journal of Physical Chemistry C*, 119, 775 (2015).
23. **L. Liang**, J. Wang, W. Lin, B. G. Sumpter, V. Meunier, M. Pan, “Electronic Bandgap and Edge Reconstruction in Phosphorene Materials”, *Nano Letters*, 14, 6400 (2014).
24. **L. Liang**, V. Meunier, “First-principles Raman spectra of MoS₂, WS₂ and their heterostructures”, *Nanoscale*, 6, 5394 (2014).
25. **L. Liang**, E. Cruz-Silva, E. C. Girão, V. Meunier, “Enhanced thermoelectric figure of merit in assembled graphene nanoribbons”, *Physical Review B*, 86, 115438 (2012).

Teaching and Mentoring Experience

Mentoring Postdocs, Oak Ridge National Laboratory (e.g., <i>Xiangru Kong, now assistant professor at Northeastern University, China</i>)	2019-Present
Co-mentoring Students, Oak Ridge National Laboratory (e.g., <i>Natalya Sheremetyeva and Andrew Cupo, Rensselaer Polytechnic Institute; Jingjie Zhang, University of Virginia; Weijun Luo, Boston University; Jameela Fatheema, University of Texas at Austin</i>)	2015-Present
Serving on the dissertation committee of PhD and Master students (<i>Weijun Luo, Boston University; Jameela Fatheema, University of Texas at Austin; Sung Jin Yang, University of Texas at Austin; João Fernandes, University of Minho</i>)	2017-Present
Mentoring Students and Postdoctoral Researchers, Department of Physics, RPI (e.g., <i>Pan Zhu and Daniel Massote, Rensselaer Polytechnic Institute</i>)	2013-2015
Graduate Teaching Assistant, Department of Physics, RPI	2010-2012