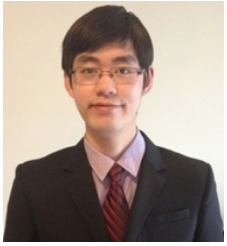
Liangbo Liang
Eugene P. Wigner Fellow
Center for Nanophase Materials Sciences
Oak Ridge National Laboratory
liangl1@ornl.gov
(865) 574-7192



Education

2014 Ph.D. in Physics, Rensselaer Polytechnic Institute, U.S.A. (Advisor: Dr. Vincent Meunier)
2008 B.S. in Physics, Wuhan University, China

Honors and Awards

2015 Eugene P. Wigner Fellowship of Oak Ridge National Laboratory (ORNL)
2014 Hillard B. Huntington Award of Rensselaer Polytechnic Institute (RPI)
2008 Outstanding Undergraduate Student of Wuhan University
2007 First Prize of the National Scholarship & the People's Scholarship
2006 Samsung Scholarship & First Prize of the People's Scholarship
2005 Huangzhangren Scholarship & First Prize of the People's Scholarship

Professional Experience

2015-Present Eugene P. Wigner Fellow, ORNL (Supervisor: Dr. Bobby G. Sumpter)
2014–2015 Postdoctoral Research Associate, Department of Physics, RPI
2010–2014 Research Assistant, Department of Physics, RPI

- Theoretical research on electronic, magnetic, optical and thermal properties of nanomaterials such as carbon nanotubes, graphene, transition metal dichalcogenides, phosphorene, etc.
- Computational modeling of scanning tunneling microscopy/spectroscopy, Raman scattering, neutron scattering, photoluminescence spectroscopy, etc.
- Active collaboration with experimentalists across the world to corroborate experimental results ranging from nanomaterials to superconductors.

Professional and Synergistic Activities

2015 Program Coordinator for International Phosphorene Symposium

2015 Contributed Talk at American Physical Society March Meeting

2014 Contributed Talk at American Physical Society March Meeting

2013 Invited Talk at the Physics Colloquium of Rensselaer Polytechnic Institute

Referee to journals: Nanoscale, Carbon, Scientific Reports, Advanced Electronic Materials, Physical Chemistry Chemical Physics, Materials Research Express, Nanotechnology, 2D Materials, Computational Materials Science, Journal of Applied Physics.

Publications

(Including 1 in Nature Nanotechnology, 1 in Nature Communications, 4 in Nano Letters, 2 in ACS Nano, 2 in Physical Review Letters, 1 in Nanoscale, 1 in PNAS, 1 in JACS)

1. J. Lin, **L. Liang**, X. Ling, S. Zhang, N. Mao, N. Zhang, B. G. Sumpter, V. Meunier, L. Tong, J.

Zhang, “Enhanced Raman Scattering on In-plane Anisotropic Layered Materials”, Journal of the American Chemical Society, (2015).

2. X. Ling*, **L. Liang***, S. Huang, A. Puretzky, D. B. Geohegan, B. G. Sumpter, J. Kong, V. Meunier, M. S. Dresselhaus, “Low-frequency Interlayer Breathing Modes in Few-layer Black Phosphorus”, Nano Letters, 15, 4080 (2015). [*equal contribution]

3. A. A. Puretzky, **L. Liang**, X. Li, K. Xiao, K. Wang, M. Mahjouri-Samani, L. Basile, J. Idrobo, B. G. Sumpter, V. Meunier, D. B. Geohegan, “Low-Frequency Raman Fingerprints of Two-Dimensional Metal Dichalcogenide Layer Stacking Configurations”, ACS Nano, 9, 6333 (2015).

4. G. Bhimanapati, Z. Lin, V. Meunier, Y. Jung, J. Cha, S. Das, D. Xiao, Y. Son, M. Strano, V. Cooper, **L. Liang**, S. Louie, E. Ringe, W. Zhou, B. Sumpter, H. Terrones, F. Xia, Y. Wang, J. Zhu, D. Akinwande, N. Alem, J. Schuller, R. Schaak, M. Terrones, J. Robinson, “Recent Advances in Two-Dimensional Materials Beyond Graphene”, ACS Nano, (2015).

5. R. Lv, G. Chen, Q. Li, A. McCreary, A. Botello-Méndez, S. Morozov, **L. Liang**, X. Declerck, N. Perea-López, D. Cullen, S. Feng, A.Elías, R. Cruz-Silva, K. Fujisawa, M. Endo, F. Kang, J. Charlier, V. Meunier, M. Pan, A. Harutyunyan, K. Novoselov, M. Terrones, “Ultrasensitive gas detection of large-area boron-doped graphene”, Proceedings of the National Academy of Sciences, (2015).

6. G. Vasseur, Y. Fagot-Revurat, M. Sicot, B. Kierren, L. Moreau, D. Malterre, L. Cardenas, G. Galeotti, J. Lipton-Duffin, F. Rosei, M. Di Giovannantonio, G. Contini, P. Le Fevre, F. Bertran, **L. Liang**, V. Meunier, D.F. Perepichka, “Quasi one-Dimensional Band Dispersion and Surface Metallization In long Range Ordered Polymeric wires”, Nature Communications, (2015).

7. M. Lin, H. Zhuang, J. Yan, T. Ward, A. A. Puretzky, C. M. Rouleau, Z. Gai, **L. Liang**, V. Meunier, B. G. Sumpter, P. Ganesh, P. R. C. Kent, D. B. Geohegan, D. G. Mandrus, K. Xiao, “Ultrathin Nanosheets of $CrSiTe_3$: A Semiconducting Two-Dimensional Ferromagnetic Material”, Journal of Materials Chemistry C, (2015).

8. A. Lherbier, **L. Liang**, J. Charlier, V. Meunier, “Charge carrier transport and separation in pristine and nitrogen-doped graphene nanowiggle heterostructures”, Carbon, 95, 833 (2015).

9. S. Huang, X. Ling, **L. Liang**, Y. Song, W. Fang, J. Zhang, J. Kong, V. Meunier, M. S. Dresselhaus, “Molecular Selectivity of Graphene-Enhanced Raman Scattering”, Nano Letters, 15, 2892 (2015).

10. **L. Liang**, P. Zhu, V. Meunier, “Electronic, structural, and substrate effect properties of single-layer covalent organic frameworks ”, The Journal of Chemical Physics, 142, 184708 (2015).

11. **L. Liang**, V. Meunier, “Atomically Precise Graphene Nanoribbon Heterojunctions for Excitonic Solar Cells”, The Journal of Physical Chemistry C, 119, 775 (2015).

12. C. Daniels, A. Horning, A. Phillips, D. Massote, **L. Liang**, Z. Bullard, B. G. Sumpter, V. Meunier, "Elastic, plastic, and fracture mechanisms in graphene materials", Journal of Physics: Condensed Matter, 27, 373002 (2015).

13. F. Qi, **L. Liang**, D. Zhang, X. Yu, “Sodium Controlled Synthesis of Hexagonal-Phase $NaGdF_4$: Yb, Er Nanocrystals with Enhanced Upconversion Fluorescence for Bioimaging”, Nanoscience and Nanotechnology Letters, 7, 121 (2015).

14. **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).

15. S. Huang, X. Ling, **L. Liang**, J. Kong, H. Terrones, V. Meunier, M. S. Dresselhaus, “Probing the

Interlayer Coupling of Twisted Bilayer MoS_2 Using Photoluminescence Spectroscopy", Nano Letters, 14, 5500 (2014).

16. J. Cai., C. A. Pignedoli, L. Talirz, P. Ruffieux, H. Söde, **L. Liang**, V. Meunier, R. Berger, R. Li, X. Feng, K. Müllen, R. Fasel, "Graphene nanoribbon heterojunctions", Nature Nanotechnology, 9, 896 (2014).

17. G. Li, **L. Liang**, Q. Li, M. Pan, V. Nascimento, X. He, A. Karki, V. Meunier, R. Jin, J. Zhang, E. Plummer, "Role of antiferromagnetic ordering in the (1×2) surface reconstruction of $Ca(Fe_{1-x}Co_x)_2As_2$", Physical Review Letters, 112 (2014).

18. B. G. Sumpter, **L. Liang**, A. Nicolaï, V. Meunier, "Interfacial Properties and Design of Functional Energy Materials", Accounts of Chemical Research, 47, 3395 (2014).

19. **L. Liang**, V. Meunier, "First-principles Raman spectra of MoS_2, WS_2 and their heterostructures", Nanoscale, 6, 5394 (2014).

20. E. C. Girão, **L. Liang**, V. Meunier, "Heterospin Junctions in Zigzag-Edged Graphene Nanoribbons", Applied Sciences, 4, 351 (2014).

21. E. C. Girão, **L. Liang**, J. Owens, E. Cruz-Silva, B. G. Sumpter, V. Meunier, book chapter "Electronic Transport in Graphitic Carbon Nanoribbons", in the book "Graphene Chemistry: Theoretical Perspective", John Wiley & Sons (2013).

22. **L. Liang**, V. Meunier, "Electronic and thermoelectric properties of assembled graphene nanoribbons with elastic strain and structural dislocation", Applied Physics Letters, 102, 143101 (2013).

23. **L. Liang**, E. C. Girão, V. Meunier, "Quasiparticle band gaps of graphene nanowiggles and their magnetism on Au (111)", Physical Review B, 88, 035420 (2013).

24. **L. Liang**, V. Meunier, "Electronic structure of assembled graphene nanoribbons: Substrate and many-body effects", Physical Review B, 86, 195404 (2012).

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).

26. E. C. Girão, E. Cruz-Silva, **L. Liang**, A. Filho, V. Meunier, "Structural and electronic properties of graphitic nanowiggles", Physical Review B, 85, 235431 (2012).

27. E. C. Girão, **L. Liang**, E. Cruz-Silva, A. Filho, V. Meunier, "Emergence of atypical properties in assembled graphene nanoribbons", Physical Review Letters, 107, 135501 (2011).

28. W. Ren, **L. Liang**, F. Qi, Z. Sun, Z. Yang, X. Huang, Q. Wu, H. Zhu, X. Yu, H. Quan, Q. Gong, "Bimodal fluorescence and magnetic resonance imaging using water-soluble hexagonal $NaYF_4$:Ce,Tb,Gd nanocrystals", Journal of Nanomaterials, 70 (2011).

29. Y. Ding, **L. Liang**, M. Li, D. He, L. Xu, P. Wang, X. Yu, "Efficient manganese luminescence induced by Ce^{3+}-Mn^{2+} energy transfer in rare earth fluoride and phosphate nanocrystals", Nanoscale Research Letters, 6, 1 (2011).

30. Y. Xiang, X. Xu, D. He, M. Li, **L. Liang**, X. Yu, "Fabrication of rare-earth/quantum-dot nanocomposites for color-tunable sensing applications", Journal of Nanoparticle Research, 13, 525 (2011).

31. Z. Chen, C. Lian, D. Zhou, Y. Xiang, M. Wang, M. Ke, **L. Liang**, X. Yu, "Greatly enhanced and controlled manganese photoluminescence in water-soluble ZnCdS:Mn/ZnS core/shell quantum dots", Chemical Physics Letters, 488, 73 (2010).