

Bin Cheng - Curriculum Vitae

Contact Information

Bin Cheng (程斌)
Associate Researcher
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Education

Ph.D., Physics, University of California Riverside, CA, March 2015
Advisor: Marc Bockrath
Thesis title: Transport Properties of Few-Layer Graphene on Boron Nitride

M.S., Physics, Nanjing University, Nanjing, China, June 2009
Advisor: Qiang-hua Wang
Thesis title: Decoherence in Open Quantum System

B.S., Physics, Nanjing University, Nanjing, China, June 2006
Advisor: Qiang-hua Wang
Thesis title: The theory of phase transition: from mean field to renormalization group

Employment

Associate Researcher, School of Physics, Nanjing University, Nanjing, China, Spring 2019 - Present

Postdoctoral Fellow, Computer, Electrical and Mathematical Science and Engineering Division, King Abdullah University of Science and Technology, Kingdom of Saudi Arabia, Spring 2016 - Spring 2019

Project Specialist, Department of Physics, University of California, Riverside, CA, Spring 2015 – Fall 2015

Graduate Student Researcher, Department of Physics, University of California, Riverside, CA, Fall 2013 – Winter 2014

Teaching Assistant, Department of Physics, University of California, Riverside, CA, Fall 2009 - Summer 2013

Research Assistant, Department of Physics, Nanjing University, Nanjing, China, Fall 2006 – Spring 2009

Honors

Dean's Distinguished International Fellowship Award, University of California-Riverside, CA, 2009/09

Outstanding Graduate Award, Nanjing University, 2006/03

First Class of Freshman's Scholarship, Nanjing University, 2002/09

Publications

1. C. Wang, C. Pan, S. -J Liang, **B. Cheng***, F. Miao*, "Reconfigurable Vertical Field-Effect Transistor based on Graphene/MoTe₂/Graphite Heterostructure", *Science China Information Sciences*, doi:10.1007/s11432-019-2778-8.
2. S. -J Liang†, **B. Cheng†**, X. Cui*, F. Miao*, "Van der Waals Heterostructures for High-Performance Device Applications: Challenges and Opportunities", *Advanced Materials*, doi:10.1002/adma.201903800.
3. **Bin Cheng†**, Cheng Pan†, Shi Che, Peng Wang, Yong Wu, Kenji Watanabe, Takashi Taniguchi, Supeng Ge, Roger Lake, Dmitry Smirnov, Chun Ning Lau, Marc Bockrath, "Tunable Fractional and Symmetry-Broken Chern Insulators in Bilayer-Moiré Superlattices", *Nano Lett.* 2019, 19 (7): 4321-4326.
4. C.H. Lin†, **Bin Cheng†**, T.Y. Li, J.R. Durán Retamal, T.C. Wei, X.S. Fang and J.H. He, "Orthogonal Patterning Halide Perovskite for Nanodevice Application", *ACS Nano* 2019, 13, 1168-1176.
5. **Bin Cheng†**, T.Y. Li†, P.C. Wei, J. Yin, K.T. Ho, J.R. Durán Retamal, O. F. Mohammed, J.H. He, "Layer-Edge Device of 2D Hybrid Perovskites", *Nature Communications* 9, 5196 (2018).
6. **Bin Cheng†**, T.Y. Li†, P. Maity, P.C. Wei, D. Nordlund, K.T. Ho, D.H. Lien, C.H. Lin, R.Z. Liang, X.H. Miao, I.A. Ajia, J. Yin, S. Dimosthenis, A. Javey, I.S. Roqan, O.F. Mohammed, J.H. H, "Extremely reduced dielectric confinement in two-dimensional hybrid perovskites with large polar organics", *Communications Physics* 1, 80 (2018).
7. **Bin Cheng†**, Yong Wu†, Peng Wang, Cheng Pan, T. Taniguchi, K. Watanabe, and M. Bockrath, "Gate-Tunable Landau Level Filling and Spectroscopy in Coupled Massive and Massless Electron Systems", *Phys. Rev. Lett.* 117, 026601 (2016).
8. **Bin Cheng**, Peng Wang, Cheng Pan, Tengfei Miao, Yong Wu, T. Taniguchi, K. Watanabe, C. N. Lau, M. Bockrath, "Raman Spectroscopy Measurement of Bilayer Graphene Twist Angle to Boron Nitride", *Appl. Phys. Lett.* 107, 033101 (2015).
9. **Bin Cheng**, Qiang-Hua Wang and Robert Joynt, "Transfer matrix solution of a model of qubit decoherence due to telegraph noise", *Phys. Rev. A* 78, 022313 (2008).
10. C. Pan, C. Wang, S. -J Liang*, Y. Wang, T. Cao, P. Wang, C. Wang, S. Wang, **B. Cheng**, A. Gao, E. Liu, K. Watanabe, T. Taniguchi, F. Miao*, "Reconfigurable logic and neuromorphic circuits based on electrically tunable two-dimensional homojunctions", *Nat. Electron.* (2020). <https://doi.org/10.1038/s41928-020-0433-9>.
11. C. Wang, S. -J Liang, S. Wang, P. Wang, Z. Li, Z. Wang, A. Gao, C. Pan, C. Liu, J. Liu, H. Yang, X. Liu, W. Song, C. Wang, **B. Cheng**, X. Wang, K. Chen, Z. Wang, K. Watanabe, T. Taniguchi, J. Yang*, F. Miao*, "Gate-tunable van der Waals heterostructure for reconfigurable neural network vision sensor", *Science Advances* 6, eaba6173 (2020).
12. C. Wang, Z. Yang, S. Wang, P. Wang, C. Wang, C. Pan, **B. Cheng**, S. -J Liang*, F. Miao*, "A Braitenberg Vehicle Based on Memristive Neuromorphic Circuits", *Advanced Intelligent Systems* 2, 1900103 (2020) (Cover Paper and editors' choice).

13. S. Yan, P. Wang, C. Wang, T. Xu, Z. Li, T. Cao, M. Chen, C. Pan, **B. Cheng**, L. Sun, S. -J Liang*, F. Miao*, "Chemical Vapor Deposition Synthesis of Two-dimensional Freestanding Transition Metal Oxychloride for Electronic Applications", *Science China Information Sciences* 62 , 220407 (2019).
14. Jun Yin, Partha Maity, Rounak Naphade, **Bin Cheng**, Jr-Hau He, Osman M. Bakr, Jean-Luc Brédas, and Omar F. Mohammed*, "Tuning Hot Carrier Cooling Dynamics by Dielectric Confinement in Two-Dimensional Hybrid Perovskite Crystals", *ACS Nano* 2019, 13, 11, 12621–12629.
15. Partha Maity, Jun Yin, **Bin Cheng**, Jr-Hau He, Osman M. Bakr, and Omar F. Mohammed*, "Layer-Dependent Coherent Acoustic Phonons in Two-Dimensional Ruddlesden–Popper Perovskite Crystals", *J. Phys. Chem. Lett.* 2019, 10, 17, 5259–5264.
16. Y. Wang, L. Wang, X. Liu, H. Wu, P. Wang, D. Yan, **B. Cheng**, Y. Shi, K. Watanabe, T. Taniguchi, S. -J Liang*, F. Miao*, "Direct evidence for charge compensation induced large magnetoresistance in thin WTe₂", *Nano Lett.*, DOI: 10.1021/acs.nanolett.9b01275.
17. Shi Che†, Petr Stepanov†, Supeng Ge†, Yongjin Lee, Kevin Myhro, Yanmeng Shi, Ruoyu Chen, Ziqi Pi, Cheng Pan, **Bin Cheng**, Takashi Taniguchi, Kenji Watanabe, Marc Bockrath, Yafis Barlas, Roger Lake, Chun Ning Lau, "Twist Angle-Dependent Bands and Valley Inversion in 2D Materials/hBN Heterostructures", *arXiv:1803.03679*.
18. K.T. Ho, S.F. Leung, T.Y. Li, P. Maity, **Bin Cheng**, H.C. Fu, O.F. Mohammed, and J.H. He, "Surface Effect on the 2-Dimensional Hybrid Perovskite Crystals: Perovskites using Ethanalamine organic layer as an example," *Adv. Mater.* 30, 1870351 (2018).
19. A.M. Al-Amri, **Bin Cheng**, and J.H. He, "Methylammonium Lead Trihalide Perovskite Heterostructures: Progress and Challenges," *IEEE Trans. Nano* (published online).
20. C.H. Lin, T.Y. Li, **B. Cheng**, C.X. Liu, C.W. Yang, J.J. Ke, T.C. Wei, A. Fratalocchi, L.J. Li, and J.H. He, "Metal Contact and Carrier Transport in Single Crystalline Organic-Inorganic Perovskite," *Nano Energy* 53, 817-827 (2018).
21. Chun-Ho Lin, Hui-Chun Fu, **Bin Cheng**, Meng-Lin Tsai, Wei Luo, Lihui Zhou, Soo-Hwan Jang, Liangbing Hu, & Jr-Hau He, "A Flexible Solar-Blind 2D Boron Nitride Nanopaper-based Photodetector Featuring High Thermal Resistance", *npj 2D Mater. Appl.* 2, 23 (2018).
22. Yong Wu, Dawei Zhai, Cheng Pan, **Bin Cheng**, Takashi Taniguchi, Kenji Watanabe, Nancy Sandler, Marc Bockrath, "Quantum wires and waveguides formed in graphene by strain", *Nano Lett.*, 2018, 18 (1), pp 64–69.
23. Cheng Pan, Yong Wu, **Bin Cheng**, Shi Che, T. Taniguchi, K. Watanabe, C. N. Lau, and M. Bockrath, "Layer Polarizability and Easy-Axis Quantum Hall Ferromagnetism in Bilayer Graphene", *Nano Lett.*, 2017, 17 (6), pp 3416-3420 (2017).
24. Sergei Lopatin, **Bin Cheng**, Wei-Ting Liu, Meng-Lin Tsai, Jr-Hau He and Andrey Chuvilin, "Ultra-high Resolution of Electron Energy Loss Spectroscopy by a Monochromated Titan TEM: Towards Challenging Nanomaterials Characterization", *Microscopy and Microanalysis*, Vol. 23, Issue S1, pp. 1564-1565 (2017).

25. B.-Y. Jiang[†], G.X. Ni[†], C. Pan, Z. Fei, **Bin Cheng**, C.N. Lau, M. Bockrath, D.N. Basov, and M.M. Fogler, "Tunable Plasmonic Reflection by Bound 1D Electron States in a 2D Dirac Metal", *Phys. Rev. Lett.* 117, 086108 (2016).
26. Peng Wang, **Bin Cheng**, O. Martynov, T. Miao, L. Jing, T. Taniguchi, K. Watanabe, V. Aji, C.N. Lau, M. Bockrath, "Topological Winding Number Change and Broken Inversion Symmetry in a Hofstadter's Butterfly", *Nano Lett.*, 2015, 15 (10), pp 6395–6399.
27. Jhao-Wun Huang[†], Cheng Pan[†], Son Tran, **Bin Cheng**, Kenji Watanabe, Takashi Taniguchi, Chun Ning Lau and Marc Bockrath, "Superior Current Carrying Capacity of Boron-Nitride Encapsulated Carbon Nanotubes with Zero-Dimensional Contacts", *Nano Lett.*, 2015, 15 (10), pp 6836–6840.