Xu Du

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Education and Training

• University of Florida	Physics	Ph.D. 2004
• Beijing University	Physics	M.S. 1999
• Beijing Univ. of Aero. & Astr.	Mechanical Engineering	B.E. 1996

Research and Professional Experience

- Sept.2024-present: Professor, Stony Brook University
- Sept.2015-Sept. 2014: Associate Professor, Stony Brook University
- Sept. 2009-Sept.2015: Assistant Professor, Stony Brook University
- Mar. 2005-Sept. 2009: Postdoc Fellow, Rutgers University, Piscataway, NJ
- Dec.2004-Mar.2005: Optional Practical Training (OPT)
- Dec. 2000-Dec. 2004: Graduate Research Assistant, University of Florida

Honors /Awards

- Stony Brook Physics and Astronomy Teaching Award 2011
- AFSOR Young Investigator Research Program Award 2010-2013
- ICAM Fellowship 2008
- Alumni Fellowship, University of Florida 1999-2003
- People's scholarship, Beijing University, 1999
- People's scholarship, Beijing Univ. of Aero. & Astr., 1994
- First prize in National mathematical modeling competition, P. R. China, 1994

Publications

51. Mitigating challenges in aberration-corrected electron-beam lithography on electron-opaque substrates, Fernando Camino, Nikhil Tiwale, Sooyeon Hwang, Xu Du and Judith Yang, IOPscience Nanotechnology (2023) **DOI** 10.1088/1361-6528/ad0908

50. Infrared Nano-imaging of Dirac Magnetoexcitons in Graphene, Michael Dapolito, Makoto Tsuneto, Wenjun Zheng, Lukas Wehmeier, Suheng Xu, Xinzhong Chen, Jiacheng Sun, Zengyi Du, Yinming Shao, Ran Jing, Shuai Zhang, Adrien Bercher, Yinan Dong, Dorri Halbertal, Vibhu Ravindran, Zijian Zhou, Adrian Gozar, G. L. Carr, Qiang Li, Alexey B. Kuzmenko, Michael M. Fogler, D. N. Basov*, Xu Du* , Mengkun Liu*, Nature Nanotechnology (2023). https://doi.org/10.1038/s41565-023-01488-y .

49. Topological and stacked flat bands in bilayer graphene with a superlattice potential, SAA Ghorashi, A Dunbrack, A Abouelkomsan, J Sun, X Du, J Cano, Physical Review Letters 130 (19), 2023

48. Momentum-resolved exciton coupling and valley polarization dynamics in monolayer WS_2, Alice Kunin, Sergey Chernov, Jin Bakalis, Ziling Li, Shuyu Cheng, Zachary H. Withers, Michael G. White, Gerd Schönhense, Xu Du, Roland K. Kawakami, and Thomas K. Allison, Physical Review Letters 130, 046202 (2023)

47. Strain-tuned topological phase transition and unconventional Zeeman effect in ZrTe5 microcrystals, Apurva Gaikwad, Song Sun, Peipei Wang, Liyuan Zhang, Jennifer Cano, Xi Dai, Xu Du, ***Communications Materials*** 3, 94 (2022)

46. Uncovering Topological Edge States in Twisted Bilayer Graphene, Matthieu Fortin-Deschênes*, Rui Pu, Yan-Feng Zhou*, Chao Ma, Patrick Cheung, Kenji Watanabe, Takashi Taniguchi, Fan Zhang, Xu Du*, Fengnian Xia, ***Nano Letters,*** 22, 15, 6186–6193 (2022)

45. Scattering-type scanning near-field optical microscopy with Akiyama piezo-probes, M Dapolito, X Chen, C Li, M Tsuneto, S Zhang, X Du, M Liu, A Gozar, ***Applied Physics Letters*** 120 (1), 013104 (2022)

44. Quantum transport properties of near and well beyond the extreme quantum limit, Peipei Wang, Fangdong Tang, Peng Wang, Haipeng Zhu, Chang-Woo Cho, Junfeng Wang, Xu Du, Yonghong Shao, Liyuan Zhang, ***Physical Review B*** 103 (15), 155201 (2021)

43. Localizing fractional quasiparticles on graphene quantum hall antidots
SM Mills, DV Averin, X Du, ***Physical Review Letters*** 125 (22), 227701 (2020)

43. Moiré Band Topology in Twisted Bilayer Graphene
Chao Ma, Qiyue Wang, Scott Mills, Xiaolong Chen, Bingchen Deng, Shaofan Yuan, Cheng Li, Kenji Watanabe, Takashi Taniguchi, Xu Du*, Fan Zhang*, Fengnian Xia*, ***Nano Letters*** 20 (8), 6076-6083 (2020)

42. Bandgap opening in MoTe 2 thin flakes induced by surface oxidation
Yuan Gan, Jiyuan Liang, Chang-woo Cho, Si Li, Yanping Guo, Xiaoming Ma, Xuefeng Wu, Jinsheng Wen, Xu Du, Mingquan He, Chang Liu, Shengyuan A Yang, Kedong Wang, Liyuan Zhang, ***Frontiers of Physics*** 15 (3), 1-7 (2020)

41. In Situ Study of the Impact of Aberration-Corrected Electron-Beam Lithography on the Electronic Transport of Suspended Graphene Devices, N Mizuno, F Camino, X Du, Nanomaterials 10 (4), 666 (2020)

40. Dirac fermion quantum Hall antidot in graphene
Scott M. Mills, Anna Gura, Kenji Watanabe, Takashi Taniguchi, Matthew Dawber, Dmitri V. Averin, and Xu Du, ***Phys. Rev. B*** 100, 245130 (2019)

39. Thermal Conductivity of HfTe5: A Critical Revisit

T Feng, X Wu, X Yang, P Wang, L Zhang, X Du, X Wang, ST Pantelides, ***Advanced Functional Materials*** Volume30, Issue5, 1907286, 2020

38. Contact transparency in mechanically assembled 2D material devices
Scott Mills, Naomi Mizuno, Peng Wang, Jian Lyu, Kenji Watanabe, Takashi Taniguchi, Fernando Camino, Liyuan Zhang, Xu Du, ***Journal of Physics: Materials*** 2 (3), 035003 (2019)

37. Photo-induced terahertz near-field dynamics of graphene/InAs heterostructures
Ziheng Yao, Vyacheslav Semenenko, Jiawei Zhang, Scott Mills, Xiaoguang Zhao, Xinzhong Chen, Hai Hu, Ryan Mescall, Thomas Ciavatti, Stephen March, Seth R Bank, Tiger H Tao, Xin Zhang, Vasili Perebeinos, Qing Dai, Xu Du, Mengkun Liu. ***Optics Express*** 27 (10), 13611-13623 (2019)

36. Detecting the major charge-carrier scattering mechanism in graphene antidot lattices
D Xu, S Tang, X Du, Q Hao, ***Carbon*** 144, 601-607 (2019)

35. Terahertz Nanoimaging of Graphene
Jiawei Zhang, Xinzhong Chen, Scott Mills, Thomas Ciavatti, Ziheng Yao, Ryan Mescall, Hai Hu, Vyacheslav Semenenko, Zhe Fei, Hua Li, Vasili Perebeinos, Hu Tao, Qing Dai, Xu Du, and Mengkun Liu, ***ACS Photonics*** 5 (7), pp 2645–2651 (2018)

34. Large-Velocity Saturation in Thin-Film Black Phosphorus Transistors
Xiaolong Chen, Chen Chen, Adi Levi, Lothar Houben, Bingchen Deng, Shaofan Yuan, Chao Ma, Kenji Watanabe, Takashi Taniguchi, Doron Naveh, Xu Du , and Fengnian Xia, ***ACS Nano*** 12 (5), pp 5003–5010 (2018)

33. Random Gauge Field Scattering in Monolayer Graphene
F. Guan, X. Du, ***Nano Letters*** 17(11), 7009 (2017) **DOI:** 10.1021/acs.nanolett.7b03618

32. Magnetic field suppression of Andreev conductance at superconductor–graphene interfaces

P Kumaravadivel, S Mills, X. Du, ***2D Materials*** 4(4), 045011 (2017)

31. Local control of the resistivity of graphene through mechanically induced switching of a ferroelectric superlattice
M. H. Yusuf, A. Gura, X. Du, M. Dawber, ***2D Materials*** 4 (2), 021022, (2017)

30. Revealing the Origins of 3D Anisotropic Thermal Conductivities of Black Phosphorus
Jie Zhu, Haechan Park, Jun-Yang Chen, Xiaokun Gu, Hu Zhang, Sreejith Karthikeyan, Nathaniel Wendel, Stephen A Campbell, Matthew Dawber, Xu Du, Mo Li, Jian-Ping Wang, Ronggui Yang, Xiaojia Wang, ***Advanced Electronic Materials***, Vol. 2, 10.1002/aelm.201600040 (2016)

29. Signatures of evanescent transport in ballistic suspended graphene-superconductor junctions
P Kumaravadivel, X Du, ***Scientific reports*** 6 (2016)

28. Tuning strain in flexible graphene nanoelectromechanical resonators

Fen Guan, Piranavan Kumaravadivel, Dmitri V. Averin and Xu Du, ***Appl. Phys. Lett.* 107**, 193102 (2015)

27. Ultrasensitive Graphene Far-Infrared Power Detectors
C.B. McKitterick, D.E. Prober, H. Vora, and X. Du, ***J. Phys. Condens. Matter*** 27 164203 (2015)

26. Extrinsic and Intrinsic Charge Trapping at the Graphene/Ferroelectric Interface.
M. Humed Yusuf, Bent Nielsen, M. Dawber, and X.Du. ***Nano Letters*** 14, 5437 (2014)

25. Bulk signatures of pressure-induced band inversion and topological phase transitions in Pb 1-xSn xSe.
Xiaoxiang Xi, Xu-Gang He, Fen Guan, Zhenxian Liu, R. D. Zhong, J. A. Schneeloch, T. S. Liu, G. D. Gu, D. Xu, Z. Chen, X. G. Hong, Wei Ku, and G. L. Carr. ***Physical Review Letters*** 113, 096401 (2014)

24. Graphene-based Bolometers.
Xu Du, Daniel E. Prober, Heli Vora, Christopher B. Mckitterick. ***Graphene and 2D materials***, Volume 1, Issue 1, ISSN (Online) 2299-3134, DOI: 10.2478/gpe-2014-0001, (2014)

23. Graphene microbolometers with superconducting contacts for terahertz photon detection.
Christopher B. McKitterick, Heli Vora, Xu Du, Boris S. Karasik, Daniel E. Prober, ***Journal of Low Temperature Physics***, DOI: 10.1007/s10909-014-1127-3 (2014)

22. Nonlinear vs. bolometric radiation response and phonon thermal conductance in graphene-superconductor junctions.
Heli Vora, Bent Nielsen and Xu Du, ***Journal of Applied Physics***, 115, 074505 (2014)

21. Ballistic-like supercurrent in suspended graphene Josephson weak links.
Naomi Mizuno, Bent Nielsen and Xu Du, ***Nature Communications*** 4, 2716 (2013) DOI:10.1038/ncomms3716

20. Bolometric response in graphene based superconducting tunnel junctions.
9Heli Vora, Piranavan Kumaravadivel, Bent Nielsen, and Xu Du, ***Applied Physics Letters*** 100, 153507 (2012)

19. Electronic properties of graphene: a perspective from scanning tunneling microscopy and magnetotransport.
Eva Y. Andrei, Guohong Li and Xu Du, ***Reports on Progress in Physics*** 75, 056501 (2012)

18. Mobility-dependent low frequency noise in graphene field effect transistors.
Yan Zhang, E. E. Mendez, and Xu Du, ***ACS Nano***, 5 (10), pp 8124–8130 (2011)

17. Fractional quantum Hall effect in suspended graphene probed with two-terminal measurements.
I. Skachko, X. Du, F. Duerr, A. Luican, D. A. Abanin, L. S. Levitov and E.Y.Andrei, ***Philosophical Transactions of the Royal Society. A*** 13 vol. 368, no. 1932, 5403-5416 (2010)

16. Fractional quantum Hall effect in suspended graphene: Transport coefficients and electron interaction strength.
D. A. Abanin, I. Skachko, X. Du, E. Y. Andrei, L. S. Levitov, ***Physical Review B*** 81, 115410 (2010)

15. Fractional quantum Hall effect and insulating phase of Dirac electrons in graphene.
Xu Du, Ivan Skachko, Fabian Duerr, Adina Luican and Eva Y. Andrei, ***Nature***, 462, 192-195 (2009)

14. Towards ballistic transport in Graphene.
Xu Du, Ivan Skachko, and Eva Y. Andrei***, International Journal of Modern Physics B (IJMPB)*** 22, No: 25/26, 4579 (2008)

13. Approaching ballistic transport in suspended graphene.
Xu Du, Anthony Barker, Ivan Skachko, and Eva Y. Andrei, ***Nature Nanotechnology*** 3, 491 (2008)

12. Josephson Current and Multiple Andreev Reflections in Graphene SNS Junctions.
Xu Du, Ivan Skachko, and Eva Y. Andrei, ***Physical Review B*** 77, 184507 (2008) (selected as PRB Editors'Suggestions; selected for Virtual Journal of Applications of Superconductivity)

11. Aging memory and glassiness of a driven vortex system.
Xu Du, Guohong Li, Eva Y. Andrei, M. Greenblatt, P. Shuk, ***Nature Physics*** 3, 111 (2007)

10. Transparent, conductive carbon nanotube films.
Z. Wu, Z. Chen, X. Du, J. Logan, J. Sippel, M. Nikolou, K. Kamaras, J. R. Reynolds, D. B. Tanner, A. F. Hebard, A. G. Rinzler, ***Science*** 305, 1273 (2004)

9. Metal-insulator-like behavior in semimetallic bismuth and graphite.
Xu Du, Shan-wen Tsai, Dmitrii Maslov, and Arthur. F. Hebard, ***Physical Review Letters*** 94, 166601 (2005)

8. Onset of motion and glassy dynamics of a moving vortex lattice.
G Li, EY Andrei, X Du, ZL Xiao, P Shuk, M Greenblatt, Journal de Physique IV (Proceedings) 131, 101-106 (2005)

7. Bulk separative enrichment in metallic or semiconducting single-walled carbon nanotubes.
Z. Chen, X. Du, M. Du, D. Rancken, H. Cheng, and A.G. Rinzler, ***Nano Letters*** 3, 1245 (2003)

6. Contribution of interface capacitance to the electric-field breakdown in thin-film Al-AlOx-Al capacitors.

Singh-Bhalla, G., Du, X, and Hebard, A.F., ***Applied Physics Letters*** 83, 2417 (2003)

5. Large magnetoresistance of bismuth/gold films thermally deposited onto glass substrates.
Xu Du and A. F. Hebard, ***Applied Physics Letters*** 82, 2293 (2003)

4. Mosaic structure and its influence on carrier mobility in undoped hexagonal GaN thin film.
Du, X., Wang, Y.Z.; Cheng, L.L., Zhang, G.Y., Zhang, H., ***Materials Science & Engineering B (Solid-State Materials for Advanced Technology)*** B75, 228 (2000)

3. Calculation of modulus of elasticity between two blocks in $YBa_2Cu_3O_7$-x.
X. Du, L.L. Cheng, L. Zhang, H. Zhang, ***Physica C*** 337, 204 (2000)

2. Relationship between superconducting transition temperature and combinative energy in $YBa_2Cu_3O_7$.
Cheng Li-Li, Du Xu, Qin Xiao-Chuan, Zhang Han, ***Chinese Physics Letters*** 16, 446 (1999)

1.Relationship between cohesive energy and superconductivity in Hg-system superconductors.
Qin Xiao-Chuan, Du Xu, Zhang Han, ***Chinese Physics Letters*** 15, 745 (1998)

Invited Presentations

29. Building a meta world on graphene, Stony Brook Colloquium. April, 2023

28. Engineering artificial atoms and lattices in graphene, Long Island Social Distancing Seminars, May, 2020

27. Graphene-based Bolometers, Washington University at St. Louis, Nov. 2019

26. Localizing and Manipulating Quantum Hall States in Graphene Antidot, NSF, June, 2019

25. Suspended Graphene Under Strain, Rutgers University, Oct. 2018

24. Mechanical Assembly of Superconducting Devices, Air Force Office of Scientific Research/University of Huston, Jul. 2018

23. Suspended graphene under strain, University of Delaware, Nov. 2017

22. Probing the Graphene Bridges, 2D and Dirac materials workshop, Jacksonville, Dec. 2016

21. Graphene-superconductor devices, Air Force Office of Scientific Research, Arlington VA, Nov. 2016

20. Probing the Graphene Bridges, Dept. of Physics, South University of Science and Technology, P. R. China, Oct. 2016

19. Probing the Graphene Bridges, Dept. of Physics, Peking University, P. R. China, Jul. 2015

18. Probing the Graphene Bridges, Air Force Office of Scientific Research, Arlington VA, Jun. 2015

17. “Graphene superconductor junctions”, Dept. of Physics and Astronomy, Pennsylvania State University, Sept. 2014

16. “Graphene superconductor hybrid devices” Air Force Office of Scientific Research, Arlington VA, Jun. 2014

15. “Graphene hybrid devices”, Center for Quantum Materials, Department of Physics and Astronomy, Stony Brook University, Oct. 2013

14. “Building graphene-superconductor junction bolometers”, Dept. of Physics and Astronomy, Rutgers University, May,2013

13. “Building graphene-superconductor junction bolometers”, Dept. of Applied Physics, Yale University, Apr., 2012

12. “Bolometric response in graphene-superconductor junctions”, IOP Workshop on Frontiers of Dirac Electron Systems, Chinese Academy of Sciences, Beijing, P. R. China, Jan. 2012

11. “Study intrinsic graphene in suspended devices”, Institute of Physics, Chinese Academy of Sciences, Beijing, P. R. China, 2011

10. “Study intrinsic graphene in suspended devices”, Dept. of Physics, Peking University, P. R. China, 2011

9. “Bolometric response in graphene –superconductor junctions”, Dept. of Applied Physics, Yale University 2011

8. “Study of intrinsic graphene in suspended devices”, NY APS meeting, Albany NY. 2011

7. “Probing intrinsic graphene in suspended devices”, Boston Area Carbon Nanoscience meetings, 06/25/2010

6. “Magnetically induced correlated states in suspended graphene”, International work shop on Interactions, Disorder, and Topology in Quantum Hall Systems, Max Plank Institute, Dresden, 06/10/2010

5. “Observation of Fractional quantum Hall effect and insulating phase of Dirac electrons in suspended graphene”, Boston College, 05/18/2010

4. “Magnetically induced correlated states in suspended graphene”, 2010 APS March meeting

3. “Probing intrinsic Dirac Fermion physics in graphene”, SUNY@Stony Brook, 2009

2. “Glassy vortex dynamics 2H-NbSe2 and Superconducting proximity effect in graphene”, ICAM conference, 2008

1. “Superconducting proximity effect in graphene SNS junctions” Invited, Los Alamos National laboratory, 2007

Synergistic Activities

- Co-organizing a focused session (Graphene Devices: Function, Fabrication, and Characterization) for 2015APS March meeting
- NSF-DMR Review Panel

- Chairing a session (Graphene: Transport in Devices and Structures) for the 2012 APS March Meeting
- Participating 2011 Sorter Meeting for 2012 APS March Meeting
- User proposal Review Panel for Center for Functional Nanomaterials, BNL
- Referee for: Science, Nature Communications, Scientific Reports, Physical Review Letters, Physical Review B, New Journal of Physics, Nano Letters, ACS Nano, Journal of Physics:Condensed Matter, Nanotechnology, etc.