Benjamin M. Hunt

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Education

- Ph.D. (Physics), Cornell University **2009**
  Advisor: Prof. J. C. Séamus Davis
  Dissertation Title: "Relaxation Dynamics of Solid Helium-4"
- M.S. (Physics), Cornell University **2007**
- B.Sc. (Physics), McGill University **2002**

Employment

- Falco DeBenedetti Career Development Chair, Carnegie Mellon University **2019**-present
- Associate Professor of Physics, Carnegie Mellon University **2020**-present
- Assistant Professor of Physics, Carnegie Mellon University **2015-2020**
- Courtesy Professor, Materials Science and Engineering, CMU **2016**-present
- Research Scientist, Columbia University **2014-2015**
  Advisors: Prof. Cory Dean and Prof. James Hone
- Postdoctoral Associate / Postdoctoral Fellow, M.I.T. **2009-2014**
  Advisor: Prof. Raymond Ashoori

Awards

Cottrell Scholar (2019), Department of Energy Early Career Award (2017), Kaufman Foundation Young Investigator Research Grant (2016)

Publications

Submitted

1. M.R. Sinko, S.C. de la Barrera, O. Lanes, K. Watanabe, T. Taniguchi, D. Pekker, M. Hatridge, and **B. Hunt**, "Superconducting Contact and Quantum Interference Between a Two-Dimensional van der Waals Superconductor and a Conventional Metal", arXiv:1911.09711 (2019), *in review*.

2. Z. Sun, J. Beaumariage, Q. Cao, K. Watanabe, T. Taniguchi, **B. Hunt**, I.V. Bondarev, and D.W. Snoke, "Toward a Room Temperature Schafroth Superconductor Based on Charged Excitonic Complexes", arXiv:2003.05850 (2020), *submitted*

Published and In Press

3. Z. Sun, J. Beaumariage, Q. Cao, K. Watanabe, T. Taniguchi, **B. Hunt**, and D.W. Snoke, "Interlayer Exciton Gases in WSe_2-pWSe_2 Heterostructures", *in press,* ***ACS Photonics*** (2020).

4. D. Aasen, R.S.K. Mong, **B. Hunt**, D. Mandrus, and J. Alicea, "Electrical Probes of the Non-Abelian Spin Liquid in Kitaev Materials", *in press,* ***Physical Review X*** (2020).

5. F. Lüpke*, D. Waters*, S.C. de la Barrera, M. Widom, D.G. Mandrus, J. Yan, R.M. Feenstra, and **B. Hunt**, "Proximity-induced Superconducting Gap in the Quantum Spin Hall Edge State of Monolayer WTe_2", ***Nature Physics*** **16**, 526 (2020).

6. J. Liang, K. Xu, M. Wu, **B. Hunt**, W.-H. Wang, K. Cho, and S.K. Fullerton-Shirey, "All-Solid-State Non-Volatile Two-Dimensional Crystal Memory Gated by a Monolayer Electrolyte", ***Nano Letters*** **19**, 8911 (2019).

7. R. Garg, D.P. Gopalan, S.C. de la Barrera, H. Hafiz, N.T. Nuhfer, V. Viswanathan, **B. Hunt**†, and T. Cohen-Karni†, "Electron Transport in Multidimensional Fuzzy Graphene Nanostructures", ***Nano Letters*** **19**, 5335 (2019).

8. S.C. de la Barrera, M.R. Sinko, D.P. Gopalan, N. Sivadas, K.L. Seyler, K.Watanabe, T.Taniguchi, A.W. Tsen, X. Xu, D. Xiao and **B. Hunt**, "Tuning Ising Superconductivity with Layer and Spin–Orbit Coupling in Two-dimensional Transition-Metal Dichalcogenides", ***Nature Communications*** **9**, 1427 (2018).

9. **B. Hunt**, J.I.A. Li, A.A. Zibrov, L. Wang, T. Taniguchi, K. Watanabe, J. Hone, C.R. Dean, M. Zalatel, R. C. Ashoori, and A.F. Young, "Direct Measurement of Discrete Valley and Orbital Quantum Numbers in Bilayer Graphene", ***Nature Communications*** **8**, 948 (2017).

10. R. Garg, S. K. Rastogi, M. Lamparski, S.C. de la Barrera, G.T. Pace, N. T. Nuhfer, **B. Hunt**, V. Meunier, and T. Cohen-Karni, "Nanowire-Mesh-Templated Growth of Out-of-Plane Three-Dimensional Fuzzy Graphene", ***ACS Nano*** **11**, 6301 (2017).

11. J. D. Sanchez-Yamagishi*, J. Y. Luo*, A. F. Young, **B. Hunt**, K. Watanabe, T. Taniguchi, R. C. Ashoori , and P. Jarillo-Herrero, "Helical Edge States and Fractional Quantum Hall Effect in a Graphene Electron-Hole Bilayer", ***Nature Nanotechnology*** **12**, 118 (2017).

12. J. Jang, **B. Hunt**, L. N. Pfeiffer, K. W. West, and R. C. Ashoori, "Sharp Tunneling Resonance from the Vibrations of an Electronic Wigner Crystal", ***Nature Physics*** **13**, 340 (2016).

13. A. W. Tsen, **B. Hunt**, Y. D. Kim, Z. J. Yuan, S. Jia, R. J. Cava, J. Hone, P. Kim, A. N. Pasupathy and C. R. Dean, "Nature of the Quantum Metal in a Two-Dimensional Crystalline Superconductor", ***Nature Physics*** **12**, 208 (2016).

    News and Views in *Nature Physics* by Philip W. Phillips (*Nat. Phys.* **12**, 206 [2016])

14. V. Fatemi, **B. Hunt**, H. Steinberg, S. L. Eltinge, F. Mahmood, N. P. Butch, K. Watanabe, T. Taniguchi, N. Gedik, R. C. Ashoori and P. Jarillo-Herrero, "Electrostatic Coupling between Two Surfaces of a Topological Insulator Nanodevice", ***Phys. Rev. Lett.*** **113**, 206801 (2014).

15. A. F. Young*, J. D. Sanchez-Yamagishi*, **B. Hunt***, S.-H. Choi, K. Watanabe, T. Taniguchi, R. C. Ashoori and P. Jarillo-Herrero, "Tunable Symmetry Breaking and Helical Edge Transport in a Graphene Quantum Spin Hall State", ***Nature* 505**, 528 (2014).

16. **B. Hunt***, J. D. Sanchez-Yamagishi*, A. F. Young*, M. Yankowitz, B. J. LeRoy, K. Watanabe, T. Taniguchi, P. Moon, M. Koshino, P. Jarillo-Herrero and R. C. Ashoori, "Massive Dirac Fermions and Hofstadter Butterfly in a Van der Waals Heterostructure", ***Science* 340**, 1427 (2013).

    Perspective in *Science* by Michael Fuhrer (*Science* **340**, 1413 [2013])

    A *Physics World* Top 10 Breakthrough of the Year

17. E. Pratt*, **B. Hunt***, V. Gadagkar, M. Yamashita, M. J. Graf, A. V. Balatsky, J. C. Davis, "Interplay of Rotational, Relaxational, and Shear Dynamics in Solid ^{4}He", ***Science* 332**, 821 (2011).

18. **B. Hunt***, E. Pratt*, V. Gadagkar, M. Yamashita, A. V. Balatsky, J. C. Davis, "Evidence for a Superglass State in Solid ^{4}He", ***Science* 324**, 632 (2009).

    Perspective in *Science* by John Saunders (*Science* **324**, 601 [2009])

    Article in *Physics Today* by Johanna Miller (*Phys. Today* **62**, 18 [2009])

19. V. Gadagkar, E. J. Pratt, **B. Hunt**, M. Yamashita, M. J. Graf, A. V. Balatsky and J.C. Davis, "Generalized Rotational Susceptibility Studies of Solid ^{4}He", ***Journal of Low Temperature Physics* 169**, 180 (2012).

    * Equal contributions to the work; † co-corresponding authors

Invited Talks, Seminars and Colloquia

1. ***APS March Meeting**, Denver, CO.* "Proximity-Induced Superconducting Gap in the Quantum Spin Hall Edge State of Monolayer WTe_2" (March 2020) *conference cancelled (coronavirus)*
2. *Condensed-Matter Physics Seminar, University of Utah.* "Novel Superconductors in Two-Dimensional Materials and Heterostructures" (Nov. 2019)
3. *Department of Energy - Experimental Condensed Matter Physics - PI Meeting.* "Proximity-Induced Superconducting Gap in the Quantum Spin Hall Edge State of Monolayer WTe_2" (Sept. 2019)
4. *Cottrell Scholars Conference, Tucson, AZ.* "Comprehensive Undergraduate Nanoscience Lab" (July 2019)
5. *Physics Colloquium, University of New Hampshire.* "Novel Superconductors in Two-Dimensional Materials" (Apr. 2019)
6. *Condensed-Matter Physics Seminar, Brown University.* "Ising Superconductivity and Proximity-Induced Pairing in Monolayer Transition-Metal Dichalcogenides" (Apr. 2019)
7. *Condensed-Matter Physics Seminar, Duke University.* (Apr. 2019)
8. *Physics Colloquium, University of Vermont.* "Novel Superconductors in Two-Dimensional Materials" (Apr. 2018)
9. *Condensed-Matter Physics Seminar, Michigan State University.* (Apr. 2018)
10. *CMSS Colloquium, Ohio University.* (Mar. 2018).

11. ***APS March Meeting***, *Los Angeles, CA*. "Ising Superconductivity in 2D Transition-Metal Dichalcogenides TaS_2 and $NbSe_2$" (Mar. 2018).
12. *XXVI International Materials Research Congress 2017, Cancún, Mexico*. "Quantum Metal and Ising Superconductivity in Two-Dimensional Transition-Metal Dichalcogenides" (Aug. 2017).
13. *Future Materials Forum, Univ. of Tennessee, Knoxville*. "Magnetic and Superconducting Proximity Effects in van der Waals Heterostructures" (July 2017).
14. *Collective Phenomena in Layered and 2D Materials Workshop, Oak Ridge National Laboratory*. "Quantum Metal and Ising Superconductivity in Two-Dimensional Niobium Diselenide" (Aug. 2016).
15. *CAMP Seminar, Penn State*. "Complex Ordering of Ground States in Two-Dimensional Materials: Quantum Metal in $NbSe_2$ and Valley-Orbital Polarization in Bilayer Graphene" (Apr. 2016).
16. *Condensed Matter Seminar, UT Austin*. "Quantum Metal and Ising Superconductivity in Two-Dimensional Niobium Diselenide" (Mar. 2016).
17. *Condensed Matter Seminar, Texas A & M*. (Mar. 2016).
18. *Institute for THz Research, UCSB*. (Feb. 2016).
19. *Pittsburgh Quantum Institute, PQI2015*. "Direct Measurement of the Layer Polarization of Bilayer Graphene" (Nov. 2014).
20. *Condensed Matter Seminar, Carnegie Mellon*. (Nov. 2014).
21. *IWEPNM 2014, Kirchberg, Austria*. "Topology, Symmetry and Edge Transport in a Graphene Quantum Spin Hall State" (Mar. 2014).
22. *Physics Colloquium, University of Washington-Seattle*. "Engineering New Electronic States in Graphene Heterostructures: Massive Dirac Fermions and Hofstadter's Butterfly" (Mar. 2014).
23. *Physics Colloquium, University of Vermont* (Feb. 2014).
24. *Physics Colloquium, University of New Hampshire* (Feb. 2014).
25. *Physics Colloquium, University of Wisconsin-Madison* (Feb. 2014).
26. *Physics Colloquium, Carnegie Mellon* (Jan. 2014).
27. *Physics Colloquium, University of Miami* (Jan. 2014).
28. *Graphene Brazil 2013, Búzios, RJ, Brazil* (Sept. 2013).
29. *Condensed-Matter Seminar, Federal University of Minas Gerais, Belo Horizonte, Brazil* (Sept. 2013).
30. *Condensed-Matter Seminar, University of Colorado at Boulder* (Aug. 2013). "Engineering New Electronic States in Graphene Heterostructures: Massive Dirac Fermions, Hofstadter's Butterfly and the Quantum Spin Hall Effect"
31. *Boston-Area Carbon Nanoscience Meeting, Harvard University*. "Zero-field Insulating State in Monolayer Graphene" (Nov. 2012)
32. *Nanoscale Science and Engineering Center (NSEC) Seminar, Harvard University*. "Tunneling Spectroscopy of the Two-Dimensional Electron System with Extraordinary Resolution" (Apr. 2011).
33. *Robert M. Woods Memorial Lecture, Westminster College, New Wilmington, PA*. "Matter at the Coldest Extremes" (Apr. 2010).
34. *Supersolids 2009, Banff, AB, Canada*. "Equilibration and Dynamics of Solid ^{4}He" (Aug. 2009).