

# Johannes Pollanen

## Curriculum Vitae

Department of Physics and Astronomy, Michigan State University

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### Current Positions

2022-present: Jerry Cowen Chair of Physics and Associate Professor  
2021-present: Co-founder and Board Member, [Midwest Quantum Collaboratory \(MQC\)](#)  
2019-present: Associate Director, [MSU Center for Quantum Computing Science and Engineering](#)  
2017-present: Co-founder and Chief Science Officer (CSO) [EeroQ Quantum Hardware Corp.](#)  
2016-present: Principal Investigator of the [Laboratory for Hybrid Quantum Systems \(LHQS\)](#)

### Previous Positions

2016-2022: Jerry Cowen Chair of Physics and Assistant Professor  
2012-2015: [IQIM Postdoctoral Scholar of Physics at Caltech, Eisenstein Group](#)  
2004-2012: Graduate Research Assistant, Northwestern University, [W.P. Halperin Ultra Low Temperature \(ULT\) Physics Group](#)  
2001-2003: Research Technician, [Laboratory for Experimental Nuclear Astrophysics \(LENA\)](#) at the [Triangle Universities Nuclear Lab \(TUNL\)](#)

### Education

#### **Northwestern University, Evanston, Illinois**

Ph.D. in Physics: March 2012

Advisor: William P. Halperin

Thesis Title: [Transverse Pulsed NMR of Superfluid  \$^3\text{He}\$  in Aerogel: Unconventional Pairing in the Presence of Quenched Disorder](#)

#### **Northwestern University, Evanston, Illinois**

Masters in Physics: December 2004

Advisor: William P. Halperin

#### **University of North Carolina at Chapel Hill, Chapel Hill, North Carolina**

Bachelors of Science in Physics: December 2002

### Highlights/Awards

- ◇ 2022 NSF CAREER Award
- ◇ 2021-2022 MSU College of Natural Science Teacher-Scholar Award
- ◇ 1/2021: Co-inventor on granted US Patent (USPTO No. 10,892,398) "Qubit hardware for electrons on helium."
- ◇ 11/2020: LHQS demonstrates first quantum measurements on NV-center qubits at MSU
- ◇ 6/2018: LHQS demonstrates first superconducting qubit experiments in the state of Michigan
- ◇ 4/2018: Thomas H. Osgood Excellence in Teaching Award, Michigan State University Department of Physics and Astronomy
- ◇ Michigan State University Nominee for the Packard Fellowship in Physics (2017)
- ◇ 2017: Co-founder and CSO of quantum hardware startup company, [EeroQ Quantum Hardware Corp.](#), with Nick Farina, Faye Wattleton, David Ferguson, Stephen Lyon and David Rees
- ◇ [61 invited scientific talks](#), at major national and international conferences, summer schools, university condensed matter & QIS seminars and colloquia
- ◇ [61 refereed publications](#) totaling 1042 citations
- ◇ h-index: 18, i-10 index: 27 (Google Scholar)

**Interests & Expertise**

- ◇ Hybrid quantum systems
- ◇ Experimental quantum information science (QIS)
- ◇ Electrons on superfluid helium (eHe)
- ◇ Superconducting qubits & circuits (2d and 3d transmon systems and single electron transistors)
- ◇ Surface acoustic wave (SAW) devices and techniques
- ◇ Low-dimensional electron systems (semiconductor and van der Waals heterostructures)
- ◇ Quantum fluids (superfluid  $^3\text{He}$  &  $^4\text{He}$ )
- ◇ Nitrogen-vacancy defects (qubits) in diamond
- ◇ Nuclear magnetic resonance (NMR)
- ◇ Ultra-low temperature (sub-mK) physics (nuclear demagnetization cooling)
- ◇ Sol-gel chemistry and silica aerogels

**All Publications**

61. *A hermetic on-cryostat helium source for low temperature experiments*, K.E. Castoria, H. Byeon, J. Theis, N.R. Beysengulov, E.O. Glen, G. Koolstra, M. Sammon, S.A. Lyon, **J. Pollanen**, and D.G. Rees, [arXiv:2311.01546](https://arxiv.org/abs/2311.01546) (2023).
60. *Coulomb interaction-driven entanglement of electrons on helium*, N.R. Beysengulov, **J. Pollanen**, Ø.S. Schøyen, S.D. Bilek, J.B. Flaten, O. Leinonen, H.E. Kristiansen, Z.J. Stewart, J.D. Weidman, A.K. Wilson, and M. Hjorth-Jensen, [arXiv:2310.04927](https://arxiv.org/abs/2310.04927) (2023).
59. *Free-space coupling and characterization of transverse bulk phonon modes in a quantum acoustic device*, J.M. Kitzman, J.R. Lane, C. Undershute, M. Drimmer, A.J. Schleusner, N.R. Beysengulov, C.A. Mikolas, and **J. Pollanen**, [arXiv:2308.00807](https://arxiv.org/abs/2308.00807) (2023).
58. *Phononic bath engineering of a superconducting qubit*, J.M. Kitzman, J.R. Lane, C. Undershute, P.M. Harrington, N.R. Beysengulov, C.A. Mikolas, K.W. Murch and **J. Pollanen**, *Nature Communications*, **14**, 3910 (2023).
57. *Quantum acoustic Fano interference of surface phonons*, J.M. Kitzman, J.R. Lane, C. Undershute, N.R. Beysengulov, C.A. Mikolas, K.W. Murch and **J. Pollanen**, *Phys. Rev. A* **108**, L010601 (2023).
56. *Dirac revivals drive a resonance response in twisted bilayer graphene*, E. Morissette, J.-X. Lin, D. Sun, L. Zhang, S. Liu, D. Rhodes, K. Watanabe, T. Taniguchi, J. Hone, **J. Pollanen**, M.S. Scheurer, M. Lilly, A.M. Mounce and J.I.A. Li, *Nature Physics* **19**, 1156 (2023).
55. *Accelerating Progress Towards Practical Quantum Advantage: The Quantum Technology Demonstration Project Roadmap*, Paul Alsing, Phil Battle, Joshua C. Bienfang, Tammie Borders, Tina Brower-Thomas, Lincoln Carr, Fred Chong, Siamak Dadras, Brian DeMarco, Ivan Deutsch, Eden Figueroa, Danna Freedman, Henry Everitt, Daniel Gauthier, Ezekiel Johnston-Halperin, Jungsang Kim, Mackillo Kira, Prem Kumar, Paul Kwiat, John Lekki, Anjul Loiacono, Marko Loncar, John R. Lowell, Mikhail Lukin, Celia Merzbacher, Aaron Miller, Christopher Monroe, **Johannes Pollanen**, David Pappas, Michael Raymer, Ronald Reano, Brandon Rodenburg, Martin Savage, Thomas Searles and Jun Ye, [arXiv:2210.14757](https://arxiv.org/abs/2210.14757) (2022).
54. *Van der Waals shielding of superconducting qubit systems*, J.M. Kitzman, J.R. Lane, T. Steffanski, N.R. Beysengulov, D. Tan, K.W. Murch, and **J. Pollanen**, *J. Low Temp. Phys.* **208**, 467 (2022).
53. *Helium surface fluctuations investigated with superconducting coplanar waveguide resonator*, N.R. Beysengulov, C.A. Mikolas, J.M. Kitzman, J.R. Lane, D. Edmunds, D.G. Rees, E.A. Henriksen, S.A. Lyon, and **J. Pollanen**, *J. Low Temp. Phys.* **208**, 482 (2022).
52. *Piezoacoustics for precision control of electrons floating on helium*, H. Byeon, K. Nasyedkin, J.R. Lane, N.R. Beysengulov, L. Zhang, R. Loloee, and **J. Pollanen**, *Nature Communications* **12**, 4150 (2021).

51. *Noise performance and thermalization of a single electron transistor using quantum fluids*, N.R. Beysengulov, J.R. Lane, J.M. Kitzman, K. Nasyedkin, D.G. Rees, and **J. Pollanen**, *J. Low Temp. Phys.* **205**, 143 (2021).
50. *Superconductivity in PtPb<sub>4</sub> with possible nontrivial band topology*, C.Q. Xu, B. Li, L. Zhang, **J. Pollanen**, X.L. Yi, X.Z. Xing, Y. Liu, J.H. Wang, Zengwei Zhu, Z.X. Shi, Xiaofeng Xu and X. Ke, *Phys. Rev. B* **104**, 125127 (2021).
49. *Coherent hopping transport and giant negative magnetoresistance in epitaxial CsSnBr<sub>3</sub>*, L. Zhang, I. King, K. Nasyedkin, P. Chen, B. Skinner, R.R. Lunt, and **J. Pollanen**, *ACS Applied Electronic Materials* **3**, 2948 (2021).
48. *Extraordinary phase coherence length in epitaxial halide perovskites*, K. Nasyedkin, I. King, L. Zhang, P. Chen, L. Wang, R.J. Staples, R.R. Lunt, and **J. Pollanen**, *iScience* **24**, 102912 (2021).
47. *Integrating superfluids with superconducting qubit systems*, J.R. Lane, D. Tan, N.R. Beysengulov, K. Nasyedkin, E. Brook, L. Zhang, T. Stefanski, H. Byeon, K.W. Murch and **J. Pollanen**, *Phys. Rev. A* **101**, 012336 (2020).
46. *Fabrication of Graphene-inserted Tunneling Device (GiTD) for emerging spin devices*, H.R. Cherian, N.O. Birge, **J. Pollanen**, and E.C. Ahn *ECS Transactions* **98**, 3 (2020).
45. *Anomalous attenuation of piezoacoustic surface waves by liquid helium thin films*, H. Byeon, K. Nasyedkin, J.R. Lane, L. Zhang, N.R. Beysengulov, R. Loloee and **J. Pollanen**, *J. Low Temp. Phys.* **195**, 336 (2019).
44. *Flip-chip gate-tunable acoustoelectric effect in graphene*, J.R. Lane, L. Zhang, M.A. Khasawneh, B.N. Zhou, E.A. Henriksen and **J. Pollanen**, *Journal of Applied Physics* **124**, 194302 (2018).
43. *Unconventional field effect transistor composed of electrons floating on helium*, K. Nasyedkin, H. Byeon, L. Zhang, N.R. Beysengulov, J. Milem, S. Hemmerle, R. Loloee and **J. Pollanen**, *Journal of Physics: Condensed Matter* **30**, 465501 (2018).
42. *Charge metastability and hysteresis in the quantum Hall regime*, **J. Pollanen**, J.P. Eisenstein, L.N. Pfeiffer, and K.W. West, *Phys. Rev. B* **94**, 245440 (2016).
41. *Crystallization of <sup>4</sup>He in aerogel via mass flow through surrounding solid <sup>4</sup>He*, H. Matsuda, A. Ochi, R. Isozaki, S. Minami, R. Nomura, **J. Pollanen**, W.P. Halperin, and Y. Okuda, *Phys. Rev. B* **94**, 024509 (2016).
40. *Heterostructure symmetry and the orientation of the quantum Hall nematic phases*, **J. Pollanen**, K.B. Cooper, S. Brandsen, J.P. Eisenstein, L.N. Pfeiffer, and K.W. West, *Phys. Rev. B* **92**, 115410 (2015).
39. *Anisotropic phases of superfluid <sup>3</sup>He in compressed aerogel*, J.I.A. Li, A.M. Zimmerman, **J. Pollanen**, C.A. Collett, and W.P. Halperin, *Phys. Rev. Lett.* **114**, 105302 (2015).
38. *Stability of superfluid <sup>3</sup>He-B in compressed aerogel*, J.I.A. Li, A.M. Zimmerman, **J. Pollanen**, C.A. Collett, W.J. Gannon, and W.P. Halperin, *Phys. Rev. Lett.* **112**, 115303 (2014).
37. *Dissipation signatures of the normal and superfluid phases in torsion pendulum experiments with <sup>3</sup>He in aerogel*, N. Zhelev, R.G. Bennett, E.N. Smith, **J. Pollanen**, W.P. Halperin, and J.M. Parpia, *Phys. Rev. B* **89**, 094513 (Editors' Suggestion) (2014).
36. *The superfluid glass phase of <sup>3</sup>He-A*, J.I.A. Li, **J. Pollanen**, A.M. Zimmerman, C.A. Collett, W.J. Gannon, and W.P. Halperin, *Nature Physics* **9**, 775 (2013).
35. *Nonlinear field dependence and f-wave interactions in superfluid <sup>3</sup>He*, C.A. Collett, **J. Pollanen**, J.I.A. Li, W.J. Gannon, and W.P. Halperin, *Phys. Rev. B* **87**, 024502 (2013).

34. *Orientation of the angular momentum in superfluid  $^3\text{He-A}$  in a stretched aerogel*, J.I.A. Li, A.M. Zimmerman, **J. Pollanen**, C.A. Collett, W.J. Gannon, and W.P. Halperin, *J. Low Temp. Phys.* **175**, 31 (2013).
33. *Anisotropy of silica aerogels induced by small strain*, A.M. Zimmerman, M.G. Specht, D. Ginzburg, **J. Pollanen**, J.I.A. Li, C.A. Collett, W.J. Gannon, and W.P. Halperin, *J. Low Temp. Phys.* **171**, 745 (2013).
32. *Zeeman splitting and nonlinear field-dependence in superfluid  $^3\text{He}$* , C.A. Collett, **J. Pollanen**, J.I.A. Li, W.J. Gannon, and W.P. Halperin, *J. Low Temp. Phys.* **171**, 214 (2013).
31. *New chiral phases of superfluid  $^3\text{He}$  stabilized by anisotropic silica aerogel*, **J. Pollanen**, J.I.A. Li, C.A. Collett, W.J. Gannon, W.P. Halperin, and J.A. Sauls, *Nature Physics* **8**, 317 (2012).
30. *Nonlinear field-dependence of the imaginary squashing mode of superfluid  $^3\text{He}$  at moderate magnetic fields*, C.A. Collett, **J. Pollanen**, J.I.A. Li, W.J. Gannon, J.P. Davis, and W.P. Halperin, *J. Phys. Conf. Ser.* **400**, 012006 (2012).
29. *Pressure dependence of the longitudinal resonance frequency of  $^3\text{He}$  superfluid phases in aerogel*, J.I.A. Li, **J. Pollanen**, C.A. Collett, W.J. Gannon, and W.P. Halperin, *J. Phys. Conf. Ser.* **400**, 012039 (2012).
28. *Modification of the  $^3\text{He}$  phase diagram by anisotropic disorder*, R.G. Bennett, N. Zhelev, E.N. Smith, **J. Pollanen**, W.P. Halperin, and J.M. Parpia, *Phys. Rev. Lett* **107**, 235504 (2011).
27. *Identification of superfluid phases of  $^3\text{He}$  in uniformly isotropic 98.2% aerogel*, **J. Pollanen**, J.I.A. Li, C.A. Collett, W.J. Gannon, and W.P. Halperin, *Phys. Rev. Lett* **107**, 195301 (2011).
26. *Nanoparticle-loaded aerogels and layered aerogels cast from sol-gel mixtures*, J. Kim, H. Nakanishi, **J. Pollanen**, S. Smoukov, W.P. Halperin, and B.A. Grzybowski, *Small* **7**, 2542 (2011).
25. *Mass coupling and  $Q^{-1}$  of impurity-limited normal  $^3\text{He}$  in a torsion pendulum*, R.G. Bennett, N. Zhelev, A.D. Fefferman, K.Y. Fang, **J. Pollanen**, P. Sharma, W.P. Halperin, and J.M. Parpia, *J. Low Temp. Phys.* **162**, 174 (2011).
24. *Superfluid phase stability of  $^3\text{He}$  in axially anisotropic aerogel*, **J. Pollanen**, J.P. Davis, B. Reddy, K.R. Shirer, H. Choi, and W.P. Halperin, *J. Phys. Conf. Ser.* **150**, 032084 (2009).
23. *Low temperature thermal resistance for a new design of silver sinter heat exchanger*, **J. Pollanen**, H. Choi, J.P. Davis, B.T. Rolfs, and W.P. Halperin, *J. Phys. Conf. Ser.* **150**, 012037 (2009).
22. *Impurity effects of aerogel in superfluid  $^3\text{He}$* , W.P. Halperin, H. Choi, J.P. Davis, and **J. Pollanen**, *J. Phys. Soc. Jpn.* **77**, 111002 (2008).
21. *Globally anisotropic high porosity silica aerogels*, **J. Pollanen**, K. Shirer, S. Blinstein, J.P. Davis, H. Choi, T.M. Lippman, L.B. Lurio, and W.P. Halperin, *J. Non-Crystalline Solids* **354**, 4668 (2008).
20. *High frequency sound in superfluid  $^3\text{He-B}$* , J.P. Davis, H. Choi, **J. Pollanen**, and W.P. Halperin, *J. Low Temp. Phys.* **153**, 1 (2008).
19. *Anomalous attenuation of transverse sound in  $^3\text{He}$* , J.P. Davis, **J. Pollanen**, H. Choi, J.A. Sauls, W.P. Halperin, and A.B. Vorontsov, *Phys. Rev. Lett.* **101**, 085301 (2008).
18. *Discovery of a new excited pair state in superfluid  $^3\text{He}$* , J.P. Davis, **J. Pollanen**, H. Choi, J.A. Sauls, and W.P. Halperin, *Nature Physics* **4**, 571 (2008).
17. *Stability of the axial phase of superfluid  $^3\text{He}$  in aerogel with globally anisotropic scattering*, J.P. Davis, **J. Pollanen**, B. Reddy, K.R. Shirer, H. Choi, and W.P. Halperin, *Phys. Rev. B* **77**, 140502(R) (2008).
16. *Magnetoresistance of  $\text{UPt}_3$* , T.M. Lippman, H. Choi, J.P. Davis, **J. Pollanen**, W.J. Gannon, and W.P. Halperin, *New J. of Physics* **10**, 043006 (2008).

15. *Magneto-acoustic spectroscopy in superfluid  $^3\text{He-B}$* , J.P. Davis, H. Choi, **J. Pollanen**, and W.P. Halperin, *Phys. Rev. Lett.* **100**, 015301 (2008).
14. *Strong coupling corrections to the Ginzburg-Landau theory of superfluid  $^3\text{He}$* , H. Choi, J.P. Davis, **J. Pollanen**, T.M. Haard, and W.P. Halperin, *Phys. Rev. B* **75**, 174503 (2007).
13. *Magnetoresistance of  $\text{UPt}_3$* , T.M. Lippman, J.P. Davis, H. Choi, **J. Pollanen**, and W.P. Halperin, *J. Low Temp. Phys.* **148**, 863 (2007).
12. *Anisotropic aerogels for studying superfluid  $^3\text{He}$* , **J. Pollanen**, S. Blinstein, H. Choi, J.P. Davis, T.M. Lippman, L.B. Lurio, and W.P. Halperin, *J. Low Temp. Phys.* **148**, 579 (2007).
11. *Analysis of strong-coupling parameters for superfluid  $^3\text{He}$* , H. Choi, J.P. Davis, **J. Pollanen**, T.M. Haard, and W.P. Halperin, *J. Low Temp. Phys.* **148**, 507 (2007).
10. *Imaginary squashing mode spectroscopy of  $^3\text{He-B}$* , J.P. Davis H. Choi, **J. Pollanen**, and W.P. Halperin, *J. Low Temp. Phys.* **148**, 501 (2007).
9. *Collective modes and f-wave pairing interactions in superfluid  $^3\text{He}$* , J.P. Davis, H. Choi, **J. Pollanen**, and W.P. Halperin, *Phys. Rev. Lett.* **97**, 115301 (2006).
8. *Surface specific heat of  $^3\text{He}$  and Andreev bound states*, H. Choi, J.P. Davis, **J. Pollanen**, and W.P. Halperin, *Phys. Rev. Lett.* **96**, 125301 (2006).
7. *Specific heat of disordered  $^3\text{He}$* , H. Choi, J.P. Davis, **J. Pollanen**, N. Mulders, and W.P. Halperin, *AIP Conf. Proc.* **850**, 241 (2006).
6. *Acoustic spectroscopy of superfluid  $^3\text{He}$  in aerogel*, J.P. Davis, H. Choi, **J. Pollanen**, and W.P. Halperin, *AIP Conf. Proc.* **850**, 239 (2006).
5. *Compressed silica aerogels for the study of superfluid  $^3\text{He}$  in aerogel*, **J. Pollanen**, H. Choi, J.P. Davis, S. Blinstein, T.M. Lippman, L.B. Lurio, N. Mulders, and W.P. Halperin, *AIP Conf. Proc.* **850**, 237 (2006).
4. *Thermonuclear reaction rate of  $^{17}\text{O}(p,\gamma)^{18}\text{F}$* , C. Fox, C. Iliadis, A.E. Champagne, R.P. Fitzgerald, R. Longland, J. Newton, **J. Pollanen**, and R.C. Runkle, *Phys. Rev. C* **71**, 055801 (2005).
3. *Direct measurement of the  $^{14}\text{N}(p,\gamma)^{15}\text{O}$  S factor*, R.C. Runkle, A.E. Champagne, C. Angulo, C. Fox, C. Iliadis, R. Longland, and **J. Pollanen**, *Phys. Rev. Lett.* **94**, 82503 (2005).
2. *Explosive hydrogen burning of  $^{17}\text{O}$  in classical novae*, C. Fox, C. Iliadis, A.E. Champagne, A. Coc, J. José, R. Longland, J. Newton, **J. Pollanen**, and R.C. Runkle, *Phys. Rev. Lett.* **93**, 081102 (2004).
1. *Search for a resonance in the  $^{14}\text{N}(p,\gamma)^{15}\text{O}$  reaction at  $E_p = 127$  keV*, R.C. Runkle, A.E. Champagne, C. Fox, C. Iliadis, **J. Pollanen**, A. Stephan, and C. Westerfeldt, *Phys. Rev. C* **66**, 022801 (2002).

## Patents/IP

1. *A closed-volume on-cryostat helium source for trapped electron technologies*, K.E. Castoria, H. Byeon, J.R. Theis, N.R. Beysengulov, E. Glen, G. Koolstra, S.A. Lyon, **J. Pollanen**, D.G. Rees and M. Sammon (United States Provisional Patent 8/2023)
2. *Multi-electron qubits with dipole-dipole interaction quantum gates*, S.A. Lyon, **J. Pollanen**, and D.G. Rees, (United States Provisional Patent 7/2023)
3. *Device and method for contactless excitation of transverse piezo-acoustic phonons for quantum and classical applications*, J.M. Kitzman, P.K. Rath and **J. Pollanen**, (United States Provisional Patent 6/2023)
4. *Modular quantum interconnect apparatus for microwave and telecommunications wavelengths*, J.N. Becker, S.S. Nicley and **J. Pollanen**, (United States Provisional Patent 2/2023)

5. *Qubit hardware for electrons on helium*, **J. Pollanen**, N.R. Beysengulov, and D.G. Rees, (United States Patent Number 10,892,398 granted on 1/21/2021)

## Invited Talks

61. **Phononic bath engineering of a superconducting qubit**, University of Michigan Quantum Research Institute Seminar, Ann Arbor, MI, November 16th, 2023.

60. **I. Hybrid quantum information systems with electrons on helium & II. Phononic bath engineering of a superconducting qubit**, 10th Petra School of Physics 2023 (PSP10), Amman, Jordan, October 9-13, 2023.

59. **High-frequency collective dynamics of electrons on helium**, International Conference on Quantum Fluids and Solids 2023 (QFS2023), Manchester, England, August 9-15, 2023.

58. **Creating and controlling hybrid quantum systems ... one electron and phonon at a time**, QuanTalks: IISc Quantum Technology Initiative (IQTI) Seminar, IISc Bangalore, India (via zoom), April 12, 2023.

57. **Phononic bath engineering of a superconducting qubit**, Brown University, Providence, RI, February 9, 2023.

56. **Creating and controlling synthetic quantum systems ... one electron at a time**, Northern Illinois University (Colloquium) DeKalb, IL, February 3, 2023.

55. **Creating and controlling synthetic quantum systems ... one electron at a time**, Bard College (Colloquium) Annandale-on-Hudson, NY, December 9, 2022.

54. **Phononic bath engineering of a superconducting qubit**, [AQT/LBNL Colloquium \(via zoom\)](#) Berkeley, CA, November 17, 2022.

53. **Hybrid systems and quantum computing with electrons floating on the surface of superfluid helium**, [International Conference on Ultra Low Temperature Physics](#) Otaru, Japan, August 25-28, 2022.

52. **Creating and controlling hybrid quantum systems ... one electron at a time**, Washington University in St. Louis, March 28th, 2022.

51. **Hybrid systems based on electrons floating on superfluid helium**, [APS March Meeting Invited Talk](#) Chicago, IL, March 14-18, 2022.

50. **Quantum acoustics with hybrid SAW + qubit systems**, [Midwest Quantum Collaboratory \(MQC\) workshop on Quantum Ready Scalability](#) (via zoom), February 24th, 2022.

49. **Creating and controlling hybrid quantum systems ... one electron at a time**, Michigan State University, December 9th, 2021.

48. **Quantum piezoacoustics: From low-dimensional electrons to qubits**, [Workshop on Quantum Technologies and Hybrid Quantum Systems](#) University of Jyväskylä, Finland, October 25-29, 2021.

47. **Hybrid systems based on qubits, superfluids, and electrons on helium**, [International Conference on Quantum Fluids and Solids QFS2021](#) IISc Bangalore, India (via zoom), August 10-19, 2021.

46. **Building Quantum Technologies ... One Electron at a Time**, [MSU NatSci 2021 Classes Without Quizzes](#) (via zoom), April 24th, 2021.

45. **Hybrid systems based on superconducting circuits, superfluids and electrons on helium**, The Ohio State University (via zoom), January 25th, 2021.

44. **Hybrid systems based on superconducting circuits and electrons on helium**, University of Notre Dame (via zoom), December 9th, 2020.

43. **Hybrid systems based on superconducting circuits and electrons on helium**, Quantum Simulation for Nuclear Physics (QS4NP) Seminar Series (via zoom), December 3rd, 2020.
42. **Hybrid QIS systems based on superconducting qubits, superfluids and electrons on helium**, “Quantum Spin Coherence” Workshop (via zoom), University of Florida MagLab AMRIS and High B/T Facilities, Gainesville, FL, September 14-15th, 2020.
41. **Quantum Fluids meet Quantum Information Science**, Quantum Fluids in Isolation Seminar Series, Boston College (via zoom), July 30th, 2020.
40. **Towards quantum single electronics on liquid helium**, [RD2DS 2020: Recent Development in 2D Systems](#), Okinawa, Japan, April 6-11, 2020 (canceled due to COVID-19 pandemic).
39. **Electrons on helium find their quantum groove**, EIH2020 Electrons On/In Helium, Bangalore, India, January 23-25, 2020.
38. **Superconducting qubits  $|101\rangle$** , IBM-Q Qiskit bootcamp at MSU, East Lansing, MI, October 18, 2019.
37. **Quantum piezoacoustics: From low-dimensional electrons to qubits**, University of Kentucky, Lexington, KY, September 17, 2019.
36. **Quantum piezoacoustics: From low-dimensional electrons to qubits**, QT2DS2019 - Quantum transport in 2D Systems II, Luchon, France, May 25-31, 2019.
35. **Quantum piezoacoustics: From low-dimensional electrons to qubits**, University of Wisconsin-Madison, Madison, WI, April 11th-12th, 2019.
34. **Hybrid quantum systems based on electrons on helium and superconducting qubits**, University of Michigan Quantum Science Workshop, University of Michigan, Ann Arbor, MI, May 9th, 2019.
33. **Hybrid quantum systems based on electrons on helium and superconducting qubits**, 2019 Experimental Techniques in Quantum Sensing and Information Science, Facility for Rare Isotope Beams (FRIB) Michigan State University, East Lansing, MI, March 22nd, 2019.
32. **Creating and controlling quantum systems ... one electron at a time**, 2019 Conference for Undergraduate Women in Physics (CuWiP) Michigan State University, Physics Slam Speaker, East Lansing, MI, January 19th, 2019.
31. **Quantum piezoacoustics: From low-dimensional electrons to qubits**, Michigan State University, East Lansing, MI, November 26th, 2018.
30. **Hybrid quantum information systems with electrons on helium**, Fall 2018 INTRIQ Meeting, Bromont, QC, Canada November 13-14, 2018.
29. **Creating and controlling hybrid quantum systems ... one electron at a time**, University of Alberta, Edmonton, Alberta, Canada November 9th, 2018. (**Departmental colloquium**)
28. **Quantum piezoacoustics: From low-dimensional electrons to qubits**, EIPBN: 62<sup>nd</sup> International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication, Puerto Rico, May 29 - June 1, 2018.
27. **Piezoacoustics studies of low-dimensional electron systems**, The International Workshop on Electrons and Ions in Quantum Fluids and Solids, Mishima, Japan, March 11-14, 2018.
26. **Creating and controlling quantum systems ... one electron at a time**, Wayne State University, Detroit, MI, October 13th, 2017.
25. **Creating and controlling quantum systems ... one electron at a time**, Cowen Investiture Ceremony Public Lecture, Michigan State University, East Lansing, MI, September 14th, 2017.

24. **“Listening” to hysteretic conductivity in the quantum Hall regime**, QT2DS2017 - Quantum transport in 2D Systems II, Luchon, France, May 20-27, 2017.
23. **Quantum phases of low-dimensional electrons: On the road to hybrid quantum systems**, Purdue University, West Lafayette, IN, March 2nd, 2017.
22. **Quantum phases of low-dimensional electrons: On the road to hybrid quantum systems**, Cornell University, Ithaca, NY, January 31st, 2017.
21. **Low-dimensional electrons: On the road to hybrid quantum systems**, Northwestern University, Evanston, IL, December 1st, 2016.
20. **Low-dimensional electrons: On the road to hybrid quantum systems**, Michigan State University, East Lansing, MI, November 28th, 2016.
19. **Low-dimensional electrons: On the road to hybrid quantum systems**, McGill University, Montreal, Canada, November 10th, 2016.
18. **Superfluids and low-dimensional electrons: On the road to hybrid quantum systems**, College of Wooster, Wooster, OH, September 20, 2016. (**Departmental colloquium**)
17. **Superfluids and low-dimensional electrons: On the road to hybrid quantum systems**, Korea Research Institute of Standards and Science (KRISS), Daejeon South Korea, August 11, 2016.
16. **Low-dimensional electrons: On the road to hybrid quantum systems**, Korean Advanced Institute of Science and Technology (KAIST), Daejeon South Korea, July 28, 2016.
15. **Superfluids and low-dimensional electrons: On the road to hybrid quantum systems**, Texas A&M University, College Station, TX, March 11, 2016.
14. **Superfluids and low-dimensional electrons: On the road to hybrid quantum systems**, Notre Dame University, South Bend, IN, March 3, 2016.
13. **Heterostructure Symmetry and the Orientation of the Quantum Hall Nematic Phases**, [EPQHS 2016](#), [Workshop on Emergent Phenomena in Quantum Hall Systems](#), at the TIFR: TATA Institute for Fundamental Research, Mumbai, India January 7-9, 2016.
12. **Engineering Quantum Matter: From Superfluids to Low Dimensional Electrons**, Washington University in St. Louis, MO, November 23, 2015.
11. [Engineering Quantum Matter: From Superfluids to Low-dimensional Electrons](#), [Young Research Leaders Workshop](#), [SPICE Workshop Series](#), at the [Spin Phenomena Interdisciplinary Center \(SPICE\)](#) at Johannes Gutenberg University Mainz, Germany August 3-14, 2015.
10. **Engineering Quantum Matter: From Superfluids to Low Dimensional Electrons**, IQIM Seminar, California Institute of Technology, Pasadena, CA, May 22 2015.
9. **Engineering Quantum Matter: From Superfluids to Low Dimensional Electrons**, Stanford University, Palo Alto, CA, February 2015.
8. [Engineering Quantum Matter: From Superfluids to Low Dimensional Electrons](#), University of Vermont, Burlington, VT, February 18, 2015.
7.  **$^3\text{He}$  in Aerogel: Engineering Superfluid States with Disorder**, QFS2013 International Symposium on Quantum Fluids and Solids, Matsue, Japan, 2013.
6. **Superfluid  $^3\text{He}$  in Aerogel: Unconventional Pairing with Impurity Scattering**, University of Chicago, Chicago, IL, 2011.
5. **Superfluid  $^3\text{He}$  in Aerogel: Unconventional Pairing with Impurity Scattering**, Yale University, New Haven, CT, 2011.



4. **Superfluid  $^3\text{He}$  in Aerogel: Unconventional Pairing with Impurity Scattering**, University of California Santa Barbara, Santa Barbara, CA, 2011.
3. **Superfluid  $^3\text{He}$  in Aerogel: Unconventional Pairing with Impurity Scattering**, California Institute of Technology, Pasadena, CA, 2011.
2. **Anisotropic Aerogels for Studying Superfluid  $^3\text{He}$** , [ULT2008 Conference](#); [Frontiers of Low Temperature Physics](#), Egham, England, 2008.
1.  **$^3\text{He}$  in Aerogel: New Superfluid Phases?**, Northwestern University Society of Physics Students (SPS), Northwestern University, Evanston, IL, 2007.

#### Service: External

- ◇ Member of the International Advisory Committee for the [2023 International Symposium on Quantum Fluids and Solids QFS2023](#) (8/2022-8/2023)
- ◇ Invited member of the NSF TIP - Technology, Innovation and Partnership Directorate scoping workshop for QIST (June 27-28, 2022)
- ◇ Co-Founder and Board Member of the [Midwest Quantum Collaboratory](#) (2021-present)
- ◇ Elected member of the [US National High Magnetic Field Laboratory \(DC-High B/T\) Users Advisory Committee](#) (6/2021-present)
- ◇ Subject Matter Expert for the [NSF-funded QuSTEAM Initiative](#) (2019-present)
- ◇ Member of the International Advisory Committee for the [29th International Conference on Low Temperature Physics](#) (1/2019-8/2022)
- ◇ Member of the International Program Advisory Committee for the [2021 International Symposium on Quantum Fluids and Solids QFS2021](#) (5/2020-8/2021)
- ◇ Member of Local Advisory Committee for [2019 FRIB Workshop on Experimental Techniques in Quantum Sensing and Information Science](#) (12/2018-3/2019)
- ◇ Co-organizer of MSU workshop on [Quantum Information Science: Are we at the crossroads?](#) (September 30th-October 3rd 2018)
- ◇ Member of the American Physical Society (APS)
- ◇ Member of the Division of Condensed Matter Physics of the APS
- ◇ Member of the Division of Quantum Information of the APS
- ◇ Member of the American Association of Physics Teachers (AAPT)
- ◇ Referee for *Physical Review Letters*, *Physical Review B*, *Nature Physics*, *Nature Communications*, *Nano Letters*, *Applied Physics Letters*, *Review of Scientific Instruments*, *Journal of Applied Physics*, *Journal of Low Temperature Physics*, *Journal of Physics: Condensed Matter (IOP)*, *Journal of Physics: Communications (IOP)*, *Advanced Science (Wiley)*, *AVS Quantum Science (AIP)*

**Media/Outreach**

- ◇ [“Good vibrations: MSU physicists help bolster quantum computing”](#), (popular science article in MSUTODAY) (July 12th, 2023).
- ◇ [Quantum Computing at MSU](#), (quantum physics public outreach) (April 9th, 2022).
- ◇ [APS Graduate Student Lunch with the Experts, DQI](#), APS March Meeting, Chicago, IL, (March 15, 2022).
- ◇ [“A launchpad for flying qubits”](#), (popular science article in MSUTODAY) (July 27th, 2021).
- ◇ [MSU NatSci 2021 Classes Without Quizzes Event: Building Quantum Technologies ... One Electron at a Time](#), (quantum computing public outreach) (April 24th, 2021).
- ◇ [MSU NatSci Virtual Alumni Event: MSU’s Quantum Leap](#), (quantum computing public outreach) (May 14th, 2020).
- ◇ [MSU Classes without Quizzes](#), (quantum computing public outreach) (April 25th, 2020) (canceled due to COVID-19 pandemic).
- ◇ [Invisible Quantum World](#), (quantum physics public outreach) (April 4th, 2020) (canceled due to COVID-19 pandemic).
- ◇ [ThinkQuantum](#), NSF supported (DMR-1708331) broader impacts blog on quantum science.
- ◇ [Time for Quantum MSU SciFest Expo Zone Booth](#), (quantum physics public outreach) (April 6th, 2019).
- ◇ [Spartans on Stranger Things: Johannes Pollanen](#), (quantum physics outreach video) (October 25, 2017).
- ◇ [APS Graduate Student Lunch with the Experts, DCMP](#), APS March Meeting, Baltimore, MD, (March 15, 2016).
- ◇ [IQIM Presents: Greater Than Its Parts](#) (outreach video), (January 21, 2016).
- ◇ [IQIM News: Eisenstein group demonstrates method to control orientation of exotic quantum states](#), (November 15, 2015).
- ◇ [Outreach interview for the Institute for Quantum Information \(IQIM\) and Matter at Caltech](#), (July 2015).
- ◇ [Promotional/Outreach Video: Institute for Quantum Information and Matter \(IQIM\) at Caltech](#), (September 18, 2014).
- ◇ [Northwestern University NANO-DAY: Low temperature physics demonstrations for high school students](#), (March 22, 2006).