

Curriculum Vitae

Wei Guo

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General Information

University address: Mechanical Engineering
FAMU-FSU College of Engineering
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Florida State University
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Professional Preparation

- 2008 Doctoral Degree, Brown University. Major: Physics. Supervisor: H.J. Maris.
- 2004 Master of Science, Brown University. Major: Physics. Supervisor: H.J. Maris.
- 2002 Bachelor of Science, Wuhan University. Major: Physics.

Nondegree Education and Training

- 2008–2012 Yale University Physics Department (with Prof. Daniel McKinsey).

Professional Experience

- 2018–present Associate Professor, Florida State University.
- 2012–2018 Assistant Professor, Mechanical Engineering, Florida State University.
- 2010–2012 Associate Research Scientist, Physics, Yale University.
- 2008–2010 Postdoctoral Associate, Physics, Yale University.
- 2002–2008 Teaching/ Researching Assistant, Physics, Brown University Providence.

Honors, Awards, and Prizes

Invitation Fellowships for Research in Japan, Japan Society for the Promotion of Science (JSPS) (2017).

FSU CRC Planning Grant Award, Florida State University (2015).

FSU CRC First Year Assistant Professor Award, Florida State University (2013).

Coline M. Makepeace Dissertation Fellowship, Brown University (2007).

Zhang-Ren Huang Scholarship, Wuhan University (2001).

First-Prize RenMing Scholarship, Wuhan University (2000).

Current Membership in Professional Organizations

American Physical Society

Cryogenic Society of America

Teaching

Courses Taught

Cryogenics (EML5162)

Cryogenics (EML4161)

Directed Individual Study (PHY5909)

Fundamentals of Heat Transfer (EML5152)

Fundamentals of Heat Transfer (EML5152)

HighReynoldsTurbulentPipeFlow (EML5905)

Convective Heat and Mass Transfer (EML5155)

Fundamentals of Heat Transfer (EML5152)

Directed Individual Study (PHY5904)

Cryogenics Research (EML5930)

Helium Cell Dsgn for Cryognc (EML4905)

Fundamentals of Heat Transfer (EML5152)

Cryogenics (EML4930)

Fundamentals of Heat Transfer (EML5152)

Thermal Fluids II (EML3016C)

Thermal Fluids II (EML3016C)

Fundamentals of Heat Transfer (EML5152)

Thermal Fluids II (EML3016C)

Fundamentals of Heat Transfer (EML5152)

Mechanical Engineering Seminars (EML5935)

Mechanical Engineering Seminars (EML5935)

Mechanical Engineering Tools (EML3002)

Mechanical Engineering Tools (EML3002)

Thermodynamics (EML3100)

New Course Development

Convective Heat and Mass Transfer (2020)

Doctoral Committee Chair

Mastracci, B. P., graduate. (2018). *Application of Particle Tracking Velocimetry to Thermal Counterflow and Towed-grid Turbulence In Helium II.*

Gao, J., graduate. (2017). *Visualization Study of Thermal Counterflow Turbulence in Superfluid 4He.*

Garceau, N. M., doctoral candidate.

Sanavandi, H., doctoral candidate.

Doctoral Committee Cochair

Kanai, T., doctoral candidate.

Hulse, M., doctoral student.

Doctoral Committee Member

Mendoncafagundes, T., graduate. (2021).

Zhai, C., graduate. (2020). *Understanding Slow Dynamics in Polymers Using Coarse-grained Molecular Dynamics Simulations: Microphase Separation in Block Copolyelectrolytes and Photo-Switching in Azobenzene-polymers.*

Bhattarai, K. R., graduate. (2019). *Understanding Multi-physics of Quench in "No-insulation" Rare Earth Barium Copper Oxide Superconducting Magnets.*

Sensoy Cellat, T. S., graduate. (2018).

Suttell, N. G., graduate. (2017).

Chen, P., graduate. (2016).

Dhuley, R., graduate. (2016). *Gas Propagation in a Liquid Helium Cooled Vacuum Tube Following a Sudden Vacuum Loss.*

Galeano Cabral, J. R., doctoral student.

Master's Committee Chair

Wray, A. C., graduate. (2016). *Development of Operations Manual and Restoration of Low Gravity Simulator Magnet.*

Master's Committee Member

- Liaquat, K., graduate. (2021). *Modeling, Optimization, and Software Development for Concentrated Solar Power Plants*.
- Francis, A., graduate. (2019). *Variable Temperature Transport Critical Current Measurement on REBCO Coated Conductors*.
- Woerner, P. C., graduate. (2016).
- Hurd, J., graduate. (2013).
- Shah, D. R., graduate. (2013).

Supervision of Student Research Not Related to Thesis or Dissertation

- Park, S. (May 2017–present).
- Yeung, O. (May 2017–present).
- Chen, Q. (Apr 2017–present).
- Zhu, S. (Oct 2019–May 2020).
- Roby, C. (Sep 2019–May 2020).
- Wang, J. (May–Aug 2019).
- Kline, T. (Sep 2017–Aug 2019).
- Keijzer, R. (Apr–Oct 2018).
- Dodamead, T. (Feb 2016–Aug 2017).
- Ross, J. (Sep 2016–May 2017).
- W. Guo served as the project advisor of the BS-MS program that Ross was enrolled.
- Ledeboer, K. (Jul 2016–Jan 2017).
- Varga, E. (Jan 2016–Jan 2017).
- Visiting student from Charles University in Prague.
- Kurteva, D. (May–Dec 2016).
- Tamayo, D. (Apr–Aug 2015).
- Summer undergraduate research assistant.

Kiefer, M. (Jan–Dec 2014).

Undergraduate research assistant.

Marakov, A. (Apr 2013–Sep 2014).

Visiting Ph.D. Student from University of Florida.

ebere, O. (May–Aug 2014).

NSF REU summer program.

Baker, D. (Jan–Dec 2013).

Undergraduate research assistant.

Pawlowski, B. T. (Jun–Sep 2013).

Undergraduate research assistant/NSF-REU summer student.

Additional Teaching Not Reported Elsewhere

Guo, W. (2020). *Presented an invited short course on "Helium cryogenics" at the the 2020 International Applied Superconductivity Conference.*

Research and Original Creative Work

Publications

Refereed Journal Articles

Zhou, X., Koolstra, K., Zhang, X., Yang, G., Han, X., Dizdar, B., Ralu, D., Guo, W., Murch, K. W., Schuster, D. I., & Jin, D. (submitted). Electron on solid neon - a new solid-state single-electron qubit platform. *Nature*. Manuscript submitted for publication, 7 pages.

This collaborative work among four institutes (D. Jin (ANL), W. Guo (FSU), D. Schuster (U. Chicago), K. Murch (U. Washington St. Louis)) reports a new qubit system based on electrons trapped on solid neon surface. (arXiv:2106.10326).

Tesseract Collaboration:, Biekert, A., Chang, C., Fink, C. W., Garcia-Sciveres, M., Glazer, E. C., Guo, W., et al. (submitted). Scintillation yield from electronic and nuclear recoils in superfluid 4He. *Phys. Rev. D*. Manuscript submitted for publication.

This paper reports the progress made by the Tesseract Collaboration among 6 institutes (D. McKinsey and M. Pyle (Berkeley); W. Guo (FSU); C. Chang (ANL); S. Hertel (UMass); R. Mahapatra (TAMU); B. Penning (Brandeis Univ.)) in developing LHe based dark matter detector.

Yui, S., Tang, Y., Guo, W., Kobayashi, H., & Tsubota, M. (submitted). Universal turbulent diffusion in quantum fluids. *Phys. Rev. Lett.* Manuscript submitted for publication, 5 pages.

This paper reports the discovery of a universal turbulent diffusion in quantum fluid turbulence. The collaborators include Dr. Yui and Prof. Kobayashi from Keio University and Prof. Tsubota from Osaka City University.

Sanavandi, H., & Guo, W. (2021). A magnetic levitation based low-gravity simulator with an unprecedented large functional volume. *npj Microgravity*, 7, 40. Retrieved from <https://doi.org/10.1038/s41526-021-00174-4> doi:10.1038/s41526-021-00174-4

This work reports a novel design of a magnetic levitation based low-gravity simulator that has a functional volume three orders of magnitude larger than that for convention ones.

Tang, Y., Guo, W., L'vov, V. S., & Pomyalov, A. (2021). Eulerian and Lagrangian second-order statistics of superfluid 4He grid turbulence. *Phys. Rev. B*, 103, 144506. doi:10.1103/PhysRevB.103.144506

This work reports a bridging technique that allows us to extract both structure function and energy spectrum information from PTV measurement of He II turbulence. Collaborators include Prof. L'vov and Prof. Pomyalov from the Weizmann Institute of Science in Israel.

Garceau, N., Bao, S., & Guo, W. (2021). Heat and mass transfer during a sudden loss of vacuum in a liquid helium cooled tube - Part III: Heat deposition in He II. *Int. J. Heat Mass Tran*, 181, 121885. Retrieved from <https://doi.org/10.1016/j.ijheatmasstransfer.2021.121885> doi:10.1016/j.ijheatmasstransfer.2021.121885

This work reports our experimental measurement and numerical modeling of the propagation and heat/mass deposition of a condensing gas a vacuum tube immersed in He II.

Tang, Y., Bao, S., & Guo, W. (2021). Superdiffusion of quantized vortices uncovering scaling laws in quantum turbulence. *Proc. Natl. Acad. Sci*, 118, e2021957118. Retrieved from <https://doi.org/10.1073/pnas.2021957118> doi:10.1073/pnas.2021957118

This work studies superdiffusion of tracer particles trapped on quantized vortex lines in superfluid helium-4.

Bao, S., & Guo, W. (2021). Transient heat transfer of superfluid 4He in non-homogeneous geometries: Second sound, rarefaction, and thermal layer. *Phys. Rev. B*, 103, 134510. Retrieved from <https://doi.org/10.1103/PhysRevB.103.134510> doi:10.1103/PhysRevB.103.134510

This work reports a numerical study of transient heat transfer in superfluid helium-4 in non-homogeneous geometries.

Kanai, T., & Guo, W. (2021). True Mechanism of Spontaneous Order from Turbulence in Two-Dimensional Superfluid Manifolds. *Phys. Rev. Lett*, 127, 095301. Retrieved from <https://doi.org/10.1103/PhysRevLett.127.095301> doi:10.1103/PhysRevLett.127.095301

This theoretical work explains the true mechanism responsible for the spontaneous formation of Onsager vortex order in two-dimensional superfluid turbulence.

Sanavandi, H., Bao, S., Zhang, Y., Keijzer, R., Guo, W., & Cattafesta, L. N. (2020). A cryogenic-helium pipe flow facility with unique double-line molecular tagging velocimetry capability. *Rev. Sci. Instrum*, *91*, 053901. Retrieved from <https://doi.org/10.1063/5.0008117> doi:10.1063/5.0008117

This is collaborative work with colleague Prof. Cattafesta on testing a helium pipe flow facility.

Sonnenschein, V., Tsuji, Y., Kokuryu, S., Kubo, W., Suzuki, S., Tomita, H., Kiyonagi, Y., Iguchi, T., Matsushita, T., Wada, N., Kitaguchi, M., Shimizu, H., Hirota, K., Shinohara, T., Hiroi, K., Hayashida, H., Guo, W., Ito, D., & Saito, Y. (2020). An experimental setup for creating and imaging 4He_2 excimer cluster tracers in superfluid Helium-4 via neutron- 3He absorption reaction. *Rev. Sci. Instrum*, *91*, 033318. Retrieved from <https://doi.org/10.1063/1.5130919> doi:10.1063/1.5130919

This is a collaborative research with scientists from Nagoya University and a few other institutes in Japan using the JPARC neutron facility.

Yui, S., Kobayashi, M., Tsubota, M., & Guo, W. (2020). Fully coupled dynamics of the two fluids in superfluid 4He : Anomalous anisotropic velocity fluctuations in counterflow. *Phys. Rev. Lett*, *124*, 155301. Retrieved from <https://doi.org/10.1103/PhysRevLett.124.155301> doi:10.1103/PhysRevLett.124.155301

This is collaborative work on numerical study of counterflow in superfluid helium-4.

Bao, S., Garceau, N., & Guo, W. (2020). Heat and mass transfer during a sudden loss of vacuum in a liquid helium cooled tube - Part II: Theoretical modeling. *Int. J. Heat Mass Tran*, *146*, 118883. doi:10.1016/j.ijheatmasstransfer.2019.118883

This is work we conducted to understand the gas propagation and heat transfer in accelerator beamline tubes cooled by cryogenic helium.

Wen, X., Bao, S., McDonald, L., Pierce, J., Greene, G. L., Crow, L., Tong, X., Mezzacappa, A., Glasby, R., Guo, W., & Fitzsimmons, M. R. (2020). Imaging fluorescence of 4He_2 excimers created by neutron capture in liquid helium II. *Phys. Rev. Lett*, *124*, 134502. Retrieved from <https://doi.org/10.1103/PhysRevLett.124.134502> doi:10.1103/PhysRevLett.124.134502

This is a collaborative research between our group (Dr. Bao and Prof. Guo) and the team at Oak Ridge National Lab. This work has been accepted for publication in *Phys. Rev. Lett.* and has been selected as a Editor's Suggestion article.

Guo, W., & Golov, A. I. (2020). Shape fluctuations and optical transition of He_2^* excimer tracers in superfluid 4He . *Phys. Rev. B*, *101*, 064515. Retrieved from <https://doi.org/10.1103/PhysRevB.101.064515> doi:10.1103/PhysRevB.101.064515

This is a work I produced during my sabbatical visit at Prof. Golov's group at University of Manchester in UK.

Tang, Y., Bao, S., Kanai, T., & Guo, W. (2020). Statistical Properties of Homogeneous and Isotropic Turbulence in He II Measured via Particle Tracking Velocimetry. *Phys. Rev.*

Fluids, 5, 084602. Retrieved from <https://doi.org/10.1103/PhysRevFluids.5.084602>
doi:10.1103/PhysRevFluids.5.084602

This work studies the statistical properties of homogeneous and isotropic turbulence generated in He II by a towed grid using Particle Tracking Velocimetry flow visualization technique.

Bao, S., Kanai, T., Zhang, Y., Cattafesta III, L. N., & Guo, W. (2020). Stereoscopic detection of hot spots in superfluid helium-4 for accelerator-cavity diagnosis. *Int. J. Heat Mass Tran*, 161, 120259. Retrieved from <https://doi.org/10.1016/j.ijheatmasstransfer.2020.120259>
doi:10.1016/j.ijheatmasstransfer.2020.120259

This is a collaborative work with colleague Prof. Cattafesta on developing a novel visualization technique for superconducting cavity quench spot detection.

Kanai, T., Guo, W., Tsubota, M., & Jin, D. (2020). Torque and Angular Momentum Transfer in Merging Rotating Bose-Einstein Condensates. *Phys. Rev. Lett*, 124, 105302. Retrieved from <https://doi.org/10.1103/PhysRevLett.124.105302>
doi:10.1103/PhysRevLett.124.105302

This is collaborative work led by myself on numerical study of the merging dynamics of Bose condensates.

Mastracci, B., & Guo, W. (2019). Characterizing vortex tangle properties in steady-state He II counterflow using particle tracking velocimetry. *Phys. Rev. Fluid*, 4, 023301.
doi:10.1103/PhysRevFluids.4.023301

Selected as Editor's Suggestion.

Matsushita, T., Sonnenschein, V., Guo, W., Hayashida, H., Hiroi, K., Hirota, K., Iguchi, T., Ito, D., Kitaguchi, M., Kiyanagi, Y., Kokuryu, S., Kubo, W., Saito, Y., Shimizu, H. M., Shinohara, T., Suzuki, S., Tomita, H., Tsuji, Y., & Wada, N. (2019). Generation of 4He_2 Clusters via Neutron- 3He Absorption Reaction towards Visualization of Full Velocity Field in Quantum Turbulence. *J. Low Temp. Phys*, 196, 275. Retrieved from <https://doi.org/10.1007/s10909-018-02112-3> doi:10.1007/s10909-018-02112-3

This is a collaboration work on studying the generation of He_2 molecular tracer clouds in superfluid helium using neutron- 3He absorption reaction using the J-PARC neutron facility in Japan. W. Guo was involved in project design and data analysis.

Garceau, N., Bao, S., & Guo, W. (2019). Heat and mass transfer during a sudden loss of vacuum in a liquid helium cooled tube - Part I: Interpretation of experimental observations. *Int. J. Heat Mass Tran*, 129, 1144.
doi:10.1016/j.ijheatmasstransfer.2018.10.053

This work studies the propagation of condensate gas in a helium-cooled pipe.

Kanai, T., Guo, W., & Tsubota, M. (2019). Merging of rotating Bose-Einstein condensates. *J. Low Temp. Phys*, 195, 37. Retrieved from <https://doi.org/10.1007/s10909-018-2110-1>
doi:10.1007/s10909-018-2110-1

This work discusses the soliton dynamics in the merging of rotating BECs. It is a collaborative work with

Prof. Tsubota from Osaka City University in Japan.

Guo, W. (2019). Molecular Tagging Velocimetry in Superfluid Helium-4: Progress, Issues, and Future Development. *J. Low Temp. Phys*, 196, 60. Retrieved from <https://doi.org/10.1007/s10909-018-2102-1> doi:10.1007/s10909-018-2102-1

This work reviews the progress made in our lab on developing molecular tagging velocimetry technique for superfluid helium-4 research.

Mastracci, B., Bao, S., Guo, W., & Vinen, W. F. (2019). Particle tracking velocimetry applied to thermal counterflow in superfluid 4He: motion of the normal fluid at small heat fluxes. *Phys. Rev. Fluids*, 4, 083305. doi:10.1103/PhysRevFluids.4.083305

This is a theoretical work on result interpretation of our PTV experiment.

Bao, S., & Guo, W. (2019). Quench spot detection for superconducting accelerator cavities via flow visualization in superfluid helium-4. *Phys. Rev*, 11, 044003. doi:10.1103/PhysRevApplied.11.044003

This is a experimental and modeling work on developing new technique for accelerator quench spot detection.

Garceau, N., Bao, S., Guo, W., & Van Sciver, S. W. (2019). The design and testing of a liquid helium cooled tube system for simulating sudden vacuum loss in particle accelerators. *Cryogenics*, 100, 92. doi:10.1016/j.cryogenics.2019.04.012

This work reports our new design of the vacuum beam system.

Mastracci, B., & Guo, W. (2018). An apparatus for generation and quantitative measurement of homogeneous isotropic turbulence in He II. *Rev. Sci. Instrum*, 89, 015107. Retrieved from <http://aip.scitation.org/doi/10.1063/1.4997735> doi:10.1063/1.4997735

This work reports our design and fabrication of an instrument for studying homogeneous isotropic turbulence.

Mastracci, B., & Guo, W. (2018). An exploration of thermal counterflow in He II using particle tracking velocimetry. *Phys. Rev. Fluid*, 3, 063304. doi:10.1103/PhysRevFluids.3.

This work studies solidified tracer particle dynamics in thermal counterflow in superfluid helium-4.

Gao, J., Guo, W., Vinen, W. F., Yui, S., & Tsubota, M. (2018). Dissipation in quantum turbulence in superfluid 4He. *Phys. Rev. B*, 97, 184518. doi:10.1103/PhysRevB.97.184518

This work studies the dissipation mechanism in superfluid helium-4. It was conducted in collaboration with Prof. Tsubota from Osaka City University and Prof. Vinen from University of Birmingham.

Kanai, T., Guo, W., & Tsubota, M. (2018). Flows with fractional quantum circulation in Bose-Einstein condensates induced by nontopological phase defects. *Phys. Rev. A*, *97*, 013612. Retrieved from <https://journals.aps.org/pr/abstract/10.1103/PhysRevA.97.013612>
doi:10.1103/PhysRevA.97.013612

This work is a numerical simulation of Bose-Einstein Condensate dynamics. It was conducted in collaboration with Prof. Tsubota and his student Kanai from Osaka City University.

Varga, E., Gao, J., Guo, W., & Skrbek, L. (2018). Intermittency enhancement in quantum turbulence in superfluid 4He. *Phys. Rev. Fluids*, *3*, 094601.
doi:10.1103/PhysRevFluids.3.094601

This work studies the turbulence intermittency in towed-grid generated quantum turbulence in superfluid helium-4. It was conducted in collaboration with Prof. Skrbek from Charles University in Czech Republic.

Bao, S., Guo, W., L'vov, V. S., & Pomyalov, A. (2018). Statistics of turbulence and intermittency enhancement in superfluid 4He counterflow. *Phys. Rev. B*, (arXiv:1810.00507), *98*, 174509. doi:10.1103/PhysRevB.98.174509

This work reports the statistics and intermittency behavior of superfluid helium-4 counterflow turbulence. Collaborators include Prof. L'vov and Prof. Pomyalov from the Weizmann Institute of Science in Israel.

Gao, J., Varga, E., Guo, W., & Vinen, W. F. (2017). Energy Spectrum of Thermal Counterflow Turbulence in Superfluid Helium-4. *Phys. Rev. B*, *96*, 094511.

This work studies the energy spectrum in counterflow in superfluid helium-4. It was conducted in collaboration Prof. Vinen from University of Birmingham.

Gao, J., Varga, E., Guo, W., & Vinen, W. F. (2017). Statistical measurement of counterflow turbulence in superfluid helium-4 using He2 tracer-line tracking technique. *J. Low Temp. Phys*, *187*, 490. doi:10.1007/s10909-016-1681-y

This work reports preliminary study of counterflow spectrum in superfluid helium-4. It was conducted in collaboration with Prof. Vinen from University of Birmingham.

Mastracci, B., Takada, S., & Guo, W. (2017). Study of particle motion in He II counterflow across a wide heat flux range. *J. Low Temp. Phys*, *187*, 446.
doi:10.1007/s10909-016-1734-2

This work reports our study on tracer particle motion in counterflow in superfluid helium-4.

Gao, J., Guo, W., L'Vov, V. S., Pomyalov, A., Skrbek, L., Varga, E., & Vinen, W. F. (2016). Challenging Problem in Quantum Turbulence: Decay of Counterflow in Superfluid 4He. *JETP Letters*, *103*, 732 (2016), *103*, 732.

This work reports experimental and theoretical study of decaying counterflow in superfluid helium-4. It was conducted in collaboration with Prof. Vinen from University of Birmingham, Prof. Skrbek from Charles University in Czech Republic, Prof. L'vov and Prof. Pomyalov from Weizmann Institute of Science in Israel.

Gao, J., Guo, W., & Vinen, W. F. (2016). Determination of the effective kinematic viscosity for the decay of quasiclassical turbulence in superfluid 4He. *Physical Review B*, *94*, 094502.

This work reports our measurement of effective viscosity in superfluid helium-4. It was conducted in collaboration with Prof. Vinen from University of Birmingham.

Gao, J., Marakov, A., Guo, W., Pawlowski, B. T., Van Sciver, S. W., Ihas, G. G., McKinsey, D. N., & Vinen, W. F. (2015). Producing and Imaging a Thin Line of He2 Tracer Molecules in Helium-4. *Review of Scientific Instruments*, *86*, 093904.

This work reports the development of a tracer line tracking instrument for flow visualization in superfluid helium-4. It was conducted in collaboration with Prof. Van Sciver from FSU, Prof. Ihas from University of Florida, Prof. McKinsey from Yale University, and Prof. Vinen from University of Birmingham.

Marakov, A., Gao, J., Guo, W., Van Sciver, S. W., Ihas, G. G., McKinsey, D. N., & Vinen, W. F. (2015). Visualization of the normal-fluid turbulence in counterflowing superfluid 4He. *Phy. Rev. B*, *91*, 094503.

This work reports flow visualization study of counterflow in superfluid helium-4. It was conducted in collaboration with Prof. Van Sciver from FSU, Prof. Ihas from University of Florida, Prof. McKinsey from Yale University, and Prof. Vinen from University of Birmingham.

Guo, W., Lathrop, D. P., La Mantia, M., & Van Sciver, S. W. (2014). Visualization of two-fluid flows of superfluid helium-4 at finite temperatures. *Proc. Natl. Acad. Sci*, *111*, 4653. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3970863/> doi:10.1073/pnas.1312546111

This work reviews recent years development of flow visualization techniques in superfluid helium-4. It was conducted in collaboration with Prof. Van Sciver from FSU, Prof. Lathrop from University of Maryland, Dr. La Mantia from Charles University in Czech Republic.

Zmeev, D. E., Pakpour, F., Walmsley, P. M., Golov, A. I., Guo, W., McKinsey, D. N., Ihas, G. G., Vinen, W. F., & McClintock, P. V. E. (2013). Capture of He2 Molecules by Vortex Lines in Superfluid 4He at T=0.2K. *Phys. Rev. Lett*, *110*, 175303.

This work reports the trapping of He2 molecular tracers on quantized vortices in superfluid helium-4. It was conducted in collaboration with Prof. Golov from Manchester University in UK, Prof. McClintock from Lancaster University in UK, Prof. Ihas from University of Florida, Prof. McKinsey from Yale University, and Prof. Vinen from University of Birmingham.

Guo, W., & McKinsey, D. N. (2013). Concept for A Dark Matter Detector Using Liquid Helium-4. *Phys. Rev. D*, *87*, 115011.

This work discusses the feasibility of using superfluid helium-4 as target material for dark matter detection. It was conducted in collaboration with Prof. McKinsey from Yale University.

Zmeev, D. E., Pakpour, F., Walmsley, P. M., Golov, A. I., McClintock, P. V. E., Fisher, S. N., Guo, W., McKinsey, D. N., Ihas, G. G., & Vinen, W. F. (2013). Observation of Crossover from Ballistic to Diffusion Regime for Excimer Molecules in Superfluid 4He. *J. Low. Temp. Phys*, *171*, 207. doi:10.1007/s10909-012-0720-6

This work reports the motion of He2 molecular tracers in superfluid helium-4. It was conducted in

collaboration with Prof. Golov from Manchester University in UK, Prof. McClintock and Prof. Fisher from Lancaster University in UK, Prof. Ihas from University of Florida, Prof. McKinsey from Yale University, and Prof. Vinen from University of Birmingham.

Guo, W., McKinsey, D. N., Marakov, A., Thompson, K. J., Ihas, G. G., & Vinen, W. F. (2013). Visualization technique for determining the structure functions of normal fluid turbulence in superfluid helium-4. *J. Low. Temp. Phys.*, *171*, 497.
doi:10.1007/s10909-012-0708-2

This work reports the concept of a tracer line tracking technique for flow visualization in superfluid helium-4. It was conducted in collaboration with Prof. Ihas from University of Florida, Prof. McKinsey from Yale University, and Prof. Vinen from University of Birmingham.

Jin, D., & Guo, W. (2012). Finite-temperature density functional study of electron self-trapping in 3He and 4He. *J. Chem. Phys.*, *136*, 244510.

This work reports the self-trapping of electrons in helium-3 and helium-4. It was conducted in collaboration with Dr. Jin from Brown University.

Guo, W., Dufault, M., Cahn, S. B., Nikkel, J. A., Shin, Y., & McKinsey, D. N. (2012). Scintillation and charge extraction from the tracks of energetic electrons in superfluid helium-4. *JINST*, *7*, P01002.

This work reports the extraction of charges from Beta decay events in superfluid helium. It was conducted with Prof. McKinsey from Yale University.

Guo, W., Cahn, S. B., Nikkel, J. A., Vinen, W. F., & McKinsey, D. N. (2010). Visualization study of counterflow in superfluid 4He using metastable helium molecules. *Phys. Rev. Lett.*, *105*, 045301.

Jin, D., & Guo, W. (2010). Vortex nucleation induced phonon radiation from a moving electron bubble in superfluid 4He. *Phys. Rev. B*, *82*, 094524.

Jin, D., Guo, W., Wei, W., & Maris, H. J. (2009). Electrons in Superfluid Helium-4. *J. Low Temp. Phys.*, *158*, 307.

Guo, W., Jin, D., Seidel, G. M., & Maris, H. (2009). Experiments with single electrons in liquid helium. *Phys. Rev. B*, *79*, 054515.

Guo, W., Wright, J. D., Cahn, S. B., Nikkel, J. A., & McKinsey, D. N. (2009). Metastable Helium Molecules as Tracers in Superfluid He-4. *Phys. Rev. Lett.*, *102*, 235301.

Guo, W., Wright, J. D., Cahn, S. B., Nikkel, J. A., & McKinsey, D. N. (2009). Studying the normal-fluid flow in Helium-II using metastable helium molecules. *J. Low temp. Phys.*, *158*, 346.

Guo, W., Jin, D., & Maris, H. (2008). Stability of multielectron bubbles in liquid helium. *Phys. Rev. B*, *78*, 014511.

- # Guo, W., & Maris, H. (2007). Calculation of the Cross-Section for Optical Transitions of Electron Bubble to D States. *J. Low. Temp. Phys*, 148, 213.
- # Maris, H., & Guo, W. (2007). Calculation of the Shape of S-State Electron Bubbles in Liquid Helium. *J. Low temp. Phys*, 148, 207.
- # Guo, W., Jin, D., Wei, W., & Maris, H. (2007). Low-Temperature piezoelectric and dielectric properties of lead magnesium niobate lead titanate (PMN-xPT). *J. Appl. Phys*, 102, 084104.
- # Guo, W., & Maris, H. (2007). Observations of the Motion of Single Electrons in Liquid Helium. *J. Low Temp. Phys*, 148, 199.
- # Maris, H., & Guo, W. (2004). The Shape of Electro Bubbles in Liquid Helium and the Line Width of Optical Transitions. *J. Low Temp. Phys*, 137, 491.

Refereed Proceedings

Garceau, N., Bao, S., & Guo, W. (2020). Effect of mass flow rate on gas propagation after vacuum break in a liquid helium cooled tube. In John Weisend (Ed.), *2019 International Cryogenic Engineering Conference* (pp. 012112). Hartford, CT, USA. Retrieved from <https://doi.org/10.1088/1757-899X/755/1/012112>

IOP Conf. Proc: Mater. Sci. Eng., 755, 012112 (2020).

Garceau, N., Guo, W., & Dodamead, T. (2017). Gas propagation following a sudden loss of vacuum in a pipe cooled by He I and He II. In *2017 Cryogenic Engineering Conference, Madison, WI, USA* (pp. 012081). IOP Conf. Proc: Mater. Sci. Eng. Retrieved from <http://iopscience.iop.org/article/10.1088/1757-899X/278/1/012068/meta>

This work reports experiment study of gas propagation in a pipe cooled by cryogenic helium in both the normal and the superfluid states.

Vanderlaan, M., Stubbs, D., Ledeboer, K., Ross, J., Van Sciver, S., & Guo, W. (2017). Repeatability Measurements of Apparent Thermal Conductivity of Multilayer Insulation (MLI). In *2017 Cryogenic Engineering Conference, Madison, WI, USA* (pp. 012195). IOP Conf. Ser.: Mater. Sci. Eng. Retrieved from <http://iopscience.iop.org/article/10.1088/1757-899X/278/1/012195/meta>

This work reports the data of repeatability measurements of the thermal conductivity of multilayer insulation materials.

Johnson, W. L., Vanderlaan, M., Wood, J. J., Rhys, N. O., Guo, W., Van Sciver, S., & Chato, D. J. (2017). Repeatability of Cryogenic Multilayer Insulation. In *2017 Cryogenic Engineering Conference, Madison, WI, USA* (pp. 012196). IOP Conf. Ser.: Mater. Sci. Eng. Retrieved from <http://iopscience.iop.org/article/10.1088/1757-899X/278/1/012196/meta>

This work is in collaboration with research scientists at NASA, including Johnson, W.L., Wood, J.J., Rhys, N.O., Chato, D.J. The paper reports the measurement results of thermal conductivity of cryogenic multilayer insulation materials.

Mastracci, B., & Guo, W. (2017). Visualization of grid-generated turbulence in He II using PTV. In *2017 Cryogenic Engineering Conference, Madison, WI, USA* (pp. 012081). IOP Conf. Proc: Mater. Sci. Eng. Retrieved from <http://iopscience.iop.org/article/10.1088/1757-899X/278/1/012081/meta>

This work reports the preliminary results of visualization study of towed grid generated turbulence in He II using particle tracking velocimetry (PTV) technique.

- # Guo, W., Jin, D., Seidel, G. M., & Maris, H. (2009). Experiments with single electrons in liquid helium. In *24th International Conference on Low Temperature Physics* (pp. 022020). J.Phys. Conf. Ser. 105.
- # Guo, W., Jin, D., & Maris, H. (2009). Theory of the stability of multielectron bubbles in liquid helium. In *25th International Conference on Low Temperature Physics* (pp. 032027). J. Phys.: Conf. Ser., 150.
- # Guo, W., Jin, D., & Maris, H. (2007). Using Sound Waves to Make Movies of an Electron. In *2007 Phonon Conference* (pp. 012001). J. Phys.: Conf. Ser., 92, France.
- # Guo, W., & Maris, H. (2006). Calculation of the Cross-Section for the 1S-2P Transition of an Electron Bubble in Helium II. In *AIP Conference Proc. 850* (pp. 165). USA.
- # Guo, W., & Maris, H. (2006). Properties of Moving Electron Bubbles in Superfluid Helium. In *AIP Conf. Proc. 850* (pp. 161). USA.

Presentations

Nonrefereed Papers at Conferences

For nonrefereed papers at conferences, 100.0% were international in scope.

Mastracci, B. P., & Guo, W. (presented 2015, September). *Experimental methods for PTV measurement of various liquid helium flows*. Paper presented at 11th International Symposium on Particle Image Velocimetry, University of Washington, University of Notre Dame, Purdue University, Arizona State University, University of Minnesota, University of California Santa Barbara, Santa Barbara, CA USA. (International)

Gao, J., Marakov, A., Guo, W., Van Sciver, S., Ihas, G., McKinsey, D., & Vinen, W. (presented 2014, March). *Flow visualization in superfluid helium-4 using a thin line of He2 excimer tracers*. Paper presented at American Physical Society March Meeting, American Physical Society, Denver, USA. (International)

Gao, J., Marakov, A., Guo, W., Van Sciver, S., Ihas, G., McKinsey, D., & Vinen, W. (presented 2014, March). *Visualization study of the normal-fluid motion in superfluid helium-4*. Paper presented at American Physical Society March Meeting, American Physical Society. (International)

Invited Keynote and Plenary Presentations at Conferences

For invited keynote and plenary presentations at conferences, 100.0% were international in scope.

Guo, W., Tang, Y., Bao, S., & Kanai, T. (presented 2021, August). *Studying quantum turbulence in superfluid helium-4 using particle tracking velocimetry*. Keynote presentation at 2021 International Conference on Quantum Fluids and Solids, Indian Institute of Science, Bangalore, India, Zoom online meeting. (International) Retrieved from <http://qfs2021.cense.iisc.ac.in/schedule.html>

Guo, W. (presented 2018, August). *Visualization study of quantum turbulence in superfluid helium-4: progress and future development*. Plenary presentation at International Conference on Quantum Fluids and Solids, The University of Tokyo, Tokyo, Japan. (International) Retrieved from <http://www.qfs2018.jp/program/>

Invited Keynote and Plenary Presentations at Symposia

For invited keynote and plenary presentations at symposia, 100.0% were international in scope.

Guo, W. (presented 2016, September). *Understanding quantum hydrodynamics: flow visualization in superfluid helium-4*. Keynote presentation in Dr. Taku MATSUSHITA (Chair), *IGER International Symposium on Science of Molecular Assembly and Biomolecular Systems*. Symposium conducted at the meeting of Physics Department, Nagoya University, Nagoya University, Japan. (International)

Invited Presentations at Conferences

For invited presentations at conferences, 100.0% were international in scope.

Kanai, T., & Guo, W. (presented 2021, August). *Torque and Angular Momentum Transfer in Merging Rotating Bose-Einstein Condensates*. Presentation at 2021 International Conference on Quantum Fluids and Solids, Indian Institute of Science, Bangalore, India, Zoom online meeting. (International)

Bao, S., & Guo, W. (presented 2021, July). *Detection of hot spots on accelerator cavities via flow visualization in superfluid 4He (He II)*. Presentation at 2021 Cryogenic

Engineering Conference (CEC/ICMC), Cryogenic Society of America, Zoom online meeting. (International)

Bao, S., & Guo, W. (presented 2021, July). *Understanding the freeze-out length for gas propagation in a liquid-helium-cooled tube*. Presentation at 2021 Cryogenic Engineering Conference (CEC/ICMC), Cryogenic Society of America, Zoom online meeting. (International)

Sanavandi, H., Guo, W., & Cattafesta, L. (presented 2019, November). *Molecular Tagging Velocimetry Study of High Reynolds Number Turbulent Pipe Flow in Cryogenic 4He*. Presentation at 72nd Annual Meeting of the APS Division of Fluid Dynamics, APS Division of Fluid Dynamics, Seattle, USA. (International)

Guo, W. (presented 2019, August). *Solving the puzzle of second-sound triangulation for hot-spot detection in superfluid helium-4*. Presentation at 2019 International Conference on Quantum Fluids and Solids, University of Alberta, Edmonton, Canada. (International)

Garceau, N. (presented 2019, July). *Effect of mass flow rate on gas propagation after vacuum break in a liquid helium cooled tube*. Poster presentation at 2019 Cryogenic Engineering Conference (CEC), Cryogenic Engineering Society, Hartford, CT, United States. (International) Retrieved from <https://www.cec-icmc.org/cec-icmc-2019>

Bao, S. (presented 2019, July). *Quench spot detection for SRF cavities via flow visualization in superfluid helium-4*. Presentation at 2019 Cryogenic Engineering Conference (CEC), Cryogenic Engineering Society, Hartford, CT, United States. (International) Retrieved from <https://www.cec-icmc.org/cec-icmc-2019>

This is a contributing talk.

Guo, W. (presented 2018, September). *Locating quench spot of SRF cavities using He2 molecular tracer-line tracking technique in superfluid helium*. Presentation at 27th International Cryogenic Engineering Conference (ICEC), Oxford University, Oxford University, United Kingdom. (International) Retrieved from <http://www.icec27-icmc2018.org/events/icec27-icmc-2018/event-summary-c3727f2e36794ac0bb91b26e73687e4e.aspx?i=69eaa91f-cf76-4b37-b9ea-b216e26a5000>

Mastracci, B. (presented 2017, July). *Visualization of grid-generated turbulence in He II using PTV*. Presentation at 2017 Cryogenic Engineering Conference, Cryogenic Engineering Conference (CEC) committee, Madison, WI, USA. (International)

Guo, W. (presented 2016, March). *Flow visualization in superfluid helium-4 using He2 molecules as tracers*. Presentation at American Physical Society March Meeting 2016, American Physical Society, Baltimore, MD, USA. (International)

Guo, W. (presented 2015, August). *Simultaneous study of the superfluid and the normal fluid in counterflowing superfluid helium-4*. Presentation at 2015 International Conference

on Quantum Fluids and Solids, New York University in Buffalo, Niagara Falls, NY, USA. (International) Retrieved from <http://www.physics.buffalo.edu/QFS2015/qfs2015.html>

- Guo, W. (presented 2014, August). *Flow Visualization in Superfluid Helium-4 Using a Thin Line of He2 Excimer Tracers*. Presentation at 27th International Conference on Low Temperature Physics, International Union of Pure & Applied Physics, Buenos Aires, Argentina. (International) Retrieved from <http://lt27.df.uba.ar/>
- # Guo, W. (presented 2011, August). *Flow visualization in superfluid He-4 using metastable helium molecules as tracers*. Presentation at 26th International Conference on Low Temperature Physics, International Union of Pure & Applied Physics, Beijing, China. (International)
- # Guo, W. (presented 2011, August). *He2 molecules laser-induced fluorescence and its applications*. Presentation at Ultra-Low Temperature Physics Conference, International Union of Pure & Applied Physics, Daejeon, Korea. (International)
- # Guo, W. (presented 2009, August). *Quantitative Study of the Normal-fluid Flow using He2 Molecules*. Presentation at International Symposium on Quantum Fluids and Solids, Northwestern University, Evanston, IL, USA. (International)

Nonrefereed Presentations at Conferences

For nonrefereed presentations at conferences, 100.0% were international in scope.

- Guo, W. (presented 2017, August). *Puzzling thermal counterflow turbulence in superfluid helium-4*. Poster presentation at The 28th International Conference on Low Temperature Physics, Chalmers University of Technology, International Union of Pure and Applied Physics (IUPAP), Gothenburg, Sweden. (International)
- Garceau, N. (presented 2017, July). *Gas propagation following a sudden loss of vacuum in a pipe cooled by He I and He II*. Poster presentation at 2017 Cryogenic Engineering Conference, Cryogenic Engineering Conference (CEC) committee, Madison, WI, USA. (International)

Invited Workshops

For invited workshops, 95.0% were international, 5.0% were national in scope.

- Tang, Y., & Guo, W. (2021, June). *Superdiffusion of quantized vortices in a random vortex tangle*. Workshop delivered at United Kingdom Quantum Fluids network webinar, Zoom online meeting (organized by Newcastle University). (International)
- Guo, W. (2021, June). *The true mechanism of spontaneous order from turbulence in two-dimensional superfluid*. Workshop delivered at United Kingdom Quantum Fluids

network webinar, Zoom online meeting (organized by Newcastle University).
(International)

Guo, W. (2020, January). *International Workshop on "Turbulence of All Kinds"*. Workshop delivered at Nambu Yoichiro Institute of Theoretical and Experimental Physics (NITEP), Osaka, Japan. (International) Retrieved from <https://sites.google.com/view/toak>

Presented an invited talk titled "Probing quantum turbulence in superfluid helium-4 using particle tracking velocimetry".

Guo, W. (2019, July). *ARO/AFOSR Joint Program Review Meeting*. Workshop delivered at Air Force Academy, Colorado Springs, USA. (International)

Presented an invited talk titled "Advanced molecular tagging velocimetry in cryogenic helium".

Kanai, T. (2019, April). *Workshop on Universal Themes of Bose-Einstein Condensation*. Workshop delivered at University of Pittsburgh, Pittsburgh, Pennsylvania, USA. (International) Retrieved from <https://www.mrs.org/ubec-2019/program-schedule/speakers>

Guo, W. (2019, April). *Workshop on Universal Themes of Bose-Einstein Condensation*. Workshop delivered at University of Pittsburgh, Pittsburgh, Pennsylvania, USA. (International) Retrieved from <https://www.mrs.org/ubec-2019/program-schedule/speakers>

Guo, W. (2019, March). *Quantum Turbulence: Cold Atoms, Heavy Ions, and Neutron Stars*. Workshop delivered at Institute for Nuclear Theory, University of Washington in Seattle, Seattle, United States. (International)

Invited review talk.

Guo, W. (2018, April). *Chasing tornadoes: vorticity above, below, and in the lab*. Workshop delivered at Newcastle University, Newcastle University, NE1 7RU, United Kingdom. (International) Retrieved from <https://conferences.ncl.ac.uk/chasingtornadoes/speakers/>

Guo, W. (2017, April). *Flow visualization in superfluid helium: progress, issues, and future development*. Workshop delivered at Quantum Turbulence Workshop, National High Magnetic Field Laboratory. (International) Retrieved from <https://nationalmaglab.org/news-events/events/for-scientists/quantum-turbulence-workshop>

Guo, W. (2016, May). *Very Cold Neutron Source for the Second Target Station Workshop*. Workshop delivered at Oak Ridge National Lab, Oak Ridge National Lab. (International)

Talk title "Possible application of neutron in the study of quantum fluid hydrodynamics".

- Guo, W. (2015, September). *Interpretation of measurements in superfluid turbulence of He4*. Workshop delivered at DSM/IRAMIS, Unité de Recherche Associée au CNRS, CEA Saclay, L'Orme des Merisiers, Amphitheatre Claude Bloch. (International) Retrieved from <http://homepages.warwick.ac.uk/~masbu/minimal-grey/editable.html#!page-home>
- Guo, W. (2015, August). *Grand Challenges in Quantum Fluids and Solids Workshop*. Workshop delivered at National Science Foundation, 101 Baldy Hall of the University at Buffalo. (International) Retrieved from <http://sites.psu.edu/qfs2015/>
- Guo, W. (2014, December). *Workshop on New Perspectives in Quantum Turbulence: experimental visualization and numerical simulation*. Workshop delivered at Nagoya University, Nagoya, Japan. (International) Retrieved from <http://www.math.nagoya-u.ac.jp/en/research/conference/2014/quantum-turb.html>
Talk title: Molecular tagging velocimetry in superfluid helium-4.
- Guo, W. (2014, May). *Quantum Turbulence and its Visualization*. Workshop delivered at New York University Abu Dhabi, Abu Dhabi, UAE. (International)
Talk title: Prospects for visualization below 1K with He2 excimer molecules.
- Guo, W. (2013, December). *1st ESA Workshop on the Physics of Microgravity Cryogenic Sloshing Motions*. Workshop delivered at European Space Agency, the European Space Research and Technology Centre (ESTEC), Noordwijk, The Netherlands. (International)
- Guo, W. (2013, November). *FCAAP Workshop and Polysonic Wind Tunnel Commissioning*. Workshop delivered at Florida Center for Advanced Aero-Propulsion, 2003, Levy Avenue, AME Building, Florida State University, Tallahassee FL 32310. (National)
- # Guo, W. (2012, July). *8th Patras Workshop on Axions, WIMPs and WISPs*. Workshop delivered at Fermi Lab and CERN, Chicago, IL, USA. (International)
- # Guo, W. (2012, May). *Workshop on Turbulence in Quantum Two-Fluid Systems*. Workshop delivered at New York University Abu Dhabi, Abu Dhabi, UAE. (International)
Talk title: New techniques for visualization study of normal-fluid turbulence in superfluid He-4 using metastable He2 molecules.
- # Guo, W. (2011, May). *Workshop on classical and quantum turbulence*. Workshop delivered at New York University Abu Dhabi, Abu Dhabi, UAE. (International)
Talk title: Visualization of quantum turbulence with He2 excimer molecules.
- # Guo, W. (2008, November). *Workshop on Visualizing Thermo-Fluid Dynamics at Low Temperature*. Workshop delivered at Florida State University, San Antonio, Texas, USA. (International)
Talk title: Imaging the flow in superfluid helium with Helium molecules.

Invited Lectures and Readings of Original Work

For invited lectures and readings of original work, 25.0% were international, 75.0% were local in scope.

Guo, W. (2021, October). *True mechanism of spontaneous order from turbulence in two-dimensional superfluid*. Delivered at Newcastle University, Zoom online meeting. (International)

Guo, W. (2021, October). *Visualization study of quantum fluid dynamics in superfluid 4He*. Delivered at IISc Quantum Technologies Initiative, Indian Institute of Science, Bangalore, India, Zoom online meeting. (International)

Guo, W. (2020, October). *Helium Cryogenics*. Delivered at 2020 International Applied Superconductivity Conference, Online Lecture. (International) Retrieved from <https://ascinc.org/conference-program/asc-short-courses/>

This is an invited short course for the 2020 International Applied Superconductivity Conference held online.

Guo, W. (2019, November). *Particle tracking velocimetry study of quantum turbulence in superfluid helium-4*. Delivered at University of Manchester, University of Manchester, United Kingdom. (Local)

Seminar talk at the Department of Physics.

Guo, W. (2019, November). *Visualization study of quantum fluid dynamics in superfluid helium-4*. Delivered at Lancaster University, Lancaster University, United Kingdom. (Local)

Seminar talk at the Physics Department.

Guo, W. (2019, October). *Merging of Rotating Bose Condensates*. Delivered at Birmingham University, Birmingham University, United Kingdom. (Local)

Seminar talk at the Department of Physics.

Guo, W. (2019, October). *Merging of Rotating Bose Condensates*. Delivered at Newcastle University, Newcastle University, United Kingdom. (Local)

Seminar talk at the Applied Math and Physics Department.

Guo, W. (2019, October). *Visualization study of quantum fluid dynamics in superfluid helium-4*. Delivered at East Anglia University, East Anglia University, United Kingdom. (Local)

Seminar talk at the Applied Math Department.

Guo, W. (2019, July). *Visualization study of quantum fluid dynamics in superfluid helium-4*. Delivered at Wuhan University, Wuhan University, Wuhan, China. (Local)

Seminar talk at the Department of Physics of Wuhan University.

- Guo, W. (2019, May). *Visualization study of quantum fluid dynamics in superfluid helium-4*. Delivered at National High Magnetic Field Laboratory, National High Magnetic Field Laboratory, Tallahassee, FL, USA. (International)
Condensed Physics Seminar.
- Guo, W. (2017, October). *Flow visualization in superfluid helium: progress and future development*. Delivered at University of Florida, Department of Physics, Gainesville, Florida. (Local)
- Guo, W. (2017, July). *Visualization study of quantum turbulence in superfluid helium*. Delivered at Nagoya University, Department of Mechanical Science & Engineering, Nagoya, Japan. (Local)
- Guo, W. (2017, June). *Flow visualization in superfluid helium: progresses and future development*. Delivered at Osaka City University, Department of Physics, Osaka City University, Japan. (Local)
- Guo, W. (2016, November). *Understanding quantum hydrodynamics: flow visualization in superfluid helium-4*. Delivered at Physics and Astronomy, University of Tennessee, University of Tennessee, Knoxville, TN. (Local)
- Guo, W. (2015, March). *Flow visualization in cryogenic helium-4*. Delivered at University of Wisconsin-Madison, Mechanical Engineering, Mechanical Engineering Department seminar room. (Local)
- Guo, W. (2013, July). *Concept for a dark matter detector using liquid helium-4*. Delivered at Los Alamos National Lab, Los Alamos National Lab. (Local)
- Guo, W. (2012, September). *Visualization study of quantum turbulence in superfluid He-4*. Delivered at University of Florida, Physics Department, University of Florida. (Local)
- # Guo, W. (2011, May). *Flow visualization in superfluid Helium-4*. Delivered at Institute of Natural Sciences, Shanghai Jiaotong University. (International)
- # Guo, W. (2010, May). *Thermal counterflow in superfluid Helium-4*. Delivered at Laboratoire de Physique Statistique de l'Ecole Normale Supérieure (ENS), Paris, France. (Local)
- # Guo, W. (2007, May). *Electron bubbles in liquid helium*. Delivered at MIT Physics Department. (Local)

Contracts and Grants

Contracts and Grants Funded

Guo, W. (Aug 2021–Jul 2024). *Stereoscopic visualization study of turbulence and vortex-tangle dynamics in He II*. Funded by National Science Foundation. (DMR-2100790). Total award \$521,489.

McKinsey, D. N., Guo, W., Chang, C., Hertel, S., Mahapatra, R., Pyle, M., & Penning, B. (Oct 2020–Sep 2024). *Searching for Interactions of Light Dark Matter Using Zero-Field Detectors with Transition Edge Sensor Readout*. Funded by US Department of Energy. (DE-AC02-05CH11231). Total award \$2,700,000.

This is a collaborative program on developing the next generation technology for dark matter detection.

Shoele, K., Guo, W., & Sussman, M. (Feb 2020–Jan 2023). *Fast multilevel multi-phase CFD-nodal model for cryogenic applications*. Funded by NASA. (80NSSC20K0352). Total award \$549,454.

This is a collaborative program in which I serve as a co-PI.

Guo, W. (Aug 2019–Mar 2022). *Liquid Helium Fluid Dynamics Studies*. Funded by US Department of Energy. (DE-SC0020113). Total award \$600,000.

OMNI: 227000-520-043096.

Guo, W. (PI), & Cattafesta, L. (co-PI). (Dec 2018–Dec 2019). *Advanced Molecular Tagging Velocimetry In Cryogenic Helium*. Funded by Army Research Office. (W911NF1910047). Total award \$216,893.

Guo, W. (Aug 2018–Jul 2021). *Flow Visualization Study of Quantum Hydrodynamics in Superfluid Helium-4*. Funded by National Science Foundation (total amount: \$335,023). (DMR-1807291). Total award \$335,023.

Guo, W. (PI), & Cattafesta, L. (co-PI). (Jun 2018–Dec 2021). *High Reynolds Number Turbulence Research in Cryogenic Helium*. Funded by National Science Foundation. (CBET-1801780). Total award \$375,003.

Guo, W. (Oct 2017–Sep 2018). *High resolution validation of next generation turbulent flow models using neutron beams and laser fluorescence in cryogenic Helium*. Funded by Oak Ridge National Lab. Total award \$34,780.

Guo, W. (Sep 2016–Aug 2017). *Workshop on Quantum Turbulence*. Funded by National Science Foundation. (DMR-1636539). Total award \$13,000.

Guo, W., & Van Sciver, S. W. (Apr 2016–Mar 2019). *Liquid Helium Fluid Dynamics Studies*. Funded by Department of Energy. (DE-FG02 96ER40952). Total award \$765,000.

Guo, W., & Van Sciver, S. (Mar 2016–Mar 2017). *Repeatability Testing of Multilayer Insulation Blankets Using Calorimetry*. Funded by Yetispace, Inc. (227000-524-037894). Total award \$93,750.

Van Sciver, S., & Guo, W. (Jun 2015–Jul 2017). *Repeatability Measurements Of MLI Apparent Thermal Conductivity For Different Boundary Temperatures*. Funded by NASA. (227000-520-036577). Total award \$99,694.

Guo, W. (May 2015–May 2016). *Visualization study of vortex-line dynamics in a magnetically levitated helium-4 drop*. Funded by FSU CRC PG program. Total award \$13,000.

Guo, W. (May 2015–Apr 2018). *Visualization study of vortex-line dynamics in a magnetically levitated helium-4 superfluid drop*. Funded by National Science Foundation. Total award \$302,362.

Guo, W. (Nov 2014–Nov 2015). *Flow Visualization in Superfluid Helium-4 Using A Thin Line of He2 Excimer Tracers*. Funded by FSU Faculty Travel Grant Program. Total award \$1,500.

Van Sciver, S., & Guo, W. (May 2014–Jun 2016). *Liquid Helium Fluid Dynamics Studies*. Funded by Department of Energy. Total award \$500,000.

Van Sciver, Steven W (Co-PI), Cao, Jianming (Co-PI), McGill, Stephen Adrian (Co-PI), & Guo, Wei (PI). (May 2013–May 2014). *EIEG: Generation III Intensified CCD Camera for Time-Resolved Imaging and Spectroscopy Applications*. Funded by FSU EIEG Award. (None). Total award \$43,000.

Guo, W. (May 2013–Aug 2013). *FYAP: Producing a Line of Excimer Helium Molecules for Visualization Study of Turbulence in Super-fluid Helium-4*. Funded by FSU CRC. Total award \$20,000.

Contracts and Grants Pending

Guo, W. (Oct 2021). *Liquid Helium Fluid Dynamics Studies for Accelerator Applications*. Submitted to US Department of Energy.

Guan, J., Guo, W., & Ren, Y. (Sep 2021). *Determining Whether Phagocytic Capacity of Macrophages Is Limited by Membrane Area and Independent of Object Shape*. Submitted to National Science Foundation.

Postdoctoral Supervision

Tang, Y. (Jul 2019–present).

Bao, S. (Sep 2017–Oct 2021).

Dr. Bao is now a faculty at Zhejiang University.

Vanderlaan, M. (Jan 2015–Aug 2016).

Reviews of My Research and Original Creative Work by Other Authors

Reviews Appearing in Journals

- # Carlo F. Barenghi. (2010). Laminar, turbulent, or doubly turbulent? *Physics*, 3, 60. Retrieved from <http://link.aps.org/doi/10.1103/Physics.3.60>
- # Gary A. Williams. (2009). Looking at electrons. *Physics*, 2, 14. Retrieved from <http://link.aps.org/doi/10.1103/Physics.2.14>
- # Nature Publishing Group. (2007). Electron movies. *Nature*, 447(21), 888. Retrieved from <http://www.nature.com/nature/journal/v447/n7147/full/447888a.html>

Reviews Appearing in Magazines or Newsletters

- # Marty Downs. (2006, July). A Movie of an Electron! *Brown University News*, 06, 174. Retrieved from http://brown.edu/Administration/News_Bureau/2006-07/06-174.html

Reviews Appearing on a Web Site

- Radulovich, T. (2021). Low-gravity simulator design developed by FAMU-FSU College of Engineering researchers offers new avenues for space research. *Florida State University News*. Retrieved from <https://news.fsu.edu/news/science-technology/2021/11/04/low-gravity-simulator-design-offers-new-avenues-for-space-research/>
- Radulovich, T. (2021). Engineering researchers develop new explanation for formation of vortices in 2D superfluid. *Florida State University News*. Retrieved from <https://news.fsu.edu/news/science-technology/2021/09/21/engineering-researchers-develop-new-explanation-for-formation-of-vortices-in-2d-superfluid/>
- Radulovich, T. (2021). Engineering researcher gets NSF award for 3D imaging technology to advance quantum fluid research. *Florida State University News*. Retrieved from

<https://news.fsu.edu/news/science-technology/2021/05/21/engineering-researcher-gets-nsf-award-for-3d-imaging-technology-to-advance-quantum-fluid-research/>

Radulovich, T. (2021). FSU engineering researchers visualize the motion of vortices in superfluid turbulence. *Florida State University News*. Retrieved from <https://news.fsu.edu/news/science-technology/2021/04/08/fsu-engineering-researchers-visualize-the-motion-of-vortices-in-superfluid-turbulence/>

Coker, N. (2020). MagLab cryogenics researchers co-author new method for visualizing superfluid turbulence. *FAMU-FSU College of Engineering*. Retrieved from <https://www.eng.famu.fsu.edu/news/bao-guo-visualizing-superflow>

Coyne, K. (2020). "Superfluids" may merge via corkscrew-like mechanism. *National High Magnetic Field Laboratory*. Retrieved from <https://nationalmaglab.org/news-events/news/superfluids-may-merge-via-corkscrew-like-mechanism>

<https://news.fsu.edu/news/science-technology/2020/03/30/superfluids-may-merge-via-corkscrew-mechanism/>.

Radulovich, T. (2019). FAMU-FSU cryogenic researchers use the science of "cool" to advance particle accelerator development. *FAMU-FSU College of Engineering*. Retrieved from <https://www.eng.famu.fsu.edu/news/guo-cryogenics-helium-superfluid>

FAMU-FSU News. (2019). Mechanical engineering grad student paper published as Editor's Suggestion in prestigious journal. *www.eng.famu.fsu.edu*. Retrieved from <https://www.eng.famu.fsu.edu/news/mastracci-guo-physical-review-fluids>

My student B. Mastracci published his work in top ranked fluid research journal Phys. Rev. Fluids and the article was selected as an Editor's suggestion.

FAMU-FSU Engineering. (2019). Engineering Researcher receives prestigious Young Researchers Award for developing new method for accelerator quench-spot detection in superfluid helium. *www.eng.famu.fsu.edu*. Retrieved from <https://www.eng.famu.fsu.edu/news/bao-kapitza-award>

My postdoc, Dr. S. Bao, received prestigious Young Researchers Award for his research work.

Cindy Stewart. (2017). Quantum Turbulence Workshop results in research collaboration among experts. *FSU Mechanical Engineering News*. Retrieved from <https://www.eng.famu.fsu.edu/me/shared/news/article.html?l=quantum-turbulence-workshop>

Cindy Stewart. (2017). Dr. Wei Guo to perform research in Japan on JSPS Fellowship. *FSU Mechanical Engineering News*. Retrieved from <https://www.eng.famu.fsu.edu/me/shared/news/article.html?s=wei-guo-jsp-fellowship>

CBC News. (2007). Impossible now possible: Scientists capture video of moving electron. *CBC News*. Retrieved from

<http://www.cbc.ca/news/technology/impossible-now-possible-scientists-capture-video-of-moving-electron-1.649183>

Phys.org. (2007). Researchers catch motion of a single electron on video. *Phys.org*. Retrieved from <http://phys.org/news100354343.html>

Service

Florida State University

FSU University Service

Faculty senator representing the faculties at COE, FSU Faculty Senator (2021–present).

Faculty Representative, Faculty Representative for 2019 Spring Commencement at FAMU (2019).

Faculty Representative, Faculty Representative for 2012 Fall Commencement at FSU (2012).

FSU Department Service

Coordinating TA assignment, graduate assistant management, seminar and professional training, Graduate Committee (2020–present).

Department Secretary, Mechanical Engineering Department (2019–2020).

Committee member, Faculty search Committee in Thermal Fluids area (2018–2019).

Committee member, Faculty search Committee (2014–2015).

Organizing ME Seminars, Mechanical Engineering Department (2014–2015).

Organizing ME Seminars with Dr. Taira, Mechanical Engineering Department (2012–2014).

The Profession

Editorial Board Membership(s)

Journal of Modern Physics (2012–present).

Guest Reviewer for Refereed Journals

Transactions on Mechatronics (Aug 2021–present).

Phys. Rev. E (May 2021–present).

Nature Materials (Jan 2021–present).

Proc. Natl. Acad. Sci. USA (Jul 2020–present).

Journal of Fluid Mechanics (Apr 2020–present).

Cryogenics (Jan 2020–present).

Phys. Rev. Research (Sep 2019–present).

Physical Review Accelerators and Beams (Apr 2019–present).

Experimental Thermal and Fluid Science (Mar 2019–present).

IEEE Visualization and Computer Graphics (Aug 2018–present).

Phys. Rev. B (May 2018–present).

Experiments in Fluids (Oct 2017–present).

Phys. Rev. Fluids (Aug 2017–present).

Review of Scientific Instruments (May 2017–present).

Phys. Rev. D (Dec 2016–present).

Physics of Fluids (Feb 2015–present).

Physics Letters A (Apr 2014–present).

Phys. Rev. Lett (Feb 2014–present).

Europhysics Letters (Dec 2013–present).

Phys. Rev. C (Dec 2013–present).

Journal of Physics (Aug 2010–present).

Journal of Low Temperature Physics (Aug 2009–present).

Chair of a Symposium

- Guo, W., & Tsubota, M. (Chair). (2019, August). *Quantum Turbulence Workshop at the 2019 International Conference on Quantum Fluids and Solids*. Symposium conducted at the meeting of University of Alberta, University of Alberta, Canada.
- Guo, W. (Chair). (2019, March). *International Workshop on "Quantum Turbulence: Cold Atoms, Heavy Ions, and Neutron Stars"*. Symposium conducted at the meeting of Institute for Nuclear Theory, University of Washington in Seattle, Seattle, United States.
- Guo, W. (Chair). (2018, July). *Quantum Turbulence Workshop at the 2018 International Symposium on Quantum Fluids and Solids*. Symposium conducted at the meeting of University of Tokyo, University of Tokyo, Japan.
- Guo, W. (Chair). (2016, March). *Visualization of vorticity in quantum fluids*. Symposium conducted at the meeting of American Physical Society, Baltimore, MD, USA.

Reviewer or Panelist for Grant Applications

- German Research Foundation (2020–present).
- Research Corporation for Science Advancement (2020–present).
Cottrell Scholar Award.
- The Engineering and Physical Sciences Research Council in United Kingdom (EPSRC) (2017–present).
- Department of Energy (2017–present).
- National Science Foundation (Condensed Matter Physics Program) (2016–present).
Condensed Matter Program.
- Czech Science Foundation (2016–present).
- National Science Foundation (Fluid Dynamics program) (2015–present).
Fluid Dynamics program.

Additional Service Not Reported Elsewhere

Guo, W. (2021). *Scientific advisory committee for the 2021 International Conference on Quantum Fluids and Solid*. Indian Institute of Science, Bangalore, India.

Link: <http://qfs2021.cense.iisc.ac.in/organization.html>.

Guo, W. (2019). *Serving as the Scientific Advisory Committee of the program "Quantum Turbulence: Cold Atoms, Heavy Ions, and Neutron Stars" to be held at the Institute for Nuclear Theory (INT) at University of Washington in Seattle*. (Link: <http://www.int.washington.edu/PROGRAMS/19-1a/>). Institute for Nuclear Theory (INT) at University of Washington in Seattle.

Guo, W. (2017). *Organizing Quantum Turbulence Workshop* (Link: <https://nationalmaglab.org/news-events/events/for-scientists/quantum-turbulence-workshop>). Florida State University.

<https://nationalmaglab.org/news-events/events/for-scientists/quantum-turbulence-workshop>.

Professional activities that occurred prior to my employment at FSU.