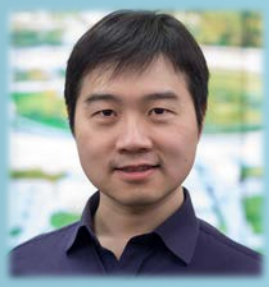
DAFEI JIN

Scientist

Center for Nanoscale Materials
Argonne National Laboratory

Email: djin@anl.gov
Phone: 630-252-4604
Fax: 630-252-5739
Office: Bldg 440, Rm A138
9700 S Cass Ave, Argonne, IL 60439



Education

2005 – 2011 **Ph. D. in Condensed Matter Physics, Brown University**
Studies of Single electrons and quantized vortices in superfluid Helium

2001 – 2005 **B. Sc. in Physics, Nanjing University**
Studies of Spin-filter magnetoresistance in magnetic tunnel junctions

Professional Experience

10/2019 – **Interim Group Leader, Argonne National Laboratory**
Lead for Nanofabrication and Devices Group, Nanoscience and Technology Division

01/2018 – **Scientist, Argonne National Laboratory**
Lead for Quantum Matter and Devices Laboratory, Center for Nanoscale Materials
Research work on single-electron and single-photon devices

2016 – 2017 **Research Scientist, University of California Berkeley**
Research work on topological plasmonics and photonics

2012 – 2016 **Postdoc Associate, Massachusetts Institute of Technology**
Research work on quantum plasmonics and excitonics

Research Expertise

- Electron transport measurement
- Microwave weak-signal measurement
- Nanofabrication and characterization
- Cryogenic system design and operation
- Scanning near-field optical microscopy
- Electron energy-loss spectroscopy
- Picosecond pump-probe measurement
- Micro-Raman and fluorescence measurement
- Real-time density-functional calculation
- Electrodynamic and cavity QED calculation

Research Interest

- Superfluidity, superconductivity, Bose-Einstein condensation
- Quantum and topological photonics, plasmonics, and excitonics
- Single-electron and single-photon quantum devices
- Low-phonon-limit nanomechanical systems, optomechanics

Facility Management

- BlueFors LD-400 Dilution Refrigerator System (<10mK temperature, 5/1/1T vector magnet, 5-directional optical access, >1000psi fill lines, 100 dc wires, 20 microwave cables, expedited sample loading.)
- FEI Nova-600 Scanning-Electron Beam and Focused-Ion Beam System (<30nm linewidth, >100um automated patterning)

Selected Publication

- X. Zhang, K. Ding, X. Zhou, J. Xu, and D. Jin, "Experimental observation of exceptional surface in synthetic dimensions with magnon polaritons", **Phys. Rev. Lett. 123**, 237202 (2019) – Selected as Editor's Suggestions.
- D. Jin*, Y. Xia*, T. Christensen, M. Freeman, S. Wang, K. Y. Fong, G. Gardner, S. Fallahi, Q. Hu, Y. Wang, L. Engel, Z.-L. Xiao, M. J. Manfra, N. X. Fang, and X. Zhang, "Topological kink magnetoplasmons on magnetic domain boundaries", **Nat. Commun. 10**, 4565 (2019).
- Y. Liu, J. Wang, S. Kim, H. Sun, F. Yang, Z. Fang, N. Tamura, R. Zhang, X. Song, J. Wen, B. Z. Xu, M. Wang, S. Lin, Q. Yu, K. B. Tom, Y. Deng, J. Turner, E. Chan, D. Jin, R. O. Ritchie, A. M. Minor, D. C. Chrzan, M. C. Scott, and J. Yao, "Helical van der Waals crystals with discretized Eshelby twist", **Nature 570**, 358−362 (2019).
- K. Y. Fong, D. Jin, M. Poot, A. Bruch, and H. X. Tang, "Phonon coupling between a nanomechanical resonator and a quantum fluid", **Nano Lett. 19**, 3716−3722 (2019).
- J. Xu, M. K. Ma, M. Sultanov, Z.-L. Xiao, Y.-L. Wang, D. Jin, Y.-Y. Lyu, W. Zhang, L. N. Pfeiffer, K. W. West, K. W. Baldwin, M. Shayegan, and W.-K. Kwok , "Negative Longitudinal Magnetoresistance in GaAs Quantum Wells", **Nat. Commun. 10**, 287 (2019).
- K. Tom, S. lin, L. Wan, J. Wang, N. Ahlm, A. N'Diaye, K. Bustillo, J. Huang, Y. Liu, S. Lou, R. Chen, S. Yan, H. Wu, D. Jin, H. Yuan, D. Prendergast, and J. Yao, "Solution-based Template-assisted Realization of Large-scale Graphitic ZnO", **ACS Nano 12**, 7554−7561(2018) – Selected as Editor's Highlights.
- D. Jin*, T. Christensen*, M. Soljacic, N. X. Fang, L. Lu, and X. Zhang, "Infrared Topological Plasmon in Graphene", **Phys. Rev. Lett. 118**, 245301 (2017) – Selected as Editor's Suggestions.
- Q. Hu, D. Jin†, J. Xiao, S. H. Nam, X. Liu, Y. Liu, X. Zhang, and N. X. Fang†, "Ultrafast fluorescent decay induced by metal-mediated dipole-dipole interaction in two-dimensional molecular aggregates", **PNAS 114**, 10017 (2017) – Featured in MIT News.
- D. Jin, L. Lu, Z. Wang, C. Fang, J. D. Joannopoulos, M. Soljacic, L. Fu, and N. X. Fang, "Topological Magnetoplasmon", **Nat. Commun. 7**, 13486 (2016).
- D. Jin, Q. Hu, D. Neuhauser, F. von Cube, Y. Yang, R. Sachan, T. S. Luk, D. C. Bell, and N. X. Fang, "Quantum-Spillover Enhanced Plasmonic Absorption at the Interface of Silver and High-Index Dielectrics", **Phys. Rev. Lett. 115**, 193901 (2015) – Featured in MIT News.
- D. Jin, A. Kumar, K. H. Fung, J. Xu, N. X. Fang, "Terahertz Plasmonics in Ferroelectric-Gated Graphene", **Appl. Phys. Lett. 102**, 201118 (2013) – Featured in MIT News.
- D. Jin and W. Guo, "Vortex Nucleation Induced Phonon Radiation from a Moving Electron Bubble in Superfluid Helium-4", **Phys. Rev. B 82**, 094524 (2010).
- D. Jin, W. Guo, W. Wei, and H. J. Maris, "Electrons in Superfluid Helium-4", **J. Low Temp. Phys. 158**, 307 (2010) – Selected as QFS 2009 Conference Brochure Cover.
- W. Guo, D. Jin, G. M. Seidel, and H. J. Maris, "Experiments with Single Electrons in Liquid Helium", **Phys. Rev. B 79**, 054515 (2009) – Selected as APS Viewpoint in Physics.
- D. Jin, Y. Ren, Z.-Z. Li, M.-W. Xiao, G. Jin, and A. Hu, Spin-filter Tunneling Magnetoresistance in a Magnetic Tunnel Junction, **Phys. Rev. B 73**, 012414 (2006).