

DAFEI JIN

Scientist

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Education

- 2005 – 2011 **Ph. D. in Physics, Brown University – Humphrey Maris Group**
Single electrons and quantized vortices in superfluid Helium
- 2001 – 2005 **B. Sc. in Physics, Nanjing University, China**
Spin-filter magnetoresistance in magnetic tunnel junctions

Professional Experience

- 2018 – Now **Scientist, Argonne National Laboratory (ANL)**
Single-electron and single-photon devices
- 2016 – 2017 **Research Scientist, University of California (UC) Berkeley – Xiang Zhang Group**
Topological plasmonics and photonics
- 2012 – 2016 **Postdoc Associate, Massachusetts Institute of Technology (MIT) – Nicholas Fang Group**
Quantum plasmonics and excitonics

Research Highlight

- ❖ **Topological behaviors of plasmons in two-dimensional electronic systems**
 - [D. Jin](#), T. Christensen, M. Soljacic, N. X. Fang, X. Zhang, and L. Lu
Infrared Topological Plasmons in Graphene
Physical Review Letters 118, 245301 (2017) – Editor’s Suggestions
 - [D. Jin](#), L. Lu, Z. Wang, C. Fang, J. D. Joannopoulos, M. Soljacic, L. Fu, and N. X. Fang
Topological Magnetoplasmon
Nature Communications 7, 13486 (2016)
- ❖ **Quantum and ultrafast dynamics of plasmons and excitons**
 - Q. Hu, [D. Jin*](#), S. H. Nam, J. Xiao, Y. Liu, X. Zhang, and N. X. Fang
Ultrafast fluorescent decay in two-dimensional molecular aggregates
Proceedings of National Academy of Science 114, 10017 (2017) – MIT News 2017
 - [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
Physical Review Letters 115, 193901 (2015) – MIT News 2015
- ❖ **Photoacoustic manipulation of single electrons and quantized vortices in quantum fluids**
 - [D. Jin](#), W. Guo, W. Wei, and H. J. Maris
Electrons in Superfluid Helium-4
Journal of Low-Temperature Physics 158, 307 (2010) – QFS conference book cover
 - W. Guo, [D. Jin](#), G. M. Seidel, and H. J. Maris
Experiments with Single Electrons in Liquid Helium
Physical Review B 79, 054515 (2009) – APS Viewpoint Physics

Research Expertise

- Cryogenic and high-vacuum system designing and operation
- Electron transport and microwave high-sensitivity measurement
- Picosecond pump-probe, micro-Raman, and fluorescence measurement
- Scanning near-field optical microscopy, electron energy-loss spectroscopy
- Nanofabrication and characterization
- Real-time high-performance density functional simulation of quantum fluids
- Topological band structure calculation, time-domain electrodynamic simulation

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

Equipment Custody

❖ Scientific Contact at ANL for

- FFI Nova focused-ion-beam system (<30nm linewidth, >100um automated patterning)
- BlueFors LD-400 dilution refrigerator system (<10mK temperature, 5/1/1T vector magnet, 6-directional optical access, >1000psi helium-cell fill lines, 100 dc wires, 20 microwave cables, multi-axis piezos)

Selected Publication

- J. Xu *et al.*,
Negative Longitudinal Magnetoresistance in GaAs Quantum Wells
Nature Commun. **10**, 287 (2019)
- K. Tom *et al.*,
Solution-based template-assisted realization of large-scale graphitic ZnO
ACS Nano **12**, 7554–7561 (2018)
- D. Jin, Y. Xia, T. Christensen, *et al.*,
Topological Kink Magnetoplasmons
arXiv: 1803.02913 (2018)
- K. Y. Fong, D. Jin, M. Poot, A. Bruch, H. X. Tang,
Phonon coupling between a nanomechanical resonator and a quantum fluid
arXiv: 1803.07552 (2018)
- Q. Hu, D. Jin*, S. H. Nam, J. Xiao, Y. Liu, X. Zhang, and N. X. Fang
Ultrafast fluorescent decay in two-dimensional molecular aggregates
Proc. Natl. Acad. Sci. **114**, 10017 (2017)
- 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)

- 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, *et al.*,
Quantum-Spillover Enhanced Plasmonic Absorption at the Interface of Silver and High-Index Dielectrics
Phys. Rev. Lett. 115, 193901 (2015)
- Y. E. Lee, K. H. Fung, D. Jin, and N. X. Fang
Optical Torque from Enhanced Scattering by Multipolar Plasmonic Resonance
Nanophotonics 3, 343 (2014)
- D. Jin and N. X. Fang
Plasmonic Angular Momentum on Metal-Dielectric Nano-Wedges in a Sectorial Indefinite Metamaterial
Opt. Express 21, 28344 (2013)
- D. Jin, A. Kumar, K. H. Fung, J. Xu, N. X. Fang
Terahertz Plasmonics in Ferroelectric-Gated Graphene
Appl. Phys. Lett. 102, 201118 (2013)
- D. Jin and W. Guo
A Finite-Temperature Density Functional Study of Electron Self-Trapping in Helium-3 and 4
J. Chem. Phys. 136, 244510 (2012)
- D. Mateo, D. Jin, M. Barranco, and M. Pi
Excited Electron-Bubble States in Superfluid Helium-4: A Time-dependent Density Functional Approach
J. Chem. Phys. 134, 044507 (2011)
- 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)
- W. Guo, D. Jin, G. M. Seidel, and H. J. Maris
Experiments with Single Electrons in Liquid Helium
Phys. Rev. B 79, 054515 (2009)
- W. Guo, D. Jin, and H. J. Maris
Stability of Multielectron Bubbles in Liquid Helium
Phys. Rev. B 78, 014511 (2008)
- D. Jin, Y. Ren, Z.-Z. Li, *et al.*
Barrier-Height and Bias-Voltage Controlled Spin-filter Effect and Tunneling Magnetoresistance in Full Ferromagnetic Junctions
J. Appl. Phys. 99, 08T304 (2006)
- D. Jin, Y. Ren, Z.-Z. Li, *et al.*
Spin-filter Tunneling Magnetoresistance in a Magnetic Tunnel Junction
Phys. Rev. B 73, 012414 (2006)