

Zhe Fei

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EDUCATION

- **Ph. D. in Physics**, University of California, San Diego, 2014. Mentor: D. N. Basov
- **M. S. in Physics**, Nanjing University, 2009. Mentor: Yi Shi
- **B. S. in Physics**, Nanjing University, 2006. Mentor: Yi Shi

PROFESSIONAL EXPERIENCE

- **Assistant Professor**, Department of Physics & Astronomy, Iowa State University, 2015-present
- **Assistant Scientist**, Center for Nanoscale Materials, Argonne National Laboratory, 2014-2015.

PUBLICATIONS

1. B. -Y. Jiang, G. X. Ni, C. Pan, **Z. Fei**, B. Cheng, C. N. Lau, M. Bockrath, D. N. Basov, and M. M. Fogler. "Tunable plasmonic reflection by bound 1D electron states in a 2D Dirac metal". *Phys. Rev. Lett.* 117, 086801 (2016).
2. **Z. Fei**, M. Scott, D. J. Gosztola, J. J. Foley, J. Yan, D. G. Mandrus, H. Wen, P. Zhou, D. W. Zhang, Y. Sun, J. R. Guest, S. K. Gray, W. Bao, G. P. Wiederrecht, X. Xu. "Nano-optical imaging of WSe₂ waveguide modes revealing light-exciton interactions". *Phys. Rev. B (Rapid)*, 94,081402(R) (2016). Selected as the Editors' Suggestion.
3. G. X. Ni, L. Wang, M. D. Goldflam, M. Wagner, **Z. Fei**, A. S. McLeod, M. K. Liu, F. Keilmann, B. Özyilmaz, A. H. Castro Neto, J. Hone, M. M. Fogler, and D. N. Basov. "Ultrafast optical switching of infrared plasmon polaritons in high-mobility graphene". *Nature Photon.* 10, 244-247 (2016).
4. **Z. Fei**, M. D. Goldflam, J.-S. Wu, S. Dai, M. Wagner, A. S. McLeod, M. K. Liu, K. W. Post, S. Zhu, G.C.A.M. Janssen, M. M. Fogler, and D. N. Basov. "Edge and surface plasmons in graphene nanoribbons". *Nano Lett.* 15, 8271-8276 (2015).
5. G. X. Ni, H. Wang, J. S. Wu, **Z. Fei**, M. D. Goldflam, F. Keilmann, B. Özyilmaz, A. H. Castro Neto, X. M. Xie, M. M. Fogler, and D. N. Basov. "Plasmons in graphene moiré superlattices". *Nature Mater.* 14, 1217-1222 (2015).
6. **Z. Fei**, E. G. Iwinski, G.-X. Ni, L. M. Zhang, W. Bao, A. S. Rodin, Y. Lee, M. Wagner, M. K. Liu, S. Dai, M. D. Goldflam, M. Thiemens, F. Keilmann, C. N. Lau, A. H. Castro-Neto, M. M. Fogler, and D. N. Basov. "Tunneling plasmonics in bilayer graphene". *Nano Lett.* 15, 4973-4978 (2015).
7. M. D. Goldflam, G-X. Ni, K. W. Post, **Z. Fei**, Y. Yeo, J. Y. Tan, A. S. Rodin, B. C. Chapler, B. Ozyilmaz, A. H. Castro Neto, M. M. Fogler, and D. N. Basov. "Tuning and persistent switching of graphene plasmons on a ferroelectric substrate". *Nano Lett.* 15, 4859-4864 (2015).
8. M. K. Liu, A. J. Sternbach, M. Wagner, T. V. Slusar, T. Kong, S. L. Bud'ko, S. Kittiwatanakul, M. M. Qazilbash, A. S. McLeod, **Z. Fei**, E. Abreu, J. Zhang, M. Goldflam, S. Dai, G. Ni, J. Lu, H. A. Bechtel, M. C. Martin, M. B.

- Raschke, R. D. Averitt, S. A. Wolf, H.-T. Kim, P. C. Canfield, and D. N. Basov. "Phase transition in bulk single crystals and thin films of VO₂ by nanoscale infrared spectroscopy and imaging". *Phys. Rev. B* 91, 245155 (2015).
9. S. Dai, Q. Ma, M. K. Liu, T. Andersen, **Z. Fei**, M. D. Goldflam, M. Wagner, K. Watanabe, T. Taniguchi, M. Thiemens, F. Keilmann, G. C. A. M. Janssen, S-E. Zhu, P. Jarillo-Herrero, M. M. Fogler and D. N. Basov. "Graphene on hexagonal boron nitride as a tunable hyperbolic metamaterial". *Nature Nanotech.* (2015).
 10. S. Dai, Q. Ma, T. Andersen, A. S. McLeod, **Z. Fei**, M. K. Liu, M. Wagner, K. Watanabe, T. Taniguchi, M. Thiemens, F. Keilmann, P. Jarillo-Herrero, M. M. Fogler, and D. N. Basov. "Subdiffractive focusing and guiding of polaritonic rays in a natural hyperbolic material", *Nature Commun.* 6, 6963 (2015).
 11. M. K. Liu, M. Wagner, J. Zhang, A. S. McLeod, S. Kittiwatanakul, **Z. Fei**, E. Abreu, M. Goldflam, A. Sternbach, S. Dai, K. West, M. M. Fogler, J. Lu, A. Stuart, and D. N. Basov. "Spontaneous symmetry breaking in strained Vanadium Dioxide films". *Appl. Phys. Lett.* 104, 121905 (2014).
 12. M. Wagner, A. S. McLeod, S. J. Maddox, **Z. Fei**, M. K. Liu, R. D. Averitt, M. M. Fogler, S. R. Bank, F. Keilmann, and D. N. Basov, "Ultrafast dynamics of surface plasmons in InAs by time-resolved infrared nanospectroscopy", *Nano Lett.* 14, 4529-4534 (2014).
 13. S. Dai, **Z. Fei**, A. S. Rodin, W. Gannett, M. Wagner, W. Regan, A. S. McLeod, M. Liu, M. Thiemens, G. Dominguez, A. H. Castro-Neto, A. Zettl, F. Keilmann, M. M. Fogler, and D. N. Basov. "Tunable phonon polaritons in atomically thin van der Waals crystals of boron nitride". *Science* 343, 1125-1129 (2014).
 14. H. T. Stinson, J. S. Wu, B. Y. Jiang, **Z. Fei**, A. S. Rodin, B. Chapler, A. S. McLeod, A. Castro Neto, Y. S. Lee, M. M. Fogler, and D. N. Basov. "Infrared nano-spectroscopy and imaging of collective superfluid excitations in anisotropic superconductors", *Phys. Rev. B* 90, 014502 (2014).
 15. M. Wagner, **Z. Fei**, A. S. McLeod, A. S. Rodin, W. Bao, E. G. Iwinski, Z. Zhao, M. Goldflam, M. K. Liu, G. Dominguez, M. Thiemens, M. M. Fogler, A. H. Castro-Neto, C. N. Lau, S. Amarie, F. Keilmann, and D. N. Basov. "Ultrafast and nanoscale plasmonic phenomena in exfoliated graphene revealed by infrared pump-probe nanoscopy". *Nano Lett.*, 14 (2), 894–900 (2014).
 16. **Z. Fei**, A. S. Rodin, W. Gannett, S. Dai, W. Regan, M. Wagner, M. K. Kiu, A. S. McLeod, G. Dominguez, M. Thiemens, M. M. Fogler, A. H. Castro-Neto, F. Keilmann, A. Zettl, R. Hillenbrand, M. M. Fogler, and D. N. Basov. "Electronic and plasmonic phenomena at grain boundaries in chemical vapor deposited graphene" *Nature Nanotech.* 8, 821-825 (2013). This work was highlighted by Nature Nanotech. 8, 802-803 (2013), nanotechweb.org, physicsworld.com and many other websites.
 17. M. K. Liu, M. Wagner, E. Abreu, S. Kittiwatanakul, A. S. McLeod, **Z. Fei**, M. Goldflam, S. Dai, M. Fogler, J. Lu, S. A. Wolf, R. D. Averitt, and D. N. Basov. "Anisotropic electronic state via spontaneous phase separation in strained Vanadium dioxide films". *Phys. Rev. Lett.* 111, 096602 (2013).
 18. **Z. Fei**, A. S. Rodin, G. O. Andreev, W. Bao, A. S. McLeod, M. Wagner, L. M. Zhang, Z. Zhao, G. Dominguez, M. Thiemens, M. M. Fogler, A. H. Castro-Neto, C. N. Lau, F. Keilmann, and D. N. Basov. "Gate-tuning of graphene plasmons revealed by infrared nano-imaging". *Nature* 487, 82–85 (2012). This work was highlighted by Nature Physics 8, 581-582 (2012), physicsworld.com, newscientist.com and many other websites.
 19. L. M. Zhang, G. O. Andreev, **Z. Fei**, A. S. McLeod, G. Dominguez, M. Thiemens, A. H. Castro-Neto, D. N. Basov, and M. M. Fogler. "Near-field spectroscopy of silicon dioxide thin films", *Phys. Rev. B* 85, 075419 (2012).
 20. **Z. Fei**, G. O. Andreev, W. Bao, L. M. Zhang, A. S. McLeod, C. Wang, M. K. Stewart, Z. Zhao, G. Dominguez, M. Thiemens, M. M. Fogler, M. J. Tauber, A. H. Castro-Neto, C. N. Lau, F. Keilmann, and D. N. Basov "Infrared nanoscopy of Dirac plasmons at the graphene-SiO₂ interface" *Nano Lett.* 11, 4701-4705 (2011).

21. M. K. Liu, B. Pardo, J. Zhang, M. M. Qazilbash, Sun Jin Yun, **Z. Fei**, Jun-Hwan Shin, Hyun-Tak Kim, D. N. Basov, and R. D. Averitt, “Photo-induced phase transitions by time-resolved far-infrared spectroscopy in V_2O_3 ” *Phys. Rev. Lett.* 107, 066403 (2011).
22. **Z. Fei**, Y. Shi, L. Pu, F. Gao, Y. Liu, L. Sheng, B. Wang, R. Zhang, and Y. Zheng “High-energy optical conductivity of graphene determined by reflection contrast spectroscopy” *Phys. Rev. B (Rapid)* 78, 201402(R) (2008).

INVITED TALKS

1. Physics Colloquium, Western Illinois University, Macomb, Illinois, 2016.
2. IEEE Photonics Conference, Waikoloa, Hawaii, 2016.
3. ECE Seminar, Nanjing University, Nanjing, China, 2016
4. Micro- & Nano- Photonics Workshop, Fudan University, Shanghai, China, 2016.
5. Progress in Electromagnetics Research Symposium, Shanghai, China, 2016.
6. Experimental Techniques and Physics in 2D Materials Workshop, Universidad de los Andes, Bogotá, Colombia, 2016.
7. Nanoscale IR Spectroscopy and Imaging Workshop, Material Research Laboratory, University of Illinois Urbana Champaign, Champaign, 2016.
8. Spectral Imaging of Nanostructured Materials Workshop, University of Minnesota, Minneapolis, 2016.
9. Integrated Imaging Initiative Seminars, Argonne National Laboratory, 2015.
10. Symposium on New Developments in Defect Mechanics, University of California at San Diego, San Diego, 2014.
11. 2013 APS March meeting, Baltimore, “Infrared nano-imaging and nano-spectroscopy of graphene plasmons”.
12. GeneExpress System & Appasani Research Conferences, Crystal and graphene science symposium, Boston, MA, 2012.

SYNERGISTIC ACTIVITIES

- **Session chair**, Focus Session “Optics at Surfaces”, IEEE Photonics Conference 2016.
- **Co-organizer**, APS-CNM Users Meeting workshop “Nanophotonic structures, surfaces and composites for radiative control”, Argonne National Laboratory, 2015.
- **Session chair**, Focus Session “Transport and Strong Coupling in Plasmonic Nanostructures”, APS March Meeting 2015.
- **Proposal reviewer** for U.S. Department of Energy Office of Science and the Netherlands Organisation for Scientific Research (NWO).
- **Journal referee** for Nature Nanotechnology, Physical Review Letters, Nature Communications, Nano Letters, Physical Review B, Physical Review E, Applied Physics Letters, Optics Letters, Optics Express, Small, Advanced Optical Materials, Nano Research, Journal of Applied Physics, Nanoscale, ACS Photonics, Optical Materials Express, Applied Optics, IEEE photonics, Frontier of Physics, IEEE transactions on Nanotechnology.