



## Yusuke Iguchi

Sr Res Scientist-Physical

T. H. Geballe Laboratory for Advanced Materials

 Curriculum Vitae available Online

### Bio

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#### BIO

Dr. Iguchi received his B.S. in physics at Tokyo University of Science in 2013 and received his Ph.D. in Basic Science from the University of Tokyo in 2018. He was JSPS Overseas Fellow in Applied Physics at Stanford University during 2018-2020. He then joined the Geballe Laboratory for Advanced Materials at Stanford University as a senior research scientist. Since 2018, he has worked in Prof. Kathryn Ann Moler's group.

Dr. Iguchi is an experimental physicist in the field of condensed matter physics, with a focus on unconventional superconductors and non-centrosymmetric magnets. His wide-ranging research covers diverse areas, including the exploration of spin dynamics in ferromagnetic insulators and chiral edge currents in topological superconductors. His achievements include the observation of non-reciprocal magnon-propagation in chiral ferromagnets, pioneering electromagnetic control over non-reciprocal microwave propagation in multiferroic materials, uncovering local superconducting states and intrinsic magnetism in candidates for chiral superconductors, and the observation of unquantized vortices in multiband superconductors.

#### ACADEMIC APPOINTMENTS

- Sr Res Scientist-Physical, T. H. Geballe Laboratory for Advanced Materials
- Staff Scientist, Stanford Institute for Materials and Energy Sciences

#### ADMINISTRATIVE APPOINTMENTS

- Co-Founder/Organizer, Girls Who Code in Japanese, (2022- present)
- Co-Founder/Organizer, Japanese Academic Seminars at Stanford (JASS), (2022- present)

#### HONORS AND AWARDS

- Overseas Research Fellowship, Japan Society for the Promotion of Science (2018/04)
- JPSJ Papers of Editors' Choice, Journal of Physical Society of Japan (2017/01)
- Research Fellowship DC2, Japan Society for the Promotion of Science (2016/04)
- Outstanding Graduate Student Award, Graduate School of Arts and Sciences, The University of Tokyo (2015/03)

#### PROFESSIONAL EDUCATION

- Postdoc, Department of Applied Physics, Stanford University (2020)
- Ph.D., Department of Basic Science, The University of Tokyo, Tokyo (2018)
- M.S., Department of Basic Science, The University of Tokyo, Tokyo (2015)
- B.S., Department of Physics, Tokyo University of Science, Tokyo (2013)

## LINKS

- My homepage: <https://yiguchi-condmat-eng.webnode.jp/>
- My homepage(Japanese): <https://yusuke-iguchi-personal-page.webnode.jp/>

## Research & Scholarship

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### CURRENT RESEARCH AND SCHOLARLY INTERESTS

Scanning SQUID (Superconducting QUantum Interference Device) microscopy, which can obtain the local susceptibility by measuring an absolute value of magnetic flux, is very unique and strong scanning magnetic probe. The purpose of this project is to reveal the local superconducting states of unconventional superconductors, such as chiral superconductor candidates, by using the scanning SQUID microscope. Recent projects are the following.

#### 1. Imaging vortex dynamics in multiband superconductors

-Anisotropic vortex pinning potential along the twin boundaries of FeSe

(Phys. Rev. B 100, 024514 (2019))

-Isotropic and anisotropic pinning potentials at different locations of URu2Si2

(Phys. Rev. B (Letter) 103, L220503 (2021))

-Unquantized flux in a superconducting vortex at KxBa1-xFe2As2

(Science 380, 1244-1247 (2023))

#### 2. Imaging superfluid density and spontaneous magnetism in chiral superconductor candidates

-Linear-T superfluid density and absence of spontaneous edge currents in URu2Si2

(Phys. Rev. B (Letter) 103, L220503 (2021))

-Single-phase superfluid density in high-quality UTe2

(Phys. Rev. Lett, 130, 196003 (2023))

## Publications

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### PUBLICATIONS

- **Superconducting vortices carrying a temperature-dependent fraction of the flux quantum.** *Science (New York, N.Y.)*  
Iguchi, Y., Shi, R. A., Kihou, K., Lee, C., Barkman, M., Benfenati, A. L., Grinenko, V., Babaev, E., Moler, K. A.  
2023; eabp9979
- **Microscopic Imaging Homogeneous and Single Phase Superfluid Density in UTe<sub>2</sub>.** *Physical review letters*  
Iguchi, Y., Man, H., Thomas, S. M., Ronning, F., Rosa, P. F., Moler, K. A.  
2023; 130 (19): 196003
- **Nonreciprocal microwave response at room temperature in multiferroic Y-type hexaferrite BaSrCo<sub>2</sub>Fe<sub>11</sub>AlO<sub>22</sub>** *APPLIED PHYSICS LETTERS*  
Hirose, S., Iguchi, Y., Nii, Y., Kimura, T., Onose, Y.  
2022; 121 (22)
- **Local observation of linear-T superfluid density and anomalous vortex dynamics in URu<sub>2</sub>Si<sub>2</sub>** *PHYSICAL REVIEW B*  
Iguchi, Y., Zhang, I. P., Bauer, E. D., Ronning, F., Kirtley, J. R., Moler, K. A.  
2021; 103 (22)
- **Imaging anisotropic vortex dynamics in FeSe** *PHYSICAL REVIEW B*  
Zhang, I. P., Palmstrom, J. C., Noad, H., Bishop-Van Horn, L., Iguchi, Y., Cui, Z., Mueller, E., Kirtley, J. R., Fisher, I. R., Moler, K. A.  
2019; 100 (2)

- **Microwave nonreciprocity of magnon excitations in the noncentrosymmetric antiferromagnet Ba<sub>2</sub>MnGe<sub>2</sub>O<sub>7</sub>** *PHYSICAL REVIEW B*  
Iguchi, Y., Nii, Y., Kawano, M., Murakawa, H., Hanasaki, N., Onose, Y.  
2018; 98 (6)
- **Magnetoelectrical control of nonreciprocal microwave response in a multiferroic helimagnet** *NATURE COMMUNICATIONS*  
Iguchi, Y., Nii, Y., Onose, Y.  
2017; 8: 15252
- **Microwave Magnetochiral Effect in the Non-centrosymmetric Magnet CuB<sub>2</sub>O<sub>4</sub>** *JOURNAL OF THE PHYSICAL SOCIETY OF JAPAN*  
Nii, Y., Sasaki, R., Iguchi, Y., Onose, Y.  
2017; 86 (2)
- **Nonreciprocal propagation of surface acoustic wave in Ni/LiNbO<sub>3</sub>** *PHYSICAL REVIEW B*  
Sasaki, R., Nii, Y., Iguchi, Y., Onose, Y.  
2017; 95 (2)
- **Terahertz Radiation by Subpicosecond Magnetization Modulation in the Ferrimagnet LiFe<sub>5</sub>O<sub>8</sub>** *ACS PHOTONICS*  
Kinoshita, Y., Kida, N., Sotome, M., Miyamoto, T., Iguchi, Y., Onose, Y., Okamoto, H.  
2016; 3 (7): 1170–75
- **Nonreciprocal magnon propagation in a noncentrosymmetric ferromagnet LiFe<sub>5</sub>O<sub>8</sub>** *PHYSICAL REVIEW B*  
Iguchi, Y., Uemura, S., Ueno, K., Onose, Y.  
2015; 92 (18)
- **Uniaxial-Pressure Effects on Spin-Driven Lattice Distortions in Geometrically Frustrated Magnets CuFe<sub>1-x</sub>Ga<sub>x</sub>O<sub>2</sub> (x=0, 0.035)** *JOURNAL OF THE PHYSICAL SOCIETY OF JAPAN*  
Nakajima, T., Iguchi, Y., Tamatsukuri, H., Mitsuda, S., Yamasaki, Y., Nakao, H., Terada, N.  
2013; 82 (11)