YUGO ONISHI

Leinweber Postdoctoral Fellow, Stanford University
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APPOINTMENTS & RESEARCH EXPERIENCE

2026-Present **Leinweber Postdoctoral Fellow**
Stanford University

Aug-Dec 2025 **KITP Graduate Fellow**
Kavli Institute for Theoretical Physics | University of California, Santa Barbara | Faculty mentor: Leon Balents

2022-2026 **PhD Researcher**
Massachusetts Institute of Technology | Advisor: Liang Fu

Apr-Sep 2022 **Doctoral Student**
University of Tokyo | Advisor: Takahiro Morimoto

2020-2022 **Master's Researcher**
University of Tokyo | Advisor: Naoto Nagaosa

2019-2020 **Undergraduate Researcher**
University of Tokyo | Advisors: Takasada Shibauchi, Kenichiro Hashimoto

EDUCATION

2026 **PhD in Physics**
Massachusetts Institute of Technology | Advisor: Liang Fu

2022 **ME in Applied Physics**
University of Tokyo | Advisor: Naoto Nagaosa

2020 **BE in Applied Physics**
University of Tokyo | Advisor: Takasada Shibauchi, Kenichiro Hashimoto

HONORS & AWARDS

2025 **Andrew M. Lockett III Memorial Fund Award**
Department of Physics, Massachusetts Institute of Technology

2020 **Dean's Award**
School of Engineering, University of Tokyo

FELLOWSHIPS & SCHOLARSHIPS

2026-2029 **Leinweber Fellowship**

Aug-Dec 2025 **KITP Graduate Fellowship**
Kavli Institute for Theoretical Physics

2022-2024 **Funai Overseas Scholarship**

Apr-Sep 2022 **JSPS Research Fellowship for Young Scientists (DC1)**

2021-2022 **MERIT-WINGS**

SERVICE & LEADERSHIP

2023-2025 **President**
Japanese Association of MIT

2023-2026 **Information-session contributor**
Japanese Graduate Student Association in the United States

PUBLICATIONS

1. **Yugo Onishi**, Nisarga Paul, Liang Fu, "Emergent Curved Space and Gravitational Lensing in Quantum Materials." Physical Review B, 2026.

2. Chung-Tao Chou, **Yugo Onishi**, Kseniia Mosina, Qiuyuan Wang, Mingda Li, Zden\v ek Sofer, Liang Fu, Luqiao Liu, "Giant Nonlinear Transport Response in a Magnetic Semiconductor Induced by Electrostatic Gating." Newton, 2025.

3. **Yugo Onishi**, Alexander Avdoshkin, Liang Fu, "Geometric Bound on the Structure Factor and a Harmonic Condition on Band Geometry." Physical Review B, 2025.

4. **Yugo Onishi**, Liang Fu, "Quantum Weight: A Fundamental Property of Quantum Many-Body Systems." Physical Review Research, 2025.

5. **Yugo Onishi**, Hiroki Isobe, Atsuo Shitade, Naoto Nagaosa, "Theory of Thermopolarization Effect." Nano Letters, 2025.

6. Barun Ghosh, **Yugo Onishi**, Su-Yang Xu, Hsin Lin, Liang Fu, Arun Bansil, "Probing Quantum Geometry through Optical Conductivity and Magnetic Circular Dichroism." Science Advances, 2024.

7. **Yugo Onishi**, Liang Fu, "Topological Bound on the Structure Factor." Physical Review Letters, 2024.

8. **Yugo Onishi**, Liang Fu, "Universal Relation between Energy Gap and Dielectric Constant." Physical Review B, 2024.

9. Lujin Min, Yang Zhang, Zhijian Xie, Sai Ayyagari, Leixin Miao, **Yugo Onishi**, Seng Lee, Yu Wang, Nasim Alem, Liang Fu, Zhiqiang Mao, "Colossal Room-Temperature Non-Reciprocal Hall Effect." Nature Materials, 2024.

10. Anyuan Gao, Shao-Wen Chen, Barun Ghosh, Jian-Xiang Qiu, Yu-Fei Liu, **Yugo Onishi**, Chaowei Hu, Tiema Qian, Damien Berube, Thao Dinh, Houchen Li, Christian Tzschaschel, Seunghyun Park, Tianye Huang, Shang-Wei Lien, Zhe Sun, Sheng-Chin Ho, Bahadur Singh, Kenji Watanabe, Takashi Taniguchi, David Bell, Arun Bansil, Hsin Lin, Tay-Rong Chang, Amir Yacoby, Ni Ni, Liang Fu, Qiong Ma, Su-Yang Xu, "An Antiferromagnetic Diode Effect in Even-Layered MnBi2Te4." Nature Electronics, 2024.

11. **Yugo Onishi**, Liang Fu, "High-Efficiency Energy Harvesting Based on a Nonlinear Hall Rectifier." Physical Review B, 2024.

12. **Yugo Onishi**, Liang Fu, "Fundamental Bound on Topological Gap." Physical Review X, 2024.

13. Anyuan Gao, Yu-Fei Liu, Jian-Xiang Qiu, Barun Ghosh, Thais V., **Yugo Onishi**, Chaowei Hu, Tiema Qian, Hung-Ju Tien, Shao-Wen Chen, Mengqi Huang, Damien Berube, Houchen Li, Christian Tzschaschel, Thao Dinh, Zhe Sun, Sheng-Chin Ho, Shang-Wei Lien, Bahadur Singh, Kenji Watanabe, Takashi Taniguchi, David Bell, Hsin Lin, Tay-Rong Chang, Chunhui Du, Arun Bansil, Liang Fu, Ni Ni, Peter Orth, Qiong Ma, Su-Yang Xu, "Quantum Metric Nonlinear Hall Effect in a Topological Antiferromagnetic Heterostructure." Science, 2023.

14. **Yugo Onishi**, Hikaru Watanabe, Takahiro Morimoto, Naoto Nagaosa, "Effects of Relaxation on the Photovoltaic Effect and Possibility for Photocurrent within the Transparent Region." Physical Review B, 2022.

15. **Yugo Onishi**, Takahiro Morimoto, Naoto Nagaosa, "Theory of Shift Heat Current and Its Application to Electron-Phonon Coupled Systems." Physical Review B, 2022.

16. Kousuke Ishida, **Yugo Onishi**, Masaya Tsujii, Kiyotaka Mukasa, Mingwei Qiu, Mikihiko Saito, Yuichi Sugimura, Kohei Matsuura, Yuta Mizukami, Kenichiro Hashimoto, Takasada Shibauchi, "Pure Nematic Quantum Critical Point Accompanied by a Superconducting Dome." Proceedings of the National Academy of Sciences, 2022.

17. K. Mukasa, K. Matsuura, M. Qiu, M. Saito, Y. Sugimura, K. Ishida, M. Otani, Y. Onishi, Y. Mizukami, K. Hashimoto, J. Gouchi, R. Kumai, Y. Uwatoko, T. Shibauchi, "High-Pressure Phase Diagrams of FeSe1-xTex: Correlation between Suppressed Nematicity and Enhanced Superconductivity." Nature Communications, 2021.

18. **Yugo Onishi**, Hiroki Isobe, Naoto Nagaosa, "Theory of Seebeck Ratchet in a Noncentrosymmetric Electron-Phonon Coupled System." Physical Review B, 2021.

TALKS & PRESENTATIONS

May 2026	**Repulsive Casimir Effect and Quantum Geometric Force** Talk | Solvay Workshop "Kahler geometry: From topological quantum matter to quantum field theories | Solvay Institute, Belgium
Mar 2026	**Ground state geometry, Structure factor, and Topological bounds** Talk | APS Global Physics Summit 2026 | Denver, Colorado
Mar 2026	**Emergent curved space in quantum materials** Talk | APS Global Physics Summit 2026 | Denver, Colorado
Jan 2026	**Bound on energy gap in quantum many-body systems** Seminar | University of Tokyo | University of Tokyo, Japan
Nov 2025	**Bound on energy gap in quantum many-body systems** Seminar | Stanford University | Stanford, California
Sep 2025	**Universal bounds in quantum many-body systems** Seminar | Condensed matter seminar at UC Berkeley | Berkeley, California
Sep 2025	**Universal bounds in quantum many-body systems** Seminar | Lunch Seminar at Caltech | Pasadena, California
Sep 2025	**Universal bounds and geometry in quantum ground states** Seminar | Seminar in Eslam Khalaf group at Harvard Univesity | Cambridge, Massachusetts
Apr 2025	**Ground state geometry and Topological bound** Seminar | Online Seminar | Online
Mar 2025	**Quantum geometry and topological bound** Talk | 2025 Spring Meeting, The Physical Society of Japan | Online
Mar 2025	**Topological Bound on Structure Factor** Talk | APS Global Physics Summit 2025 | Anaheim, California

Feb 2025	**Repulsive Casimir force from Quantum Geometry** Talk | The Institute for Solid State Physics, The University of Tokyo | University of Tokyo, Japan
Jan 2025	**Topology and Geometry in Structure factor** Seminar | ETH Zurich | ETH Zurich, Switzerland
Jul 2024	**Universal bound in topological phase** Talk | Quantum Designer Physics 2024 | San Sebastian, Spain
May 2024	**Fundamental bound on topological gap** Talk | ■■■■■■■■■■■■■O■■■■■■■■workshop at Kyoto University | Kyoto University, Japan
May 2024	**Fundamental gap bound in insulators** Seminar | Seminar at Fujimoto group at Osaka University | Osaka University, Japan
May 2024	**Fundamental gap bound in insulators** Talk | NQCM2024 | University of Tokyo, Japan
Apr 2024	**Fundamental bound on topological gap** Seminar | ETH Zurich | ETH Zurich, Switzerland
Apr 2024	**Quantum weight** Seminar | Speakers■■Corner Talk | Online
Apr 2024	**Fundamental gap bound in insulators** Seminar | Group meeting of Narang group at UCLA | Online
Mar 2024	**Fundamental gap abound in insulators** Seminar | Harvard CMT Kids' Seminar | Cambridge, Massachusetts
Mar 2024	**Fundamental bound on topological gap** Talk | APS March Meeting 2024 | Minneapolis, Minnesota
Feb 2024	**Quantum geometry, Optical property, and Energy gap** Seminar | National Cheng Kung University | Tainan, Taiwan
Feb 2024	**Quantum geometry, Optical property, and Energy gap** Seminar | National Taiwan University | Taipei, Taiwan
Feb 2024	**Quantum geometry, Optical property, and Energy gap** Seminar | Academia Sinica | Taipei, Taiwan
Mar 2023	**High-efficiency quantum rectenna for millimeter wave and terahertz technologies** Talk | APS March Meeting 2023 | Las Vegas, Nevada

TEACHING

Apr 2021	**Teaching Assistant for Statistical Mechanics 3** University of Tokyo, Department of Applied Physics | Tokyo, Japan
Sep 2020	**Teaching Assistant for Mathematics 1D** University of Tokyo, Department of Applied Physics | Tokyo, Japan
Sep 2020	**Teaching Assistant for Mathematics 1D** University of Tokyo, Department of Applied Physics | Tokyo, Japan
Apr 2020	**Teaching Assistant for Statistical Mechanics 3** University of Tokyo, Department of Applied Physics | Tokyo, Japan