

Naoki Itsui

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Research interests

Theoretical condensed matter physics, focusing on periodically driven quantum systems, Floquet topological phases, and two-dimensional quantum materials driven by surface acoustic waves.

Additional interests: Quantum spin liquids; Surface acoustic waves; Topological insulators and semimetals; Axion electrodynamics in condensed matter; Physics under a strong magnetic field; Non-equilibrium quantum many body systems.

Education

Apr 2025 – present
Master's student, Department of Physics, Graduate School of Science, The University of Tokyo, Japan
Supervisor: Takashi Oka

Apr 2021 – Mar 2025
B.S. in Physics, Department of Physics, Faculty of Science, Hiroshima University, Japan
Supervisor: Yasuhiro Tada

Theses

Feb 2025
Bachelor's thesis, Hiroshima University
"Electromagnetic Responses of 3D Topological Insulators" (in Japanese)
Supervisor: Yasuhiro Tada [PDF] [Slide] [Poster]

Research experience

Nov 2026
Research Visit, Okinawa Institute of Science and Technology, Japan
Collective Dynamics and Quantum Transport Unit (Shu Zhang)

Apr 2024 – Aug 2024
Research Internship, Okinawa Institute of Science and Technology, Japan
Quantum Systems Unit (Thomas Busch)

Publications

[1] **Naoki Itsui**, Masafumi Udagawa, Takashi Oka,
"Proposal of Topological Space-Time Crystal in the Honeycomb Lattice Fermion System Driven by Surface Acoustic Wave,"
in preparation.

Fellowships and program selections

Oct 2025 – Mar 2030
MERIT-WINGS graduate program, The University of Tokyo

2025
Selected for the MITOU Target Program, Information-technology Promotion Agency (IPA), Japan

Awards

Aug 2026 **Outstanding Presentation Award**, 71st Condensed Matter Physics Summer School

Aug 2025 **Poster Award**, 70th Condensed Matter Physics Summer School

Mar 2025 **Outstanding Bachelor's Thesis Presentation Award**, Department of Physics, Faculty of Science, Hiroshima University

Academic service

Oct 2025 – Sep 2026 **Organizing Committee Member**, 2026 MERIT Student-Led Camp

Aug 2025 – Jul 2026 **Organizing Committee Member**, 71st Condensed Matter Physics Summer School

Presentations

Oral presentations (English)

Mar 17, 2026 **Naoki Itsui**, Masafumi Udagawa, Takashi Oka,
Kitaev Quantum Spin Liquid Driven by Surface Acoustic Waves,
APS Global Physics Summit, Colorado convention center. [URL]

Nov 19, 2025 **Naoki Itsui**, Masafumi Udagawa, Takashi Oka,
Kitaev Quantum Spin Liquid Driven by Surface Acoustic Waves,
Short talk of 9th Intensive Lecture Series, RIKEN.

Apr 18, 2025 **Naoki Itsui**,
Electromagnetic Responses of 3D Topological Insulators and Axion Electrodynamics in Condensed Matter Systems,
group meeting at Oka group, ISSP. [Slide]

Aug 2, 2024 **Naoki Itsui**,
Topological Properties of Non-Periodic Kronig-Penney Model,
Quantum System Unit Weekly Group Seminar, OIST. [Slide]

Poster presentations (English)

Oct 1, 2026 **Naoki Itsui**, Masafumi Udagawa, Takashi Oka,
Kitaev Quantum Spin Liquid Driven by Surface Acoustic Waves,
International Conference on Strongly Correlated Electron Systems 2026 (SCES 2026),
Toyama International Conference Center. [Program]

Jul 23, 2026 **Naoki Itsui**, Masafumi Udagawa, Takashi Oka,
Kitaev Quantum Spin Liquid Driven by Surface Acoustic Waves,
New Frontiers in Spintronic and Mesoscopic Physics (NFSMP2026), ISSP. [Workshop]

May 30, 2026 **Naoki Itsui**, Masafumi Udagawa, Takashi Oka,
Kitaev Quantum Spin Liquid Driven by Surface Acoustic Waves,
2026 SNU-ISSP Workshop, Seoul National University. [Workshop]

Jan 28, 2026 **Naoki Itsui**, Masafumi Udagawa, Takashi Oka,
Kitaev Quantum Spin Liquid Driven by Surface Acoustic Waves,
New Frontiers of Geometry and Topology in Condensed Matter Physics, ISSP.

Nov 21, 2025 **Naoki Itsui**, Masafumi Udagawa, Takashi Oka,
Kitaev Quantum Spin Liquid Driven by Surface Acoustic Waves,
2025 SNU-ISSP Workshop, ISSP, The University of Tokyo.

Oral presentations (Japanese)

Sep 16, 2026 **伍井 直輝**, 宇田川 将文, 岡 隆史,
表面弾性波に駆動されたキタエフ量子スピン液体の研究,
81st Annual Meeting of the Physical Society of Japan, Komaba Campus, The University of Tokyo. [Program]

Aug 2026 **伍井 直輝**, 宇田川 将文, 岡 隆史,
表面弾性波に駆動されたキタエフ量子スピン液体の研究,
71st Condensed Matter Physics Summer School, Kumamoto.

Sep 2025 **伍井 直輝**, 宇田川 将文, 岡 隆史,
表面弾性波用いたキタエフスピン液体の研究,
80th Annual Meeting of the Physical Society of Japan, Hiroshima University.

Aug 2025 **伍井 直輝**, 宇田川 将文, 岡 隆史,
表面弾性波用いたキタエフスピン液体の研究,
70th Condensed Matter Physics Summer School, Shiga.

Feb 24, 2023 **伍井 直輝**,
Monte Carlo 法を用いた Kosterlitz-Thouless 転移の解析,
第 6 回サマーチャレンジ世代間交流会, KEK. [Slide]

Poster presentations (Japanese)

Aug 2025 **伍井 直輝**,
表面弾性波を用いたグラフェンの研究,
70th Condensed Matter Physics Summer School. [Poster]