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Contact Information

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Research Interests

- **Exotic phases in strongly interacting systems**:

  Fractional quantum hall effect, topological materials, Edge physics(Bulk-Edge correspondence), Luttinger liquids, Bosonization, Floquet engineering

- **Quantum computer engineering:**

  Braiding of Majorana zero modes and parafermion zero modes.

Education

Nagoya University, Nagoya, Japan — 2022–2025 (Expected)
Doctorate of Engineering in Applied Physics
Advisor: Prof. Yukio Tanaka.

Nagoya University, Nagoya, Japan — 2020–2022
Masters of Engineering in Applied Physics
Advisor: Prof. Yukio Tanaka.

Nagoya University, Nagoya, Japan. — 2016–2020
Bachelor of Science in Physics.
Thesis: *Gauge/Gravity Duality.* Advisor: Prof. Masaharu Tanabashi

Research Experience

- **PhD research** — 2022–2025
  During my PhD, I plan to apply Floquet engineering and bosonization techniques to study topological superconductors, fractional quantum hall systems, and their hetrostructures as a mean to realize non-abelian anyons.

- **Masters Thesis** — 2020–2022
  I investigated the effects of Floquet Majorana edge modes on the accumelation of odd-frequency pairing amplitude in time-periodic Kitaev topological superconductors.

- **Bachelor Thesis: Gauge/Gravity duality** — 2019–2020
  I reproduced the relation developed by Gubser, Klebanov, Polyakov, and Witten and applied it to study the response theory of scalar operators in N=4 supersymmetric Yang-Mill theory(SU(N)) at zero temperature.

Teaching Experience

- **Teaching Assistant** — 2019–2022
  Department of applied physics, Nagoya University
  - Courses TA'd: Mathematical Physics 1, Quantum Mechanics 3, Statistical Physics 3, Analytical Mechanics 1
  - Engaged in discussions with the students during the tutorials
  - Graded the students' assignments.

Administrative Experience

- **Administrative Assistant** — 2021–2022
  Tanaka & Kawaguchi lab, department of applied physics, Nagoya University
  - Translated the group website into English
  - Typed lecture notes of professor Tanaka in both Japanese and English

Skills and Hobbies

- *Computer Skills*: Python, LaTeX.
- *Language Skills*: Arabic(Native), English(Advanced), Japanese(Intermediate)
- *Hobbies*: Creative Writing, Science Communication

Honors and Awards

- Seventh place at the 1st Egyptian Physics Olympiad 2015
- Third place at the 2nd Egyptian physics Olympiad 2016
- Participated at the International Physics Olympiad 2016
- Received the Egyptian Parliament Medal of Excellence 2016
- Recipient of Nagoya University G30 scholarship 2016 – 2020
- Recipient of Al Alfi Foundation's "Leadership & Innovation Program" scholarship 2016 – 2020
- Recipient of KDDI scholarship 2022

References

Prof. **Yukio Tanaka**
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Prof. **Masaharu Tanabashi**
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