

# Postdoctoral Researcher Position in Quantum Magnonics and Spintronics

Tohoku University – JST ASPIRE Japan–Netherlands

## Position Overview

The Advanced Institute for Materials Research (AIMR) at Tohoku University invites applications for a postdoctoral researcher (specially appointed assistant professor) position in theoretical quantum magnonics and spintronics. The position is funded through the JST ASPIRE Japan–Netherlands collaborative research project focused on quantum information technologies based on magnetic materials.

The project aims to establish the theoretical and experimental foundations of standalone quantum magnonics using magnetic materials and spintronic heterostructures. The successful candidate will work on theoretical aspects of quantum magnonics, nonlinear quantum dynamics, spintronic quantum sensing, dissipative quantum systems, and quantum transport.

The project is conducted in collaboration with leading research groups in Japan and the Netherlands, including researchers at Tohoku University, The University of Tokyo, Delft University of Technology, Utrecht University, and the University of Groningen.

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## Research Topics

Possible research directions include:

- Generation and control of quantum states of magnons with nonlinear magnon interactions
- Nonequilibrium quantum field theory in dissipative quantum systems and open quantum dynamics in spintronics
- Magnon qubits and bosonic quantum information
- Spintronic quantum sensing
- Quantum transport mediated by pure spin currents
- Quantum dynamics in van der Waals magnetic materials
- Tensor-network and many-body numerical methods for open systems in spintronics

The exact research direction will be adjusted depending on the expertise and interests of the successful candidate.

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## Qualifications

Applicants should have:

- A Ph.D. in physics or a closely related field
- Strong background in condensed matter theory, quantum many-body physics, quantum information, spintronics, or related areas
- Experience in analytical and/or numerical methods for quantum systems
- Strong publication record and scientific communication skills
- Ability to work with cultural sensitivity in an international collaborative environment

Experience in one or more of the following areas is particularly welcome:

- Quantum optics or bosonic quantum systems
  - Nonequilibrium quantum field theory
  - Spintronics and magnetism
  - Quantum transport theory
  - Numerical many-body methods
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## Research Environment

The successful candidate will join an international and interdisciplinary research environment at AIMR, Tohoku University, with close interactions with both theoretical and experimental groups.

The project includes international collaboration and researcher exchange opportunities with leading research groups in the Netherlands.

Tohoku University is one of Japan's leading research universities and AIMR provides a highly international research environment with strong activities in condensed matter physics, spintronics, and quantum materials.

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## Employment Conditions

- Position: Specially Appointed Assistant Professor (Postdoctoral Researcher)
  - Starting date: Flexible (from October 2026 onward)
  - Duration: Initially one year, extendable up to four years depending on performance and project progress
  - Salary: In accordance with Tohoku University regulations depending on experience
  - Location: Sendai, Japan
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## Application Materials

Applicants should submit:

1. Curriculum vitae
2. Publication list
3. One-page research statement describing previous research experience and future interests
4. Contact information for references

Applications will be reviewed on a rolling basis until the position is filled.

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## Contact

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## About the Project

The project aims to establish scalable quantum information technologies based on magnetic materials, quantum magnonics, and spintronics. By integrating expertise in quantum many-body physics, spintronics, quantum transport, and magnetic nanodevices, the project seeks to develop new principles for quantum information processing beyond conventional superconducting architectures.

The project particularly emphasizes long-term international collaboration and young researcher development between Japan and the Netherlands.