OIST OKINAWA INSTITUTE OF SCIENCE AND TECHNOLOGY
沖縄科学技術大学院大学

VISITING PROGRAM

TSVP TALK

Indistinguishability and Statistics of Quantum Particles

2025 THU. **Jul. 03**

15:00–16:00

HYBRID L5D23, ZOOM

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The microscopic world is governed by quantum mechanics, which has many counter-intuitive properties. Matter consists of microscopic particles such as electrons, which are often illustrated as small balls or grains of sand. However, in quantum mechanics, identical particles cannot be distinguished even in principle, in stark contrast to classical particles such as grains of sand. This "quantum statistics" has remarkable consequences which are observed experimentally. But why can Indistinguishable particles even exist? Modern physics has a certain answer to this philosophical question.

I will also discuss exotic types of quantum statistics of identical particles vigorously studied recently, with a possible application to quantum computing.

ISSP, The University of Tokyo

Masaki Oshikawa

Masaki Oshikawa is a theorist whose research spans condensed matter physics, statistical physics, and field theory. After earning his Ph.D. from the University of Tokyo in 1995, he became a Killam Postdoctoral Fellow at the University of British Columbia. He then served as Associate Professor at Tokyo Institute of Technology from 1998 until 2006, when he became a Professor at the Institute for Solid State Physics, University of Tokyo. His scientific contributions have been recognized with several awards and honors, including the Ryogo Kubo Memorial Prize, the Japan Society for the Promotion of Science Prize, and Fellowship of the American Physical Society. Frequently invited to international conferences and workshops, he is known for traveling with his iconic blue folding bicycle, which has accompanied him to 25 countries so far.

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