

AIMR Workshop on Quantum Materials and Spintronics: Spin, Topology and Superconductivity

Date: 11-12th July 2019.



Advanced Institute for Materials Research (AIMR),

Tohoku University

Sendai, Japan

This workshop is sponsored by AIMR (Tohoku University), and partially by Tohoku University-Tsinghua University Collaborative Research Fund and MathAM-OIL (AIST) .



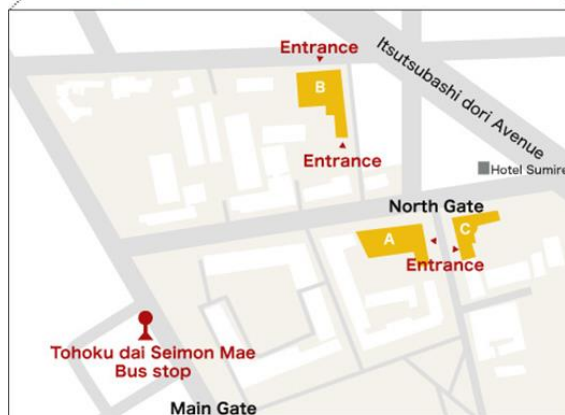
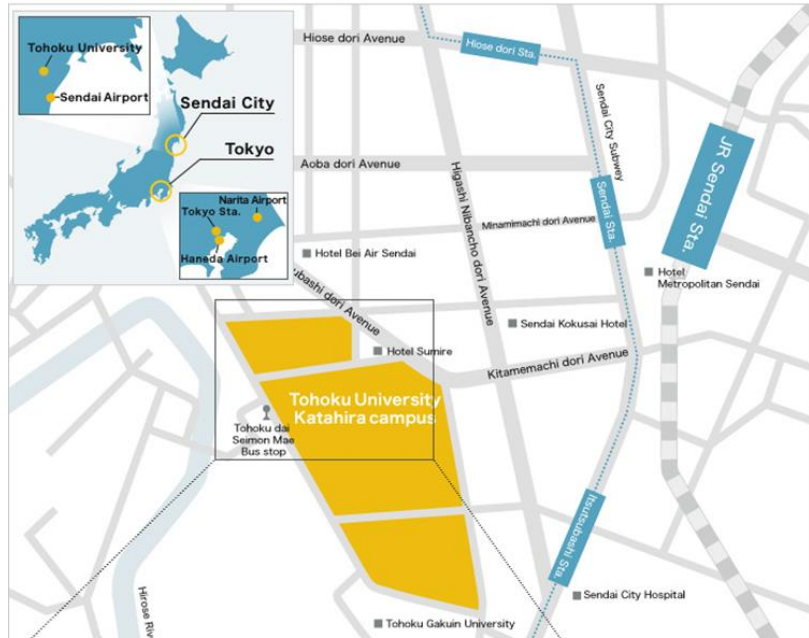
AIMR Workshop on Quantum Materials and Spintronics:
Spin, Topology and Superconductivity

Date: 11-12th July, 2019.

Location: 5th floor Combination Room and 1st floor Meeting Room, Advanced Institute for Materials Research (AIMR), Tohoku University

Address: 2-1-1 Katahira, Aoba-ku, Sendai, 980-8577 Japan

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A...AIMR Main Building
B...AIMR Laboratory Building
C...AIMR Annex

SCIENTIFIC PROGRAM

Program: DAY 1 (11th July 2019)

LOCATION: 5F Combination Room, AIMR

14:05-14:15 **Welcome Remarks by Yong P. Chen (Purdue University and AIMR, Tohoku University)**

Session 1 "Novel Topological States"

Session Chair: Andreas Dechant (AIMR, Tohoku University)

14:15-14:50 **Takeshi Nakanishi, MathAM-OIL, AIST**

"Hinge shape and electronic states in higher-order topological insulator"

14:50-15:10 **Ryo Okugawa, AIMR, Tohoku University**

"Topological non-Hermitian nodal phases with parity-time and parity-particle-hole symmetries"

15:10-15:30 **Yong P. Chen, Purdue University and AIMR, Tohoku University**

"Realization of a symmetry protected bosonic topological state in a synthetic space"

[15 min break]

Session 2 "Topological Wave Transport"

Session Chair: Guanghui Cheng (AIMR, Tohoku University)

15:45-16:20 **Qian Niu, Department of Physics, University of Texas at Austin**

"Towards a geometric theory of magnetization dynamics"

16:20-16:40 **Max Lein, AIMR, Tohoku University**

"Topological origin of electromagnetic waves at interfaces between two media"

16:40-17:00 **Koji Sato, IMR, Tohoku University**

"Krein-Schrödinger formalism for topological classification of magnonic BdG systems"

Program: DAY 2 (12th July 2019)

LOCATION: 1F Meeting Room, AIMR

Session 3 "Topological Insulators and Superconductors"

Session Chair: Hiroshi Idzuchi (AIMR, Tohoku University)

- 9:00-9:35 **Katsumi Tanigaki, AIMR and Department of Physics, Tohoku University**
"High Quality Single Crystal Thin Films of Three-Dimensional Topological Insulators and Applications"
- 9:35-10:10 **Takafumi Sato, AIMR and Department of Physics, Tohoku University**
"Search for topological superconductivity through band-structure engineering"
- 10:10-10:30 **Takuya Aoyama, Department of Physics, Tohoku University**
"Fe-based ladder materials"

[15 min break]

Session 4 "Topological Superconductors and Majoranas"

Session Chair: Koji Sato (IMR, Tohoku University)

- 10:45-11:20 **Tetsuo Hanaguri, CEMS, RIKEN**
"Zero-energy vortex bound state in Fe(Se,Te) and its relevance to the Majorana zero mode"
- 11:20-11:40 **Kosuke Nakayama, Department of Physics, Tohoku University**
"Possible topological superconductivity in a hybrid of non-superconducting Bi_2Te_3 and FeTe"
- 11:40-12:00 **Yong P. Chen, Purdue University and AIMR, Tohoku University**
"Topological Josephson Junction"
- 12:00-12:20 **Chen-Hsuan Hsu, CEMS, RIKEN**
"Majorana Kramers pairs in higher-order topological insulators"

[Lunch break]

Session 5 "Novel Topological States and Materials"

Session Chair: Stephane Yu Matsushita (Department of Physics, Tohoku University)

13:30-13:50 **Seigo Souma, CSRN and AIMR, Tohoku University**

"New topological phases protected by Θ T symmetry"

13:50-14:10 **Khuong Kim Huynh, AIMR, Tohoku University**

"Negative and positive magnetoresistance in the itinerant antiferromagnet BaMn_2Pn_2 (Pn = P, As, Sb, and Bi) with PT symmetry"

14:10-14:30 **Xing-Chen Pan, AIMR, Tohoku University**

"Tuning band structure and Fermi surface in Tungsten ditelluride"

[15 min break]

Session 6 "Novel Spin Systems"

Session Chair: Akichika Kumatani (AIMR, Tohoku University)

14:45-15:05 **Hiroshi Idzuchi, AIMR, Tohoku University**

"Hetero-interface effect in two-dimensional van der Waals Ferromagnet and Superconductor"

15:05-15:25 **Yoshinori Imai, Department of Physics, Tohoku University**

"Hydrated alkali metal intercalation into Kitaev spin liquid candidate material $\alpha\text{-RuCl}_3$ "

15:25-15:45 **Jana Lustikova, CSIS, Tohoku University**

"Vortex rectenna powered by environmental fluctuations"

Joint Session with Friday Tea Time in AIMR

LOCATION: 5F Combination Room, AIMR

16:00-17:00 **Tea Time Talk by Prof. Qian Niu, Department of Physics, University of Texas at Austin**

"Topology and Geometry of Bloch Electrons"