

Frontiers of Correlated Electron Sciences

Koshiba hall, Hongo campus, University of Tokyo (May 29-31, 2019)

May 29 (Wed.)

09:00 - 09:10 Opening

Chair : Masatoshi Imada

09:10 - 09:40 **Gabriel Kotliar** (*Brookhaven National Labo. / Physics Dept., Rutgers Univ.*)
Theory of Normal State and Superconductivity in Iron Pnictides and Chalcogenides.

09:45 - 10:15 **Ivan Božović** (*Brookhaven National Labo. / Applied Physics Dept., Yale Univ.*)
What Makes Cuprate Superconductors so Exceptional?

10:20 - 10:35 **Takahiro Misawa** (*Institute for Solid State Physics, Univ. of Tokyo*)
Development of many-variable variational Monte Carlo method (mVMC) and its applications to high-Tc cuprates

10:40 - 11:00 Coffee Break

Chair : Fakher Assaad

11:00 - 11:20 **Atsushi Fujimori** (*Dept. of Physics, Univ. of Tokyo*)
Origin of the pseudogap in electron-doped and hole-doped cuprates revealed by ARPES

11:25 - 11:45 **Marcello Civelli** (*Laboratoire de Physique des Solides, Univ. Paris-Sud*)
A Cluster Dynamical Mean Field Theory Perspective on the pseudogap of cuprates: correlation and competition with the high Tc superconductivity

11:50 - 12:05 **Shiro Sakai** (*Center for Emergent Matter Science, RIKEN*)
Direct relation between electronic structures of Mott insulator and of high-temperature superconductor

12:10 - 12:25 **Youhei Yamaji** (*Dept. of Applied Physics, Univ. of Tokyo*)
Hidden self-energy structures of high-temperature superconductivity

12:30 - 12:50 Group photo

12:50 - 13:55 Lunch

Chair : Roser Valenti

- 13:55 - 14:25 **Ferdi Aryasetiawan** (*Mathematical Physics, Lund University*)
Multi-Tier Self-Consistent GW+EDMFT Scheme
- 14:30 - 14:45 **Kazuma Nakamura** (*Dept. of Basic Sciences, Kyushu Institute of Technology*)
RESPACK: Ab initio software for many-body perturbation calculation and effective-model derivation
- 14:50 - 15:05 **Claude Ederer** (*Materials Theory, ETH Zurich*)
Metal-insulator transitions in complex oxide thin films and heterostructures from DFT+DMFT
- 15:10 - 15:30 **Shinji Tsuneyuki** (*Dept. of Physics / Institute for Solid State Physics, Univ. of Tokyo*)
Transcorrelated method: the idea and its applications

15:35 - 15:55 Coffee Break

Chair : Silke Biermann

- 15:55 - 16:25 **Karsten Held** (*Institute for Solid State Physics, TU Wien*)
 π -tons --- generic optical excitations of correlated systems
- 16:30 - 16:50 **Yoshiteru Maeno** (*Dept. of Physics, Kyoto Univ.*)
Non-Equilibrium Steady States (NESS) of a Mott-Anderson Insulator Candidate
- 16:55 - 17:15 **Frank Lechermann** (*Institut für Theoretische Physik, Univ. Hamburg*)
Doping effects in the strongly correlated vanadium oxides V_2O_3 and VO_2
- 17:20 - 17:35 **Ryotaro Arita** (*Dept. of Applied Physics, Univ. of Tokyo / RIKEN Center for Emergent Matter Science*)
Cluster multipole dynamics in non-collinear antiferromagnets

May 30 (Thu.)

Chair : Karsten Held

09:00 - 09:30 **Antoine Georges** (*Center for Computational Quantum Physics, Collège de France / Flatiron Institute*)

Strong Correlations in Multi-Orbital Materials: Beyond Mottness.

09:35 - 09:55 **Shik Shin** (*Institute for Solid State Physics, Univ. of Tokyo*)

Topological superconductors and Multiple topological states in iron-based superconductors

10:00 - 10:20 **Yuji Matsuda** (*Dept. of Physics, Kyoto Univ.*)

Quantum oscillations and charge-neutral fermions in an insulator

10:25 - 10:40 **Sergey Streltsov** (*Institute of Metal Physics, Russian Academy of Science*)

Spin-orbit-entangled $j_{\text{eff}}=1/2$ state in 3d transition metal oxide: CuAl_2O_4

10:45 - 11:10 Coffee Break

Chair : Naoki Kawashima

11:10 - 11:40 **Silke Biermann** (*Centre de Physique Théorique, Ecole Polytechnique*)

Spectral properties of Sr_2IrO_4

11:45 - 12:00 **Takashi Miyake** (*CD-FMat, AIST*)

Magnetocrystalline anisotropy of rare-earth magnets

12:05 - 12:20 **Arun Paramakanti** (*Univ. of Toronto*)

Skyrmions: Classical spin crystals and chiral quantum liquids

12:25 - 12:40 **Toru Sakai** (*Graduate School of Material Science, Univ. of Hyogo / QST SPring-8*)

Spin Nematic Liquid of Low-Dimensional Quantum Antiferromagnets

12:45 - 14:05 Lunch

Chair : Gabriel Kotliar

14:05 - 14:35 **Philipp Werner** (*Dept. of Physics, Univ. of Fribourg*)

GW+DMFT simulation of lattice models in and out of equilibrium

14:40 - 15:00 **Stefan Kaiser** (*Max-Planck Institute for Solid State Research / 4th Physics Institute, Univ. of Stuttgart*)

Higgs Spectroscopy in Unconventional Superconductors

15:05 - 15:25 **Takami Tohyama** (*Dept. of Applied Physics, Tokyo Univ. of Science*)

Characterization of photoexcited states in the half-filled one-dimensional

extended Hubbard model by machine learning

15:30 - 15:50 Coffee Break

Chair : Philipp Werner

15:50 - 16:10 **Ryo Shimano** (*Cryogenic Research Center and Dept. of Physics, Univ. of Tokyo*)

Dynamical control of superconducting order parameter by light

16:15 - 16:30 **Kenji Yonemitsu** (*Dept. of Physics, Chuo Univ.*)

Photoinduced Charge Oscillations in Correlated Dimer Systems

16:35 - 16:55 **Norio Kawakami** (*Dept. of Physics, Kyoto Univ.*)

Non-Hermitian quantum phenomena in correlated systems

17:00 - 18:40 **Poster session**

May 31 (Fri.)

Chair : Takami Tohyama

- 09:00 - 09:30 **Roser Valenti** (*Institut für Theoretische Physik, Goethe-Univ. Frankfurt*)
Field- and Pressure-induced phases in generalized Kitaev models and materials
- 09:35 - 09:50 **Yukitoshi Motome** (*Dept. of Applied Physics, Univ. of Tokyo*)
Majorana signatures in proximate Kitaev spin liquids
- 09:55 - 10:10 **Peter Prelovsek** (*J. Stefan Institute, Ljubljana, Slovenia / Faculty of Mathematics and Physics, Univ. of Ljubljana*)
Spin liquid in extended Heisenberg models on triangular lattice
- 10:15 - 10:30 **Syngae Todo** (*Dept. of Physics / Institute for Solid State Physics, Univ. of Tokyo*)
Optical bistability in a quantum low photon-density regime

10:35 - 11:00 Coffee Break

Chair : Norio Kawakami

- 11:00 - 11:30 **Fakher Assaad** (*Institut für Theoretische Physik und Astrophysik, Univ. Würzburg*)
Intertwined orders in Dirac Fermions
- 11:35 - 11:55 **Giorgio Sangiovanni** (*Institut für Theoretische Physik und Astrophysik, Univ. of Würzburg*)
First-order topological phase transitions with correlated electrons
- 12:00 - 12:20 **Yoshihiro Iwasa** (*Dept. of Physics and QPEC, Univ. of Tokyo / RIKEN Center for Emergent Matter Science*)
Superconductivity in 2D Materials
- 12:25 - 12:40 **Tomi Ohtsuki** (*Physics Division, Sophia Univ.*)
Phase Diagrams and Scaling Behaviors of Disordered Weyl Semimetals

12:45 - 13:55 Lunch

Chair : Antoine Georges

- 13:55 - 14:25 **Matthias Troyer** (*Microsoft Quantum*)
The Quantum Computing Future of Strongly Correlated Electron Simulations
- 14:30 - 14:50 **Naoki Kawashima** (*Institute for Solid State Physics, Univ. of Tokyo*)
Tensor Network States for Lattice Systems
- 14:55 - 15:10 **Yusuke Nomura** (*Dept. of Applied Physics, Univ. of Tokyo*)
Machine learning for solving quantum many-body Hamiltonians

15:15 - 15:45 **Masatoshi Imada** (*Waseda Research Institute for Science and Engineering,
Waseda Univ./ Toyota Physical and Chemical Research Institute*)
Perspectives on descriptions of correlated electron phenomena

15:50 - 16:00 Closing