Integrated Spectroscopy for Strong Electron Correlation -Theory, Computation and Experiment

Koshiba hall, Hongo campus, University of Tokyo (Dec 5-8, 2022)

Dec. 5 (Mon.)

13:30 - 13:55 **Kohei Tamao** *(President, Toyota Riken)*
Opening Address
Masatoshi Imada *(Chair of ISSEC2022)*
Opening and Overview

13:55 - 14:00 Announcement

Chair : Masatoshi Imada

14:00 - 14:35 **Dirk van der Marel** *(University of Geneva)*
Spectroscopic properties of the superconducting state far beyond the gap

14:45 - 15:10 **Ryo Shimano** *(University of Tokyo)*
Light-induced Josephson plasma resonance-like response without long range superconducting coherence in cuprate superconductors

15:20 - 15:40 **Yuta Murakami** *(RIKEN)*
High-harmonic generation in strongly correlated system

15:50 - 16:20 Coffee Break

Chair : Atsushi Fujimori

16:20 - 16:55 **J.C. Séamus Davis** *(University of Oxford)*
Visualizing Singlet and Triplet Pair Density Wave States

17:05 - 17:30 **Yuhki Kohsaka** *(Kyoto University)*
High-resolution spectroscopic imaging scanning tunneling microscopy of $Bi_2Sr_2CaCu_2O_x$

17:40 - 18:05 **Tetsuo Hanaguri** *(RIKEN)*
Evolutions of the band structure and the superconducting gap upon Te substitution in Fe(Se,Te)

Dec. 6 (Tue.)

Chair : Takeshi Kondo

09:00 - 09:35 **Zhi-Xun Shen** *(Stanford University)*

Benchmarking Many-Body Theory – Insights from excitation spectra in photoemission

09:45 - 10:10 **Shiro Sakai** *(RIKEN)*

Nonperturbative calculations on spectroscopic properties of cuprate superconductors

10:20 - 10:45 **Youhei Yamaji** *(National Institute for Materials Science)*

Neural-network and numerical analysis of self-energy for high-T_c cuprate superconductors

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10:55 - 11:25 Coffee Break

Chair : Bernhard Keimer

11:25 - 12:00 **Andrea Damascelli** *(University of British Columbia)*

Quantum Materials in the Time Domain

12:10 - 12:35 **Kyoko Ishizaka** *(University of Tokyo)*

Micro-focused ARPES study on 2 dimensional transition-metal ditellurides

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12:45 - 13:00 Group photo

13:00 - 14:20 Lunch

Chair : Dirk van der Marel

14:20 - 14:55 **Di-Jing Huang** *(National Synchrotron Radiation Research Center)*

Quantum fluctuations and excitonic excitation of cuprate superconductors probed with RIXS

15:05 - 15:40 **Ying-Ying Peng** *(Peking University)*

Evolution from charge-order phase to high-temperature superconductivity

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15:50 - 16:20 Coffee Break

Chair : Di-Jing Huang

16:20 - 16:45 **Takami Tohyama** *(Tokyo University of Science)*

Time-resolved RIXS and Raman scattering in a photoexcited Mott insulator on a square lattice

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Chair : Shiro Sakai

16:55 - 18:55 **Poster session (incl. 1-min. preview)**

Dec. 7 (Wed.)

Chair : Masatoshi Imada

09:00 - 09:35 **Bernhard Keimer** *(Max Planck Institute, Stuttgart)*

Recent progress on spectroscopy of clean cuprate superconductors

09:45 - 10:20 **Subir Sachdev** *(Harvard University)*

Paramagnon fractionalization theory of the cuprate pseudogap

10:30 - 11:00 Coffee Break

Chair : Takami Tohyama

11:00 - 11:35 **Yong Baek Kim** *(University of Toronto)*

Quantum Spin Liquids and Quantum Criticality in Multipolar Materials

11:45 - 12:20 **Federico Becca** *(University of Trieste)*

Variational wave functions for spin models with anisotropic exchange couplings or spin-phonon coupling

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12:30 - 13:50 Lunch

Chair : Federico Becca

13:50 - 14:15 **Yusuke Nomura** *(Keio University)*

Neural-network studies reveal quantum spin liquid in two-dimensional J_1-J_2 Heisenberg model

14:25 - 14:50 **Kota Ido** *(University of Tokyo)*

Comprehensive analysis on ab initio Hamiltonians of organic solids β'-X[Pd(dmit)$_2$]$_2$

15:00 - 15:30 Coffee Break

Chair : Yong Baek Kim

15:30 - 16:05 **Roser Valenti** *(Goethe University Frankfurt)*

Ruthenium-based quantum spin liquids candidates: microscopic modelling and experimental signatures

16:15 - 16:50 **Giuseppe Carleo** *(École Polytechnique Fédérale de Lausanne)*

Fermionic Neural Quantum States

17:00 - 17:20 **Guang-Yu Guo** *(National Taiwan University)*

High temperature ideal Weyl semimetal phase and quantum anomalous Hall phase in ferromagnetic $BaEuNiOsO_6$ and its (111) $(BaEuNiOsO_6)/(BaTiO_3)_{10}$ superlattice

Dec. 8 (Thu.)

Chair : Subir Sachdev

09:00 - 09:35 **Gabriel Kotliar** *(Brookhaven National Laboratories / Rutgers University)*

Quantum Embedding based Theoretical Spectroscopy

09:45 - 10:20 **Andreas Kreisel** *(University of Copenhagen)*

Unusual superconducting instabilities in multi-orbital strongly-correlated materials

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10:30 - 11:00 Coffee Break

Chair : Tetsuo Hanaguri

11:00 - 11:35 **Peter Wahl** *(University of St Andrews)*

Low energy electronic structure in strontium ruthenates: from surface distortions to magnetic-field control of the electronic structure

11:45 - 12:05 **Hakuto Suzuki** *(Tohoku University)*

Spin and orbital fluctuations in Sr_2RuO_4 revealed by resonant inelastic x-ray scattering

12:15 - 12:40 **Takeshi Kondo** *(University of Tokyo)*

Observation of multipole polaron and Devil's staircase transition of the electronic structure in cerium monopnictide

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12:50 - 14:10 Lunch

Chair : J.C. Séamus Davis

14:10 - 14:35 **Yukio Hasegawa** *(University of Tokyo)*

2D superconductivity vs. disorder: STM of Pb mono layer formed on vicinal substrates

14:45 - 15:10 **Shunsuke Yoshizawa** *(National Institute for Materials Science)*

Bloch state interference in atomic layer indium studied by scanning tunneling microscopy and density functional theory

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15:20 - 15:50 Coffee Break

Chair : Youhei Yamaji

15:50 - 16:10 **Tadashi Machida** *(RIKEN)*

Zeeman effects on Yu-Shiba-Rusinov states

16:20 - 16:40 **Hsiao-Yi Chen** *(RIKEN)*

Development of ab initio method for exciton condensation and its application to $TiSe_2$

16:50 - 17:10 **Ziqian Wang** *(RIKEN)*

Revealing exciton-magnon correlation in van der Waals antiferromagnet $MnPS_3$ by second harmonic generation spectroscopy

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17:20 - 17:30 Closing

Poster Session (Dec. 6, 16:55-18:55)

P01 **Ming-Chun Jiang** (*RIKEN CEMS*)
Efficient hydrogen evolution reaction due to topological polarization

P02 **Yusuke Nomura** (*Keio University*)
Ab initio materials design of cuprate-analog d9 nickelates

P03 **Steffen Backes** (*Tokyo University*)
Diagnostics for plasmon satellites and Hubbard bands in transition metal oxides

P04 **Shakti Shankar Acharya** (*Ravenshaw University*)
Temperature dependent core level spectroscopy of Fe-Ni Invar alloys

P05 **Masahiro Naritsuka** (*RIKEN*)
Symmetry breaking in quasiparticle interference imaging of superconducting monolayer $NbSe_2$

P06 **Christopher J. Butler** (*RIKEN CEMS*)
Symmetry-breaking in the Dirac semimetal ZrSiS revealed by Landau level spectroscopy of the floating surface band

P07 **Yuya Asaka** (*Univ. Electro-Communication*)
Long-range permeation of wave function and superficial surface state due to strong quantum size effect in topological Bi/BiSb heterojunction

P08 **Shin-ichiro TANAKA** (*SANKEN, Osaka University*)
Peculiar Fano resonance at the Ti2p-Ti3d absorption edge in the momentum-resolved resonant photoelectron spectroscopy of 1T-$TiSe_2$

P09 **Hiroyasu Koizumi (***University of Tsukuba*)
U(1) phase neglected by Dirac and superconductivity: the particle number conserving Bogoliubov-de Gennes equations applied for calculations of spectroscopic properties of cuprate superconductivity

P10 **Kaori Niki** (*Graduate school of science*)
Development of analysis method for Wavenumber-resolved photoemission spectroscopy

P11 **Hiroki Kobayashi** (*University of Hyogo*)
Comparative theoretical study on x-ray magnetic circularly polarized emission from ferromagnetic Fe, Co, and Ni

P12 **Yuyang Dong** (*Institute for Solid State Physics, University of Tokyo*)
Electronic structures of Gd-based skyrmion materials studied by angle-resolved photoemission spectroscopy

P13 **Soonsang Huh** (*Institute for solid state physics, University of Tokyo*)
ARPES study of Van der Waals room temperature ferromagnet $Fe_{5-x}GeTe_2$

P14 **Kota Ido** (*Institute for Solid State Physics, University of Tokyo*)
Variational Monte Carlo method for electron dynamics in strongly correlated systems

P15 **Koichiro Ienaga** (*Tokyo Institute of Technology*)
STM study of a monolayer Kondo lattice $CePt_2$/Pt(111)

P16 **Hidemaro Suwa** (*The University of Tokyo*)
Large-scale calculation of dynamical spin structure factor for correlated electron systems

P17 **Yajian Hu** (*CEMS, RIKEN*)
Polar Kerr effect study on the time-reversal symmetry-breaking in the charge density wave of CsV_3Sb_5

P18 **Rico Pohle** (*University of Tokyo*)
Ground state of the S = 1/2 pyrochlore Heisenberg antiferromagnet: A quantum spin liquid from dimensional reduction

P19 **Brajesh Rajesh Bhagat** (*Department of Physics, Faculty of Science, The M S University of Baroda*)
Computational Raman Spectroscopy to Study Reaction Mechanism over Co_2B_2-MBene

P20 **Kunihiko Yamauchi** (*Osaka University*)
First-Principles Engineering of Spin-Polarized Surface States in Topological-Insulator Heterostructure

P21 **NGUYEN THI PHUONG THAO** (*Osaka University*)
First-Principles Study on Electronic Structure in VI_3 and Comparison with ARPES Measurements

P22 **Kaishu Kawaguchi** (*Institute for Solid State Physics, The University of Tokyo*)
Time-, spin- and angle-resolved photoemission spectroscopy system with 10.7-eV ultrashort pulsed laser at 1-MHz repetition rate

P23 **Naoya Yoshikane** (*Osaka Metropolitan University*)
Mixed valency in strongly-correlated rare-earth fullerides, $RE_{2.75}C_{60}$ – a combined structural and spectroscopic study

P24 **Mourad Boujnah** (*Jeonju university*)
Optoelectronic and thermoelectric properties of new heterobilayers of Janus-type Noble-Metal Chalcogenides materials

P25 **MOTOAKI HIRAYAMA** (*The University of Tokyo*)
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P26 **Jean-Baptiste Pierre Guy Morée** (*Waseda University*)
Ab initio low-energy effective Hamiltonians for superconducting cuprates $Bi_2Sr_2CuO_6$, $Bi_2Sr_2CaCu_2O_8$, $HgBa_2CuO_4$ and $CaCuO_2$

P27 **Michael Thobias Schmid** (*Waseda University*)
Superconductivity in ab initio low energy effective Hamiltonians of $Bi_2Sr_2CuO_6$, $Bi_2Sr_2CaCu_2O_8$, $HgBa_2CuO_4$ and $CaCuO_2$