Application Form for the Organization of an IUVSTA Workshop

TITLE OF THE WORKSHOP:

Workshop on Advanced Spectroscopy and Transport for 2D Materials at Surfaces

VENUE : Okinawa Institute of Science and Technology Graduate University (OIST), 1919-1 Tancha, Onna-son, Kunigami-gun, Okinawa 904-0495, Japan

DATES (NB workshops should normally be 4-5 days in length): 13 – 17 September 2020

PRINCIPAL THEMES/TOPICS:

The topics discussed in the workshop include the following highly advanced subjects of surface physics/science and nanoscale science;

Atomic layer superconductivity

Research on the ultimately thin two-dimensional (2D) superconductor was initiated in Asia. Xue's group (China) first demonstrated the presence of single-layer 2D superconductivity by using scanning tunneling microscopy (STM). Then the supercurrent was detected by the transport measurements (Hasegawa and Uchihashi's groups (Japan), independently). Recent, superconductivity in the Rashba-split surface states (Hasegawa's group, Saranin's group (Russia)) has opened up the possibility of unconventional superconductivity arising from the broken centrosymmetry. Recent cutting-edge achievements and prospects on the ideal 2D superconductivity will be discussed.

Topological materials

Motivated by the first demonstration of quantum anomalous Hall effect (Xue's group (China)), ferromagnetic/TI hybrid systems are one of the hot subjects in this category. The subjects, such as Majorana bound states based on TI (Jia and Liu (China)), Wyle semimetals (collaboration of Takagi (Japan) and Lin (Taiwan)), topological crystalline insulator (Okada (Japan)), and antiferromagnetic topological insulator (Chulkov (Spain and Russia)), will also be agenda. Further understandings in their physics and collaborations will be sought through the discussion.

2D Xene materials

After the successful fabrication of graphene, various elemental monolayer series; Xenes, such as silicene (Le Lay (France)), germanene, borophene, stanene etc. have been successfully fabricated and its unique structural, electronic, and topological properties have been discussed. Twisted bilayer graphene is another attractive subject in this workshop as it exhibits superconductivity and quasicrystalline electronic states (Ahn (Korea)) depending on the rotational angle.

One-dimensional metallic states

One-dimensional (1D) metallic states realized on surfaces is a rich source of the relevant physics, and Yeom (Korea) and Hasegawa (Japan) initiated the exploration through the discovery of metal-insulator transition of 1D In atomic chains at low temperature. Whether the 1D states are described with Tomonaga-Lattinger liquid (TLL) has been discussed (Komori (Japan)). Edge states at steps and domain boundaries of 2D TI such as Bi and transition-metal dichalcogenide and their TLL properties are a subject of extensive discussion in this workshop.

Workshop structure: The workshop will last 5 days (from Sunday afternoon to Thursday morning). The scientific program will consist of invited lectures from world-renowned groups mainly from Asia-Pacific countries, but a certain number of world-leading researchers outside the region will be also included in a list of the invited speakers. A poster session is scheduled in the evenings mainly for the presentation by students and young researchers. We expect the majority of participants are from the Asia-Pacific countries, but researchers from outside the regions are also welcome. The number of

speakers is limited to about 30 in order to have ample time for discussions. Invited talks (40 minutes: 35+5) and contributed talks (20 minutes: 15 +5), and coffee breaks 20 minutes (2/day).

IUVSTA SCIENTIFIC SPONSORING DIVISIONS:

Nanometer Structures Division

Surface Science Division

NAMES AND NATIONALITIES OF ORGANIZERS:

Main Organizer: Prof. Shuji Hasegawa, IUVSTA Committee member of Nanometer Structures Division, Department of Physics, The University of Tokyo, 7-3-1, Hongo, Tokyo, 113-0033, JAPAN, Phone: +81-3-5841-4167, Email: shuji@phys.s.u-tokyo.ac.jp

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NAMES AND NATIONALITIES OF LIKELY INVITED SPEAKERS:

Micheal S. Altman (The Hong Kong University of Science and Technology, Hong Kong)
real-time observation of crystal growth and graphene formation by low-energy electron microscopy (LEEM) to elucidate their dynamics in atomic scale

Ya-Ping Chiu (National Taiwan University, Taiwan, *F*)
electronic transport and electronic states of compound atomic layers

Evgueni V. Chulkov (Donostia International Physics Center, Spain)
investigating electronic states of TI and relevant quantum materials based on first-principle calculations

Sergey V. Eremeev (Siberian Branch of Russian Academy of Science, Russia)
theoretical study on magnetic topological insulators based on first-princple calculations

Katharina J. Franke (Freie Universität Berlin, Germany, *F*)
local electronic structure and Majorana particle at superconducting surface studied by STM

Hyowon Kim (Samsung Advanced Institute of Technology, Korea, *F*)
STM study of topological electronic states in atomic layers

Alessandra Lanzara (UC Berkeley, United States, *F*)
electronic states of graphene and TI using advanced angle resolved photoemission spectroscopy

Guy Le Lay (Professor, Aix-Marseille University, France)
successfully fabricated silicene: graphene-like monolayer material made of silicon, and subsequently lead the new research trend of Xene science

Yan Jun Li (Osaka University, Japan, *F*)
Study of the atomic-scale charge state on TiO_2(110) surface by AFM/KPFM

Canhua Liu (Shanghai Jiao Tong University, China)
high critical tempearature of monolayer FeSe superconductor formed on an oxide substrate revealed by electron transport measurements and Meissner effect

Xucun Ma (Tsinghua University, China, *F*)
Growth and atomic-level control of thin films including topological insulators and superconductors, and their novel physical properties and quantum phenomena

Emi Minamitani (Institute for Molecular Science, Japan, *F*)
theoretical studies on Kondo effects and inelastic excitation of molecular vibration and phonon in STM and photoemission

Yoshinori Okada (Okinawa Institute of Science and Technology Graduate University, Japan)
quantum materials by STM, eg. topological crystalline materials

Michelle Y. Simmons (University of New South Wales, Australia, *F*)
successfully fabricated a single-atom transistor and demonstrated single-atom qubit operation using atomic manipulation technique of STM

Eng Soon Tok (Professor, National University of Singapore, Singapore)
investigation of atomic dynamics on transition metal dicharcogenides and graphene and their defects using STM and transmission electron microscopy

Han Woong Yeom (Pohang University of Science and Technology, Korea)
quasi-1D electronic states on surfaces; topological properties of solitons in charge density wave states formed on 1D metal chain systems

NAMES OF OTHER SPONSORS

The Japan Society of Vacuum and Surface Science (JVSS) (secretarial and organizational assistance)
Okinawa Institute of Science and Technology (OIST) (workshop site, equipment, and pending, 10,000 Euro)
University of Tokyo (pending, 5,000 Euro)

UNDERWRITING: Who will underwrite any financial loss? (If approved, IUVSTA will make offer sponsorship to a predetermined maximum level and will not have any further financial responsibility)

The Japan Society of Vacuum and Surface Science

CHECKLIST FOR APPLICANTS

Organizers must undertake to fulfil the conditions below. Financial contributions from IUVSTA are conditional upon this undertaking.

I AGREE to -

- PROVIDE full information of event to the IUVSTA Scientific Secretary
- PROVIDE a budget, updated in the event of major changes, to the IUVSTA Scientific Secretary
- PROVIDE Dedicated Website for the event. Give url if known (this information must be passed to the Scientific Secretary before any IUVSTA funds will be released):
  Name and e-mail address of person who will maintain the site:

  Shuji Hasegawa, shuji@surface.phys.s.u-tokyo.ac.jp

- PROVIDE a report of the event after its completion for the IUVSTA web site
  Name and e-mail address of person who will provide this report:

  Shuji Hasegawa, shuji@surface.phys.s.u-tokyo.ac.jp

- AGREE to include IUVSTA name and logo on all event announcements
- AGREE to use IUVSTA numbering system (e.g. IUVSTA Workshop no NN) on all event announcements
- AGREE to give a short presentation on IUVSTA at the beginning of the event. (Suitable material may be downloaded from the IUVSTA web site http://www.iuvsta.org)
- AGREE to distribute IUVSTA material provided to the organizers
- AGREE not to have a published Proceedings of the event
- AGREE to follow the Workshop Guidelines described in the IUVSTA Procedure Manual (downloadable from the IUVSTA web site: http://www.iuvsta.org)

I agree to fulfil all the points of the above checklist

Name: Shuji Hasegawa

Date and Signature: Jan. 18, 2020

 [signature]

Budget for the Workshop (2020.9.13-17)

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DATE: 13 – 17 September 2020

Income	Unit cost (EUR)	Quantity	Sub-Total (EUR)	Remarks
Registration Fee (per person)	500	24	12,000	24 registered participants plus 16 invited speakers
Registration Fee for Student (per person)	250	10	2,500	10 students
OIST funding	10,000	1	10,000	
IUVSTA funding	6,000	1	6,000	used for airfare partial support for invited speakers
University of Tokyo funding	5,000	1	5,000	
Total (EUR)			35,500	

Expenditures	Unit cost (EUR)	Quantity	Sub-Total (EUR)	Remarks
Meals (4 days per person)	120	50	6,000	Lunch, Dinner, and Coffee breaks
Banquet (per person)	50	50	2,500	
Get-Together party (on the first day, per person)	20	30	600	
Meeting Rooms, Poster Board rental	0	1	0	supported by OIST
Hotel Rooms (4 nights per person)	420	40	16,800	
Hotel Rooms (Students, shared)	300	10	3,000	
Miscellaneous	200	1	200	book of abstracts, name tag, etc.
Airfare partial support (outside Asia, per person)	800	3	2,400	for 3 invited speakers outside of Asia-Pacific region
Airfare partial support (Asia ex. Japan, per person)	400	10	4,000	for 10 invited speakers from Asia-Pacific region except J
Total (EUR)			35,500	

Registration fees include lunches (4 days), coffee breaks, conference dinner and accommodation