The 3rd Univ. Ryukyus International Symposium of Theoretical and Computational Science (RIS-TCS 2020)

-Frontier of Physics and Chemistry-

UNIVERSITY OF THE RYUKYUS

20 – 22 March, 2020

University of the Ryukyus

Since 2017, the Univ. Ryukyus computational science symposium has been held as domestic version. In the 3rd symposium, official languages has changed to be English and Japanese, to be able to welcome non-Japanese speakers. Our purpose is to activate interdisciplinary discussion between theoretical physics and chemistry. The topics discussed here are particle physics, theoretical physics, computational physics, computational chemistry, quantum chemistry and so on. You are welcome to participate in RIS-TCS 2020.

Information of Coronavirus

All invited and poster sessions were cancelled, due to the effect of unforeseen coronavirus. Instead, RIS-TCS 2020 was virtually held through the internet. It implies that all presentations was regarded to be performed, without attending the symposium venue physically.

【Organisers】

Taku Onishi, University of the Ryukyus & Mie University (Chair)

Nobuaki Shimoji, University of the Ryukyus

Susumu Yanagisawa, University of the Ryukyus

Masato Senami, Kyoto University

Shigeki Matsumoto, The University of Tokyo

【Venue】

50th Anniversary Memorial Hall, University of the Ryukyus

⇒Virtual Symposium: Via Internet Communication

【Contact】

Dr. Taku Onishi, E-mail: onishi.taku@mie-u.ac.jp

Dr. Nobuaki Shimoji, E-mail: nshimoji@tec.u-ryukyu.ac.jp

Dr. Susumu Yanagisawa, E-mail: shou@sci.u-ryukyu.ac.jp

Speakers and Presenters of RIS-TCS 2020

Prenary Lectures (40 min)
Taku Onishi
Masako Takasu
Toshio Kasai
Shigeki Matsumoto
Alexander Kusenko
Kohei Kamada
Koji Tsumura
Eizo Nakaza
Masahide Yamaguchi
Masahito Yamazaki
Yoshichika Onuki
Susumu Yanagisawa
Tokuei Sako
Minoru Tanaka
Takehiko Asaka
Michihisa Takeuchi
Joe Sato

Invited Talks (25 min)
Satoshi Shirai
Tom Melia
Vevgeny Stadnik
Neil Barrie
Nodoka Yamanaka
Eibun Senaha
Masaaki Nakamura
Masato Yamanaka
Ipsita Saha

Oral Presentations (15 min)
Shun-ichi Horigome
Taisuke Katayose
Asahi Kojima

Poster Presentations
Taku Onishi
Masaaki Nakamura
Naoya Kuroda
Tomoki Shimizu
Shingo Kuniyoshi
Ryutaro Tsuchida

Program of RIS-TCS 2020

20 March		21 March		22 March	
Session 1		**Session 4**		**Session 6**	
Chair: Sako		**Chair: Yanagisawa**		**Chair: Asaka**	
08:30-09:10	P01Onishi	08:30-09:10	P08Nakaza	08:30-09:10	P14Tanaka
09:10-09:50	P02Takasu	09:10-09:50	P09Yamaguchi	09:10-09:35	I05N.Yamanaka
09:50-10:30	P03Kasai	09:50-10:30	P10Yamazaki	09:35-10:00	I06Senaha
				10:00-10:25	I07Nakamura
Break		**Break**		**Break**	
Session 2		**Session 5**		**Session 7**	
Chair: Onishi		**Chair: Senami**		**Chair: Tanaka**	
10:50-11:30	P04Matsumoto	10:50-11:30	P11Onuki	10:50-11:30	P15Asaka
11:30-12:10	P05Kusenko	11:30-12:10	P12Yanagisawa	11:30-12:10	P16Takeuchi
12:10-12:50	P06Kamada	12:10-12:50	P13Sako	12:10-12:50	P17Sato
Break		**Break**		**Break**	
Session 3				**Session 8**	
Chair: Matsumoto				**Chair: Sato**	
14:00-14:40	P07Tsumura			14:00-14:25	I08M.Yamanaka
14:40-15:05	I01Shirai			14:25-14:50	I09Saha
15:05-15:30	I02Melia			14:50-15:05	O1Horigome
15:30-15:55	I03Stadnik			15:05-15:20	O2Katayose
15:55-16:20	I04Barrie			15:20-15:35	O3Kojima
				Poster Session	
				Chair: Shimoji	
				15:45-17:00	

*P=Plenary Lecture (01-17)

*I=Invited Talk (01-09)

*O=Oral Presentation (01-03)

Plenary Lectures (40 min)

[P01] Theoretical and Computational Science - Frontier of Physics and Chemistry

Taku Onishi[1,2]

[1]*Graduate School of Engineering, Mie University, Japan*

[2]*Hylleraas Centre for Quantum Molecular Sciences, Department of Chemistry, University of Oslo, Norway*

[P02] Molecular Dynamics Simulation of LARFH Protein with Metal

M. Watabe[1], K. Nobuoka[1], H. Yamada[2], T. Miyakawa[1], R. Morikawa[1], **M. Takasu**[1], T. Uchida[3], A. Yamagishi[4]

[1]*Computational Biophysics Laboratory in Tokyo University of Pharmacy and Life Sciences, Japan*

[2]*Education and Research Institute of Information Science in Tokyo University of Pharmacy and Life Sciences, Japan*

[3]*Laboratory of Bioanalytical and Environmental Chemistry in Tokyo University of Pharmacy and Life Sciences, Japan*

[4] *Laboratory of Bioengineering in Tokyo University of Pharmacy and Life Sciences, Japan*

[P03] Exploring unexpected roaming mechanisms beyond the transition state theory in chemical and photochemical reactions

Toshio Kasai,[1,2] Takehiro Yonehara,[3] Takahito Nakajima,[3] Hikaru Kobayashi,[2] King-Chuen Lin[1,4]

[1] *Department of Chemistry, National Taiwan University, Taipei, Taiwan*

[2] *Institute of Scientific and Industrial Research, Osaka University, Japan*

[3] *RIKEN Center for Computational Science, Japan*

[4] *Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan*

[P04] Dark Matter Search and International Linear Collider (ILC) Project

Shigeki Matsumoto

Kavli Institute for the Physics and Mathematics of the Universe, The University of Tokyo, Japan

[P05] Primordial black holes as dark matter from supersymmetry

Alexander Kusenko

Department of Physics & Astronomy, UCLA, USA

Kavli IPMU, The University of Tokyo, Japan

[P06] Magnetic Fields and Quantum Anomaly in the Early Universe

Kohei Kamada

Research Center for the Early Universe, Graduate School of Science, The University of Tokyo, Japan

[P07] The Origin of Pseudo-Nambu-Goldstone Dark Matter

Yoshihiko Abe[1], Takashi Toma[2], **Koji Tsumura[3]**

[1]*Department of Physics, Kyoto University, Japan*

[2]*Department of Physics, McGill University, Canada*

[3]*Department of Physics, Kyushu University, Japan*

[P08] A new conception of relativity

Eizo Nakaza

Department of Civil Engineering, University of the Ryukyus, Japan

[P09] Generalized ghost-free propagators in nonlocal field theory

Masahide Yamaguchi[1], Luca Buoninfante[1,2], Gaetano Lambiase[2,3], Yuichi Miyashita[1], and Wataru Takebe[1]

[1]*Department of Physics, Tokyo Institute of Technology, Japan*

[2]*INFN Sezione di Napoli, Gruppo collegato di Salerno, Italy*

[3]*Dipartimento di Fisica "E.R. Caianiello", Universit`a di Salerno, Italy*

[P10] Topological Charges in Lattice Gauge Theories

Masahito Yamazaki

Kavli IPMU, The University of Tokyo, Japan

[P11] Unique Electronic States in Eu-Based Compounds

Yoshichika Onuki[1,2] , Masato Hedo[1], and Takao Nakama[1]

[1]*Faculty of Science, University of the Ryukyus, Japan*

[2]*RIKEN Center for Emergent Matter Science, Japan*

[P12] Role of the molecular configuration on the electronic structure of organic crystals: A combined DFT and *GW* study

Susumu Yanagisawa[1] and Ikutaro Hamada[2]

[1]*Department of Physics and Earth Sciences, University of the Ryukyus, Japan*

[2]*Department of Precision Science and Technology, Graduate School of Engineering, Osaka University, Japan*

[P13] Stochastic dynamics approach to a few electron artificial atoms

Tokuei Sako

Laboratory of Physics, College of Science and Technology, Nihon University, Japan

[P14] Search for new intra-atomic force with isotope shifts

Minoru Tanaka

Department of Physics, Osaka University, Japan

[P15] T**heoretical aspects of neutrino physics: Particle Physics and Cosmology**

Takehiko Asaka

Department of Physics, Niigata University, Japan

[P16] Muon g-2 in 2HDMs at LHC

Michihisa Takeuchi

Kobayashi-Maskawa Institute for the Origin of Particles and the Universe, Nagoya University, Japan

[P17] IceCube Gap and L_mu-L_tau model

Joe Sato[1], Takeshi Araki[2], Kento Asai[3], Fumihiro Kaneko[1], Toshihiko Ota[1], Takashi Shimomura[4]

[1]*Department of Physics, Saitama University, Japan*

[2]*Learning Support Center, Kogakuin University, Japan*

[3]*Department of Physics, The University of Tokyo, Japan*

[4]*Faculty of Education, University of Miyazaki, Japan*

Invited Talks (25 min)

[I01] How Heavy can Neutralino Dark Matter be?

Hajime Fukuda[1], Feng Luo[2], and **Satoshi Shirai**[3]

[1]*Theoretical Physics Group, Lawrence Berkeley National Laboratory, USA*

[2]*School of Physics and Astronomy, Sun Yat-sen University, China*

[3]*Kavli Institute for the Physics and Mathematics of the Universe, The University of Tokyo, Japan*

[I02] Dark Matter Chemistry

Tom Melia

Kavli IPMU, The University of Tokyo, Japan

[I03] Novel approaches to dark matter detection with atomic, molecular and optical experiments

Yevgeny Stadnik

Kavli Institute for the Physics and Mathematics of the Universe, The University of Tokyo, Japan

[I04] Big Bounce Baryogenesis

Neil Barrie

Kavli Institute for the Physics and Mathematics of the Universe, The University of Tokyo, Japan

[I05] Electric dipole moment of atoms

Nodoka Yamanaka

Department of Physics, University of Massachusetts, USA

[I06] Probing matter-antimatter asymmetry of the Universe with the electric dipole moment of electron

Kaori Fuyuto[1], Wei-Shu Hou[2], and **Eibun Senaha**[3,4]

[1]*Theoretical Division, Los Alamos National Laboratory, USA*

[2] *Department of Physics, National Taiwan University, Taiwan*

[3]*Advanced Institute of Materials Science, Ton Duc Thang University, Vietnam*

[4]*Faculty of Applied Sciences, Ton Duc Thang University, Vietnam*

[I07] Rotational State Selection of Asymmetric Top Molecules and Its Application to Photofragment Imaging

Masaaki Nakamura[1], Shiun-Jr Yang[1], Po-Yu Tsai [2], King-Chuen Lin[1,3], Toshio Kasai[1,4], Dock-Chil Che[5], Federico Palazzetti[6], Andrea Lombardi[6] and Vincenzo Aquilanti[6,7]

[1]*Department of Chemistry, National Taiwan University, Taiwan*

[2]*Department of Physics, National Chung-Hsing University, Taiwan*

[3]*Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan*

[4]*Institute of Scientific and industrial Research, Osaka University, Japan*

[5]*Department of Chemistry, Graduate School of Science, Osaka University, Japan*

[6]*Università di Perugia, Dipartimento di Chimica, Biologia e Biotecnologie , Italy*

[7]*Istituto di Struttura della Materia, Consiglio Nazionale delle Ricerche, Italy*

[I08] Big-bang nucleosynthesis with long-lived charged massive particle

Masato Yamanaka[1,2]

[1]*Department of Mathematics and Physics, Osaka City University, Japan*

[2]*Nambu Yoichiro Institute of Theoretical and Experimental Physics, Osaka City University, Japan*

[I09] To determine the sign of bottom Yukawa coupling at the HL-LHC

Ipsita Saha[1], Michihisa Takeuchi[2]

[1]*Kavli IPMU, The University of Tokyo, Japan*

[2]*Department of Physics, Nagoya University, Japan*

Oral Presentations (15 min)

[O01] *J*-factor estimation of Draco, Sculptor and Ursa Minor dwarf spheroidal galaxies with the member/foreground mixture model

Shun-ichi Horigome[1], Kohei Hayashi[2], Masahiro Ibe[1,2], Miho N. Ishigaki[3], Shigeki Matsumoto[1] and Hajime Sugai[1]

[1]*Kavli Institute for the Physics and Mathematics of the Universe, The University of Tokyo, Japan*

[2]*Institute for Cosmic Ray Research, The University of Tokyo, Japan*

[3]*Astronomical Institute, Tohoku University, Japan*

[O02] Non relativistic effect on indirect probe of EWIMP at collider experiment

Taisuke Katayose[1], Shigeki Matsumoto[1], and Satoshi Shirai[1]

[1]*Kavli IPMU, The University of Tokyo, Japan*

[O03] Light thermal fermionic dark matter and core-cusp problem

Asahi Kojima[1], Shigeki Matsumoto[1], Yue-Lin Sming Tsai[2,3], and Keisuke Yanagi[1]

[1]*Kavli IPMU, The University of Tokyo, Japan*

[2]*Institute of Physics, Academia Sinica, Nangang, Taipei, Taiwan*

[3]*Chinese Academy of Sciences, China*

Poster Presentations

[P01] Hydride Ion Transport in Perovskite Fluoride and Hydride

Taku Onishi[1,2]

[1]*Graduate School of Engineering, Mie University, Japan*

[2]*Hylleraas Centre for Quantum Molecular Sciences, Department of Chemistry, University of Oslo, Norway*

[P02] Molecular Orientational Control of Asymmetric and Bulky Molecules with Hexapole State Selector

Masaaki Nakamura[1], Hsiu-Pu Chang[1], King-Chuen Lin[1,3], Toshio Kasai[1,4], Dock-Chil Che[5], Vincenzo Aquilanti[6,7] and Federico Palazzetti[6]

[1]*Department of Chemistry, National Taiwan University, Taiwan*

[2]*Department of Physics, National Chung-Hsing University, Taiwan*

[3]*Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan*

[4]*Institute of Scientific and industrial Research, Osaka University, Japan*

[5]*Department of Chemistry, Graduate School of Science, Osaka University, Japan*

[6]*Università di Perugia, Dipartimento di Chimica, Biologia e Biotecnologie, Italy*

[7]*Istituto di Struttura della Materia, Consiglio Nazionale delle Ricerche, Italy*

[P03] Effects of molecular structure of polyatomic polar molecules on spin dynamics and effective electric field

Naoya Kuroda and Masato Senami

Department of Micro Engineering, Kyoto University, Japan

[P04] The asymmetry of electron chirality induced by chiral structure of molecule

Tomoki Shimizu and Masato Senami

Department of Micro Engineering, Kyoto University, Japan

[P05] Numerical renormalization group study of an impurity Anderson model for the Eu compounds

S. Kuniyoshi[1], R. Shiina[2]

[1]*Graduate of Engineering and Science, University of the Ryukyus, Japan*

[2]*Faculty of Science, University of the Ryukyus, Japan*

[P06] Contribution of the 5f electronic component of the Fermi surface of Ac and Th

R. Tsuchida[1], Y. Yamakawa[2], Y. Tatetsu[3] and T. Maehira[4]

[1]*Graduate of Engineering and Science, University of the Ryukyus, Japan*

[2]*Tomigusuku J.H.S, Japan*

[3]*Meio University, Japan*

[4]*Faculty of Science, University of the Ryukyus, Japan*