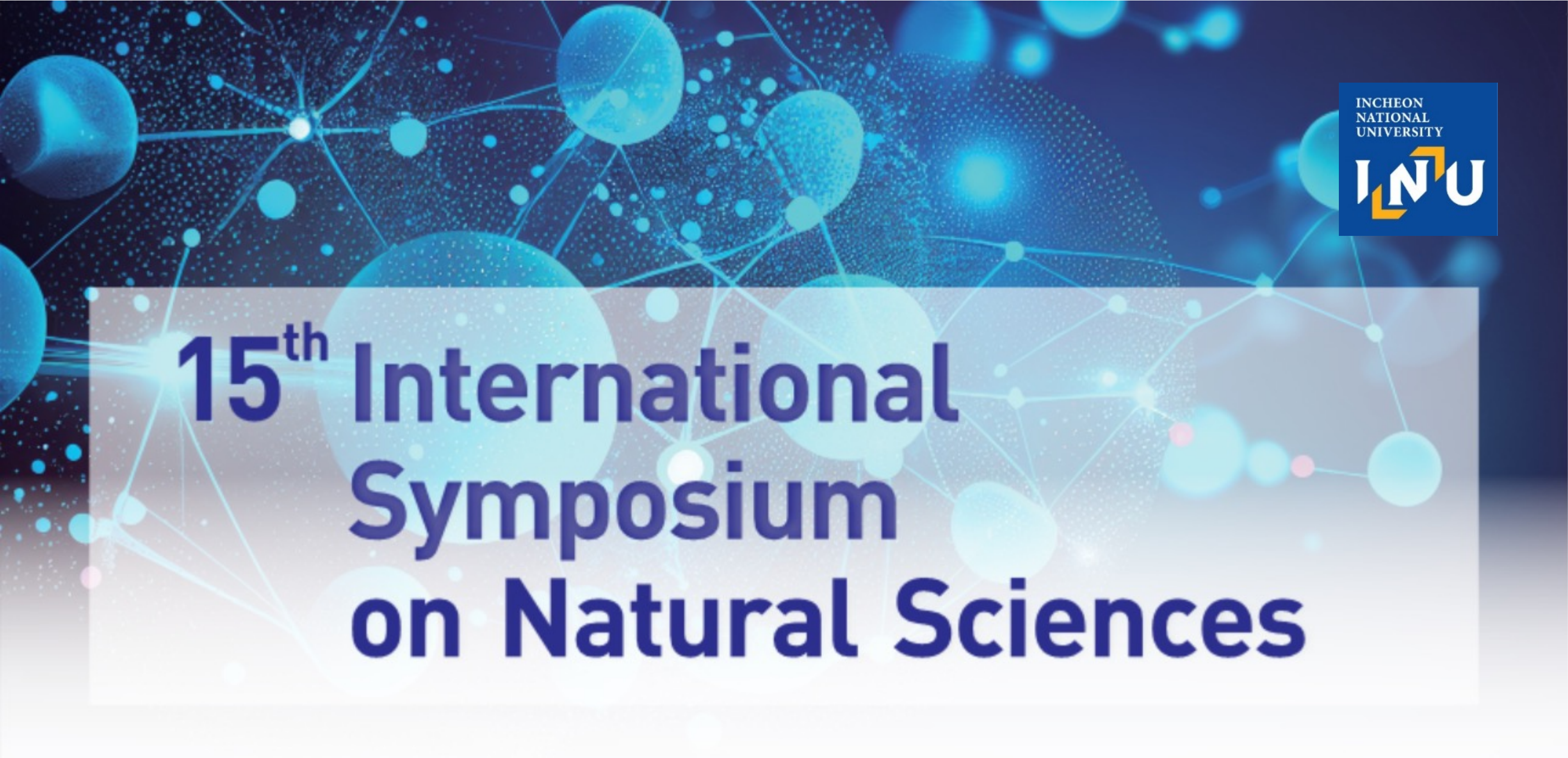

Date: October 30th~31st, 2023

Research Institute of Basic Sciences
Incheon National University

Bulletin

of the 15th International Symposium on Natural Sciences

INU 인천대학교 기초과학연구소
RESEARCH INSTITUTE OF BASIC SCIENCES, INCHEON NATIONAL UNIVERSITY

기초과학연구소

Research Institute of Basic Sciences
Incheon National University

Bulletin

of the 15th International Symposium on Natural Sciences

Date: October 30th ~ 31st, 2023

발행일 | 2023년 10월 25일
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발행처 | 인천대학교 기초과학연구소

2023-2 운영위원회		
직위	학과(부)	성명
소장	화학과	김태현
운영위원	수학과	문병수
	화학과	김형준
	물리학과	박승룡
	해양학과	김연정
	생명과학부	이종구
상임연구원	기초과학연구소	강유리
박사후연구원	기초과학연구소	장 훈

Contents

1
Oral Session (Physics)

1-1. Munkhbayar Batmunkhv (DECRA / Griffith University)

[Title] 2D materials in energy applications: photovoltaic and catalysis

[Abstract] Emerging solar cells (known as third generation photovoltaic) including perovskite solar cells, dye-sensitised solar cells, organic solar cells and silicon-based heterojunction solar cells have attracted increasing attention due to their low-cost, high efficiency, ease of fabrication and tailorable design. Despite their great promises, these solar cells do have some disadvantages such as use of expensive electrode materials, the high temperature required during production and poor operational stabilities. Two-dimensional (2D) layered nanomaterials such as black phosphorus and metal carbide MXene have shown great promise for use in a wide range of energy related applications including solar cells. The high degree of tunability in the properties of these unique nanomaterials offers an abundance of opportunities for next generation solar cells. In this talk, I will present our recent contributions to this cutting-edge research area and also highlight the future promises in this area.

Date: Oct. 31st, 2023 Time: 13:00 pm – 14:00 pm Chair: Dorj Odkhuu	Location: Zoom (ID: 822 2855 9110, PW: 135582)

C.V. of the speaker:

Munkhbayar Batmunkh is a lecturer and an Australian Research Council (ARC) DECRA Fellow in the School of Environment and Science and Queensland Micro- and Nanotechnology Centre (QMNC) at Griffith University, Australia. He has also worked at the University of Queensland (2018–2019) and Flinders University (2017–2018), both in Australia. He completed his Ph.D. in Chemical Engineering in 2017 at the University of Adelaide (Australia) and obtained his M.E. and B.Sc. degrees in 2012 and 2010 from Gyeongsang National University (South Korea) and National University of Mongolia (Mongolia), respectively. He currently leads an independent research group at Griffith University, working on functional materials for energy-related applications with specific interests in solar cells and catalysis.

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1-2. Doohee Cho (Yonsei University)

[Title] An inhomogeneous iron-based superconductor Fe(Se,Te)

[Abstract] The presence of impurities can have a significant impact on the behavior of superconductors, causing low-lying excitations to emerge within their gaps. As concentrations of impurities increase, these states can transform into continuum states. Certain unconventional superconductors require a specific amount of doping concentrations to improve their superconductivity. However, we have lacked an understanding of the correlation between impurities and superconductivity. Our study examines the electronic structure of the unconventional superconductor Fe(Se,Te) using scanning tunneling microscopy (STM). By using a superconducting tip, we are able to visualize the variations of the superfluid density in space and obtain tunneling spectra with higher energy resolution. We observe in-gap states that are dispersed in space and can be modulated by electric fields from the STM tip. Interestingly, we also detect similar spectral features at energy levels higher than the superconducting gap. Our findings suggest that these distinct features are not solely due to the multiband electronic structure commonly observed in Fe-based superconductors. Instead, we propose that they arise from an impurity band formed through orbital-selective pair breaking induced by disorder potentials. These results contribute to our understanding of amorphous impurity bands and their superconducting properties.

Date: Oct. 30th, 2023 Time: 10:10 am – 11:00 am Chair: Seung Ryong Park	Location: On-site Room 326

C.V. of the speaker:

Sep. 2019 ~ Present	Assistant Professor	Department of Physics, Yonsei University, South Korea
May 2017 ~ Aug. 2019	Postdoctoral research fellow	Leiden Institute of Physics, Leiden University, Leiden, The Netherlands
Apr. 2016 ~ Apr. 2017	Postdoctoral research fellow	Department of Physics and Astronomy, Rutgers University, New Jersey, U.S.A
Sep. 2013 ~ Mar. 2016	Postdoctoral research fellow	Institute for Basic Science (IBS), POSTECH, Pohang, Korea
Sep. 2005 ~ Aug. 2012	Ph.D. in Physics	Yonsei University, South Korea
Mar. 1999 ~ Aug. 2005	B.S. in Physics	Yonsei University, South Korea

1-3. Chul-Jin Choi (Korea Institute of Materials Science)

[Title] Development and Research Status of Rare Earth Free Permanent Magnet

[Abstract] Since 1980, Nd-Fe-B permanent magnets have been used as the most powerful magnet. However, rare earth element materials issues and their poor temperature dependence have attracted much demand for new magnetic materials to replace the Nd-Fe-B magnets, many researchers have paid great attention to develop new metallic based permanent magnets. Among them, Mn based Mn-Al, Mn-Bi alloys, body centered tetragonal Fe16N2 alloy and Fe rich compounds with ThMn12 crystal structure have received much attention. To develop new metallic permanent magnet, new alloy design and processing should be solved. Also understanding of phase transformation and detailed microstructural analysis is requisite.
We have approached to develop new metallic magnet by powder metallurgy processing for Mn and Fe based alloys. To enhance the magnetic properties, the new alloy design and development of new processing have been carried out for past several years.
In this paper, we explain the obtaining and reason of good magnetic properties of new metallic permanent magnetic materials and prospects for several potential metallic alloys as next generation permanent magnetic materials.

Date: Oct. 30th, 2023 Time: 14:10 pm – 15:10 pm Chair: Dorj Odkhuu	Location: Zoom (ID: 872 0101 2192, PW: 957496)

C.V. of the speaker:

1986.3 ~ Present	Principal Researcher	Korea Institute of Materials Science, South Korea
2017 ~ Present	Conjunctive Professor	Hanyang University, South Korea
2023 ~ Present	Chairman of Machinery and Materials committee	National council of R&D of science and technology, South Korea
2009 ~ 2019	Conjunctive Professor	University of Science and Technology, South Korea
Jan. 2012 ~ Jan. 2015	Director	Powder/Ceramic Materials Division, Korea Institute of Materials Science, South Korea
Jul. 2007 ~ Jan. 2012	Group Leader	Functional Nanopowder Materials Group, Korea Institute of Materials Science, South Korea
Aug. 1997	Ph.D. in Materials Science and Engineering	Korea Advanced Institute of Science and Technology, South Korea
Feb. 1986	M.S. in Materials Science and Engineering	Korea Advanced Institute of Science and Technology, South Korea
Feb. 1984	B.S. in Metallurgical Engineering	Korea Advanced Institute of Science and Technology, South Korea

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1-4. Takeshi Egami (Oak Ridge National Laboratory)

[Title] Strong Electron Correlation and Superconductivity

[Abstract] Electrons interact with each other via a strong Coulomb force. And yet in most matter their behavior can be described by the nearly-free electron theory. This strong approximation, first proposed by Sommerfeldt and justified by Landau, is the basis for the density functional theory (DFT), which is widely used today in modeling. However, the DFT fails for the strongly correlated electron systems, such as the transition metal oxides, which exhibit various remarkable phenomena including the high-temperature superconductivity.

The strongly correlated electron systems are usually described by the tight-binding Hubbard model, which includes local Coulomb repulsion at each atom. The repulsive term makes the Hubbard Hamiltonian non-linear, and difficult to solve. Theoretical efforts have focused on finding approximate solutions for this model. However, in my view the current approaches miss a key point of the problem, the fundamental difference between weakly correlated electrons and strongly correlated electrons. The key is that weakly correlated electrons are gas-like, whereas strongly correlated electrons are liquid-like. In gas, particles interact each other only through occasional collisions, so that the potential energy of interaction, <V>, is negligible compared to the kinetic energy, <T>. However, in liquid they are strongly correlated, and <V> is comparable to <T> through the equipartition theorem. Therefore, for weakly correlated electrons the DFT is valid. But for strongly correlated electrons the DFT is no longer valid, and the Coulomb repulsion energy reflects details of dynamic correlation. For superfluid 4He we found through inelastic neutron scattering that the atomic distance of superfluid (4 Å) is significantly larger than that of normal fluid (3.6 Å). Similarly, in the cuprates the Cooper pairs are further separated in the superconducting state compared to the normal state, reducing the Coulomb repulsion energy. This adds to the driving force for superconducting transition and raise the Tc.

Date: Oct. 31st, 2023 Time: 10:00 am – 11:00 am Chair: Dorj Odkhuu	Location: Zoom (ID: 822 2855 9110, PW: 135582)

C.V. of the speaker: Dr. Takeshi Egami is UT-ORNL Distinguished Scientist/Professor of the University of Tennessee at Knoxville, Department of Materials Science and Engineering and Department of Physics and Astronomy, with join appointment at Materials Science and Technology Division, Oak Ridge National Laboratory. He received his B. E. degree in Applied Physics from the University of Tokyo in 1968, and his Ph.D. in Materials Science from the University of Pennsylvania in 1971. After the postdoctoral research at the University of Sussex in U.K. and Max-Planck-Institut für Metallforschung in Stuttgart, Germany, he returned to the University of Pennsylvania in 1973 as Assistant Professor. He was promoted to Associate Professor in 1976, to Professor in 1980, and was Department Chair (1997-2002). In 2003 he moved to the current position. He was Director of UT-ORNL Joint Institute for Neutron Sciences (2008-2015). His research fields include liquid and glass, effects of disorder in crystals, electronic oxides including superconducting cuprates and CMR manganites, and dynamic correlation among atoms and electrons. He is known for promoting the use of the pair-distribution function (PDF) technique to the study of complex crystalline materials and the lattice effects in cuprate superconductors. He received 2003 B. E. Warren Award for Diffraction Physics from American Crystallography Association, 2010 J. D. Hanawalt Award from International Center for Diffraction Data, and other awards. He is Fellow of the American Physical Society and the Neutron Scattering Society of America. Dr. Egami has published a book (*Underneath the Bragg Peaks: Structural Analysis of Complex Materials,* Elsevier, 2003, 2012), over 30 reviews and over 550 technical papers. He is Editor of *Advances in Physics*, and Associate Editor of *Frontier in Physics*.

PHYSICS

1-5. Jungseek Hwang (Sungkyunkwan University)

[Title] Glue spectrum for superconductivity via optical spectroscopy

[Abstract] Optical spectroscopy is one of the most important spectroscopic techniques in condensed matter physics. Condensed matter shows its own unique phononic (or lattice vibration modes) and electronic structures, which are caused by the collective contributions of constituent atoms. Optical transitions occur by promoting electrons from occupied states below the Fermi level to unoccupied ones above it. Therefore, the phononic and electronic structures of the condensed material system are encoded in measured optical spectra. Superconductivity is one of the most intriguing phenomena in condensed-matter physics. In a superconducting state, electron pairs are formed by an effectively attractive force created by various microscopic mechanisms and condensed into a macroscopic ground (superconducting) state. Finding out the pairing glue for electron pairs is the key task for understanding superconductivity. I will introduce superconductivity and discuss how the glue (spectrum) can be obtained by using optical spectroscopy.

Date: Oct. 30th, 2023 Time: 11:20 am – 12:20 pm Chair: Seung Ryong Park	Location: On-site Room 326

C.V. of the speaker:

2011 ~ Present	Professor	Department of Physics, Sungkyunkwan University, South Korea
2009 ~ 2011	Assistant Professor	Department of Physics, Pusan National University, South Korea
2007 ~ 2009	Postdoctoral Research Associate	Department of Physics, University of Florida, USA
2001 ~ 2007	Research Scientist	Department of Physics & Astronomy, McMaster University, Canada
2001	Ph.D. in Physics	University of Florida, USA
1991	M.S. in Physics	Pusan National University, South Korea
1989	B.S. in Physics	Pusan National University, South Korea

1-6. Khorgolkhuu Odbadrakh (Oak Ridge National Laboratory)

[Title] All Electron, Real Space Density Functional Theory Method Based on Multiple Scattering Theory and its applications in Complex Concentrated Alloys

[Abstract] Computational study of complex disordered alloys is extremely challenging due to immense compositional landscape. Conventional methods based on pseudopotentials and plane wave basis functions are constrained by their computational scaling, and necessity to have periodic boundary conditions. Multiple Scattering theory, on the other hand, allows scattering of electrons on atomic sites to be treated as real space Green's functions, thus avoid using basis functions and pseudopotentials all together. As a result, this method scales linearly with number of electrons for spherical potential (for now) and does not need a periodic boundary condition. A full potential version with force calculations is under development.

Using this the Multiple Scattering Theory, we were able to shed light on the electronic origin of solid solution strengthening. Until recently, mechanical strength of compositionally complex alloys has been understood based on the difference in atomic sizes of the constituent elements. Our findings lead to a simple property-targeted quantitative design approach for atomic-level complexity in complex concentrated and high-entropy alloys, based on quantum- mechanically derived atomic-level pressure approximation. It allows identification of the best suited element mix for high solid-solution strengthening using the simple electronegativity difference among the constituent elements. Using this approach, a simple binary NiV solid solution whose yield strength exceeds that of the Cantor high-entropy alloy by nearly a factor of two has been fabricated. This study provides general design rules that enable effective utilization of atomic level information to reduce the immense degrees of freedom in compositional space without sacrificing physics-related plausibility.

Date: Oct. 31st, 2023 Time: 11:10 am – 12:10 pm Chair: Dorj Odkhuu	Location: Zoom (ID: 822 2855 9110, PW: 135582)

C.V. of the speaker:

2017 ~ Present	Computational Scientist	National Institute for Computational Sciences, Univ. of Tennessee/Oak Ridge National Laboratory, TN, USA
2013 ~ 2017 2010 ~ 2013	Computational Scientist Postdoctoral research fellow	Oak Ridge National Laboratory, TN, USA
2007 ~ 2010	Postdoctoral researcher	West Virginia University, WV, USA
March 2007	Ph.D. in Physics	North Carolina State University, NC, USA
March 2000	M.Sc. In Physics	University of New South Wales, Sydney, Australia
September 1995	Postgraduate Diploma	International Centre for Theoretical Physics, Trieste, Italy
June 1990	B.Sc in Physics	National University of Mongolia, Ulaanbaatar, Mongolia

PHYSICS

1-7. Dongjoon Song (University of British Columbia)

[Title] Hole Superconducting Mechanism of Electron-Doped High-Tc Superconductors

[Abstract] Antiferromagnetic spin fluctuations are the most promising candidate as the pairing glue of high critical temperature (Tc) superconductivity. However, many-body states and intertwined orders in cuprates have made it difficult to determine how electrons interact with fluctuating spins to form Cooper pairs. Recent experimental and theoretical studies have suggested spin fluctuation-driven quasiparticle band folding, but the relationship between the resultant Fermi pockets and superconductivity remains unclear. Here, we investigated this relationship in electron-doped Pr1−xLaCexCuO4□□ using angle-resolved photoemission and muon spin spectroscopy. By extracting the folded band component in the single-particle nodal band spectrum and analysing the muon relaxation rate, we discovered that Tc is proportional to the quasiparticle weight of the nodal hole pocket in the regime of the fluctuating antiferromagnetic ground state around a presumed quantum critical point. In this talk, based on our experimental and numerical observations, I will show the most recent update of the phase diagram of electron-doped cuprates, followed by a discussion on the role of interplay between the electron correlation and antiferromagnetic fluctuations in enhancing the Fermi hole pocket and consequently driving the superconductivity.

Date: Oct. 30th, 2023 Time: 09:00 am – 10:00 am Chair: Seung Ryong Park	Location: Zoom (ID: 411 832 8046, PW: w6Q4xQ)

C.V. of the speaker:

Present	Research Associate | Senior Scientist	Stewart Blusson Quantum Matter Institute, The University of British Columbia, Vancouver BC, Canada
2018.04 ~ 2021.12	Post-doctoral researcher	Institute for Basic Science (IBS), Seoul National University, Republic of Korea
2013.09 ~ 2018.03	Post-doctoral researcher	Advanced Industrial Science and Technology (AIST), Japan
2013.03 ~ 2013.08	Post-doctoral researcher	Yonsei University, Institute of natural science, Republic of Korea
2006 ~ 2013	Ph. D., Physics	Yonsei University, Republic of Korea
2002 ~ 2006	B. S., Physics	Yonsei University, Republic of Korea
2004 ~ 2006	Course in science & physics teacher education	Yonsei University, Republic of Korea

2

Oral Session (Life Sciences)

2-1. Kwang-jin Cho (Wright State University)

[Title] K-Ras plays a key role in antioxidant-induced tumer progression

[Abstract] Ras proteins are membrane-bound GTPases that regulate essential cellular processes at the plasma membrane (PM). Activating point mutations of K-Ras, one of the three Ras isoforms in mammalian cells, are frequently found in human cancers. Ferrocene derivatives, which elevate cellular reactive oxygen species (ROS), have shown to block the growth of non-small cell lung cancers harboring oncogenic mutant K-Ras. Here, we tested a novel ferrocene derivative on the growth of pancreatic ductal adenocarcinoma and non-small cell lung cancer. Our compound, which elevated cellular ROS levels, inhibited the growth of K-Ras-driven cancers, and abrogated the PM binding and signaling of K-Ras in an isoform-specific manner. These effects were reversed upon antioxidant supplementation, suggesting a ROS-mediated mechanism. We further identified that K-Ras His95 residue plays an important role in this process, and it is putatively oxidized by cellular ROS. Together, our study demonstrates that the redox system directly regulates K-Ras/PM binding and signaling via oxidative modification at the His95, and proposes a role of oncogenic mutant K-Ras in the recently described antioxidant-induced growth and metastasis of K-Ras-driven cancers.

Date: Oct. 30th, 2023 Time: 11:00 am – 12:00 pm Chair: Byung-Seok Kim	Location: Zoom (ID: 815 4847 8706, PW: none)

C.V. of the speaker:

2022.08 ~ Present 2016.10 ~ 2022.07	Associate Professor Assistant Professor	Department of Biochemistry and Molecular Biology Wright State University, Dayton, OH, USA
2014.10 ~ 2016.09 2010.01 ~ 2014.09	Assistant Professor Postdoctoral fellow	Department of Integrative Biology and Pharmacology, the University of Texas Health Science Center at Houston, Houston TX, USA
2005 ~ 2009	Ph.D. in Molecular and Cell Biology	Institute for Molecular Bioscience, The University of Queensland, Australia.
2003 ~ 2004	Master's in Molecular Biology	School of Molecular & Microbial Sciences, The University of Queensland, Australia.
2001 ~ 2002	Bachelor of Biomedical Science	School of Biomedical Science. Bond University, Australia.

2-1. Hyeyoung Woo (University of British Columbia)

[Title] Influence of mountain pine beetle outbreaks and subsequent harvesting on large fires in British Columbia and Alberta

[Abstract] A key uncertainty in understanding climate change effects on wildfires in western North America is the role of mountain pine beetle (MPB) outbreaks and the subsequent management activity in driving wildfire occurrence and severity. We investigated the complex relationship between MPB outbreaks, fires, and other environmental factors in British Columbia (BC) and Alberta (AB), Canada. We adopted a fire risk analysis method developed for fire occurrence prediction to separate the effect of changing weather conditions when neither post-outbreak fuel conditions, climate, or management are stationary. We first verified the significant impact of the MPB outbreak on fire occurrence after accounting for the confounded environmental factors using BC data. Based on lasso-logistic regression and a novel variable ranking procedure, we determined that MPB-affected areas had 1.7 times more large lightning-caused fires (≥100 ha), thus they likely contributed to the increased burned areas in BC. Fire weather factors were most influential for both lightning- and human-caused fires, while anthropogenic factors were most influential for human-caused fires. Secondly, we investigated the impact of the MPB outbreak and the subsequent harvest activity on fire occurrence in AB. Fuel dynamics following MPB outbreaks and forest management vary across the wide distribution of a host species. Furthermore, the effects of MPB and harvest on wildfire is also conditional on, as well as confounded with many other environmental factors that vary across the region. Therefore, a lack of consensus on the impacts of MPB on wildfires is not surprising.

Date: Oct. 30th, 2023 Time: 13:00 pm – 14:00 pm Chair: Jongkoo Lee	Location: Zoom (ID: 875 8828 7949, PW: none)

C.V. of the speaker:

2021.11 ~ Present	Postdoctoral Fellow	University of Victoria, Canada
2016.09 ~ 2021.12	Ph.D. in Forestry	University of British Columbia (UBC), Vancouver, BC, Canada
2013.09 ~ 2015.05	M.Sc. in Forestry	University of Montana (UM), Missoula, MT, USA
2002.03 ~ 2007.02	B.Sc. in Forest Environmental Sciences	Seoul National University (SNU), Seoul, South Korea

3

Oral Session (Mathematics)

3-1. James Hughes (Duke University)

[Title] An introduction to cluster structures from Legendrian links

[Abstract] Given a Legendrian link L in the contact 3-sphere, the moduli of microlocal rank-one sheaves with singular support on L gives an algebraic analogue of a moduli space of exact Lagrangian fillings of L. Recently, Casals and Weng described a contact-geometric cluster structure on the sheaf moduli. In this talk, I will introduce the necessary ingredients for understanding this cluster structure and its cluster automorphisms. I will then discuss some applications to the classification of exact Lagrangian fillings including new tests for showing that the induced action of certain families of exact Lagrangian concordances have infinite order.

Date: Oct. 30th, 2023 Time: 09:30 am – 11:00 am Chair: Youngjin Bae	Location: Zoom (ID: 362 420 1228, PW: none)

C.V. of the speaker:

2023 ~ Present	Elliott Assistant Research Professor	Department of Mathematics, Duke University, USA
June 2023	Ph.D. in Mathematics	University of California at Davis, USA
May 2018	B.A. in Mathematics and Music	Bowdoin College, USA

MATHEMATICS

3-2. Tatsuki Kuwagaki (Kyoto University)

[Title] Sheaf-theoretic Fukaya algebra

[Abstract] In this talk, I'd like to explain a sheaf-theoretic counterpart of curved A_\infty algebra in Lagrangian intersection Floer theory.

Date: Oct. 30th, 2023 Time: 15:40 pm – 17:10 pm Chair: Youngjin Bae	Location: Zoom (ID: 362 420 1228, PW: none)

C.V. of the speaker:

April 2022 ~ Present	Associate Professor	Department of Mathematics, Graduate School of Science, Kyoto University, Japan
April 2020 ~ March 2022	Assistant Professor	Osaka University, Japan
October 2017 - March 2020	Project Reseacher (Postdoc)	Kavli IPMU, The University of Tokyo, Japan
April 2016 ~ September 2017	Ph.D. in Mathematics	The University of Tokyo, Japan
April 2014 ~ March 2016	M.S. in Mathematics	The University of Tokyo, Japan
April 2010 - March 2014	B.S. in Mathematics	Waseda University, Japan

3-3. Sangjin Lee (Korea Institute for Advanced Study)

[Title] Asymptotic behaviors of auto-equivalences and their hyperbolic actions on stability conditions

[Abstract] I constructed symplectic automorphisms ϕ with an interesting asymptotic behavior in my thesis. It would be natural to expect that the functors on Fukaya categories, induced from these symplectic automorphisms, also have an intriguing asymptotic property. In this talk, we will explore the asymptotic behavior of the induced functors Φ from the viewpoint of Bridgeland stability conditions. For a stability condition σ and an object E, let $Z_\sigma(E) \in \mathbb{C}$ and $\phi^\pm_\sigma(E) \in \mathbb{R}$ denote the central charge and the maximal/minimal phases of E with respect to σ. Then, we will show that there exist $\lambda(\Phi) \in \mathbb{R}$ and $\tau^\pm(\Phi) \in \mathbb{Z}$ satisfying that $\lim_{n \to \infty} \tfrac{1}{n}\log |Z(\Phi^n E)| = \lambda(\Phi), \lim_{n \to \infty} \tfrac{1}{n}\phi^\pm_\sigma(\Phi^n E) = \tau^\pm(\Phi)$ for any σ and nonzero object E. If time permits, I will also discuss that the functors hyperbolically act on the space of stability conditions. This talk is based on a joint work in progress with Hanwool Bae.

Date: Oct. 30th, 2023 Time: 14:00 pm – 15:30 pm Chair: Youngjin Bae	Location: Zoom (ID: 362 420 1228, PW: none)

C.V. of the speaker:

Aug. 2023 ~ Present	Research Fellow	Korean Institute for Advanced Study (KIAS), South Korea
Jul. 2019 ~ Jul. 2023	Research Fellow	Institute for Basic Science, Center for Geometry and Physics, South Korea
Sep. 2013 ~ Jun. 2019	Ph.D. in Mathematics	University of California, Los Angeles, USA
Mar. 2006 ~ Feb. 2012	B.S. in Mathematics (Summa Cum Laude)	Seoul National University, South Korea

MATHEMATICS

3-4. Wenyuan Li (Northwestern University)

[Title] Generating families on Lagrangian cobordisms

[Abstract] Generating families (also known as generating functions) are used to define exact Lagrangian or Legendrian submanifolds, where their Morse theory provides a finite dimensional approach to the nonclassical invariants. Given an exact Lagrangian cobordism between Legendrian submanifolds in 1-jet bundles, we prove that a generating family linear at infinity on the Legendrian at the negative end extends to a generating family linear at infinity on the Lagrangian cobordism, when the necessary formal obstructions vanish. In particular, an exact Lagrangian filling with trivial stable Lagrangian Gauss map admits a generating family linear at infinity. Time permitting, we also discuss parallel results in microlocal sheaves.

Date: Oct. 30th, 2023 Time: 11:10 am – 12:40 pm Chair: Youngjin Bae	Location: Zoom (ID: 362 420 1228, PW: none)

C.V. of the speaker:

2023.08 ~ Present	Assistant Professor (RTPC) in Mathematics	Department of Mathematics, University of Southern California, USA
2018.09 ~ 2023.06	Ph.D. in Mathematics	Department of Mathematics, Northwestern University, USA
2021.09 ~ 2022.06	Visiting graduate student	Department of Mathematics, Princeton University, USA
2015.09 ~ 2018.07	B.A. in Mathematics	Department of Mathematics, Peking University, China
2014.09 ~ 2015.09		Department of Psychology, Peking University

4

Oral Session (Marine Science)

4-1. Jihee Kim (Korea Polar Research Institute)

[Title] The impact of climate change on the Antarctic Ecosystem	
Date: Oct. 31st, 2023 Time: 15:10 pm – 15:30 pm Chair: Ilnam Kim	Location: On-site Room 527

4-2. Juhyoung Kim (Kunsan National University)

[Title] Estimating Net Primary Production of Seaweed Using the Photo-Respirometry Method	
Date: Oct. 31st, 2023 Time: 16:30 pm – 17:00 pm Chair: Ilnam Kim	Location: On-site Room 527

4-3. Junho Lee (Korea Institute of Ocean Science & Technologies)

[Title] Research on sedimentation rate and utilization of remote sending(satellite, drone) through field survey in the tidal flats, South Korea	
Date: Oct. 31st, 2023 Time: 16:00 pm – 16:30 pm Chair: Ilnam Kim	Location: On-site Room 527

4-4. Shan Lu (Nanjing University)

[Title] Carotenoid metabolism of Porphyra sensu lato	
Date: Oct. 31st, 2023 Time: 13:30 pm – 14:30 pm Chair: Jang Kyun Kim	Location: On-site Room 527

4-5. Sungbong Oh (CJ CheilJedang)

[Title] ESG Management of Companies and Blue Carbon	
Date: Oct. 31st, 2023 Time: 14:40 pm – 15:10 pm Chair: Ilnam Kim	Location: On-site Room 527

5

Oral Session (Chemistry)

5-1. Chulsung Bae (Rensselaer Polytechnic Institute)

[Title] Molecular Engineering of Ion-Conducting Polymers for Electrochemical Energy Conversion Technologies

[Abstract] Anion exchange membranes (AEMs) based on hydroxide-conducting polymers are a key component for anion-based electrochemical energy technology such as hydrogen fuel cells, electrolyzers for green hydrogen, and redox flow batteries. Although these alkaline electrochemical technologies offer a promising alternative to acidic proton exchange membrane electrochemical devices, the access to chemically stable, mechanically durable, high-performing polymer electrolyte materials has been bottleneck to advance electrochemical technologies for hydrogen and other green chemicals until now. Recent progress at the Bae group of Rensselaer Polytechnic Institute in the development of advanced hydroxide-conducting polymers and membranes for AEM technology applications will be presented.

Date: Oct. 31st, 2023 Time: 10:00 am – 11:00 am Chair: Taehyun Kim	Location: On-site Room 421

C.V. of the speaker:

Chulsung Bae is Ford Foundation Professor at Department of Chemistry & Chemical Biology, Rensselaer Polytechnic Institute. Broadly speaking, Bae's research group focuses on development of functional polymeric materials that can find applications in the areas of clean energy technologies, using synthetic organic chemistry as a tool. Specific examples of projects include novel ion conducting polymers that can be used as a key component in next generation energy conversion and storage technologies, such as fuel cells, water electrolyzers, and redox flow battery, and functional polymer membranes that can play a crucial role in energy efficient separation process.

He received BS in Polymer Science & Engineering at Inha University, MS in Materials Science at POSTECH, MS in Chemistry at University of Massachusetts at Lowell, and Ph.D. in Chemistry at University of Southern California under the guidance of Surya Prakash and Nobel Laureate George A. Olah. He conducted postdoctoral research with John F. Hartwig at Yale University before starting independent academic career in 2004. In 2012 Bae relocated his research group to Rensselaer Polytechnic Institute.

5-2. Guillaume De Bo (University of Manchester)

[Title] Controlling reactivity under tension

[Abstract] Mechanical force is a formidable, and relatively unexplored, source of energy that, with its ability to distort, bend and stretch chemical bonds, is unique in the way it activates chemical reactions. The precise control of this force could revolutionise how we build and rearrange molecules and change the way we think about chemical transformations. Pulling both ends of a macromolecule apart creates highly directional strain with its highest intensity in the middle of the chain and, in polymer mechanochemistry, the force is transduced to force-sensitive moieties (mechanophores) embedded within the polymeric backbone. Here we use high-intensity ultrasound to activate mechanophores in solution, and show how geometry, topology, and substitution can be used to control the mechanical activity of a mechanophore.

Date: Oct. 31st, 2023 Time: 15:05 pm – 16:05 pm Chair: Gregory Peterson	Location: Zoom (ID: 838 9498 8537, PW: none)

C.V. of the speaker:

Guillaume is Professor of Organic Chemistry and a Royal Society University Research Fellow at the University of Manchester. His work aims at controlling the reactivity of molecules under tension for application in synthetic chemistry, materials, and biology. He is the recipient of several awards and fellowships including: the Macro Group UK Young Research Medal and the Bob Hay Lectureship. He was awarded an ERC Consolidator grant in 2022.

He obtained his Master (2004) and PhD (2009) degrees from the University of Louvain (Belgium) under the supervision of Prof. István E. Markó. In 2009 he took a post-doctoral position in the laboratory of Profs Jean-François Gohy and Charles-André Fustin (UCL, Belgium) to work on the assembly of mechanically-linked block copolymers. In 2011 he joined the group of Prof. David A. Leigh, first in Edinburgh then in Manchester, to work on the development of molecular machines. He started his independent career in January 2016 at the University of Manchester, under the impulse of a Royal Society University Research Fellowship. He was promoted to Senior Lecturer in 2021 and Professor in 2022.

5-3. Jihyun Jang (Sogang University)

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[Title] Developing High-Energy-Density Solid-State Batteries

[Abstract] All-solid-state batteries (ASSBs) are regarded as one of the next-generation technologies that can overcome numerous limitations present in conventional liquid lithium-ion batteries (LIBs) due to their extremely high safety. The comparable performance between the two stems from the development of solid-state electrolytes (SSEs) including sulfide-based SSE such as Li6PS5Cl which possesses an ionic conductivity equivalent to that of liquid electrolytes. However, several challenges must be addressed to achieve the practical application of ASSBs, such as the development of high-performance solid-state electrolytes, stable electrodeelectrolyte interfaces, and cost-effective manufacturing processes. This talk will focus on the state of ASSB research, including recent progress in solid-state electrolyte and cathode/anode materials, and cell architecture. In addition, we summarize the recent advancements and highlight the remaining challenges in ASSB research and the advanced cell fabrication processes including the scale-up manufacturing process. We also look into one of the promising alternatives for a highly cost-effective system, Na-ion ASSB, with an outlook on the future of this promising technology.

Date: Oct. 30th, 2023 Time: 15:05 pm – 16:05 pm Chair: Hyungjun Kim	Location: Zoom (ID: 369 977 0953, PW: none)

C.V. of the speaker:

Mar. 2023 ~ Present	Assistant Professor	Department of Chemistry, Sogang University, South Korea
Apr. 2021 ~ Feb. 2023	Postdoctoral Researcher	Department of Nanoengineering, UC San Diego, USA
Feb. 2019 ~ Mar. 2021	Staff Researcher	Samsung SDI, South Korea
Sep. 2015 ~ Jan. 2019	Research Staff Member	Samsung Advanced Institute of Technology, South Korea
Mar. 2010 ~ Aug. 2015	Ph.D. in Chemical and Biological Engineering	Seoul National University, South Korea
Mar. 2006 ~ Feb. 2010	B.S. in Chemical and Biological Engineering	Seoul National University, South Korea

5-4. Ho Jin (Los Alamos National Laboratory)

[Title] Spin-Exchange Manipulation of Hot-Carriers in Colloidal Quantum Dots

[Abstract] The ability to effectively manipulate non-equilibrium ‘hot’ carriers could enable novel schemes for highly efficient energy harvesting and interconversion. In the case of semiconductor materials, realization of such hot carrier schemes is complicated by extremely fast intraband cooling processes, such as phonon emission. The energy-dissipation via phonon emission outpaces energy gains due to standard Auger-type energy transfer at least by a factor of three. This suggests that the primary challenge in harnessing hot carrier for practical photoconversion applications is to enhance the energy gain/loss rate ratio. Recently, we successfully tackled this challenge by using magnetically doped colloidal semiconductor quantum dots (QDs).1-3 We can achieve extremely fast rates of spin-exchange processes that allow for ‘uphill’ energy transfer with an energy-gain rate that greatly exceeds the intraband cooling rate.1 A highly favorable energy gain/loss rate ratio realized in magnetically doped quantum dots can enable effective schemes for capturing kinetic energy of hot carriers via processes such as electron photonemission2 and carrier multiplication3. Photoemission is a process wherein a material emits free electrons upon illumination with an electromagnetic radiation such as visible or ultraviolet light. The expected efficiency of this process in QD, however, is low, because for standard Coulomb interactions the uphill Auger transitions are much slower than downhill intraband cooling. Since the rate of spin-exchange outpaces that of intraband cooling, the high-energy ‘hot’ electron can be efficiently promoted further into the external ‘vacuum’ state via one more manganese-to-QD energy-transfer step.2 Carrier multiplication is a process whereby a kinetic energy of a high-energy, ‘hot’ electron or hole relaxes via generation of additional electron–hole pairs. Still, practically realized carrier multiplication efficiencies are not sufficiently high to achieve an appreciable boost in device performance, suffering from the high e-h pair creation energy (□eh). To reduce □eh, one needs to increase the energy-gain rate associated with Coulomb collisions versus the phonon-related energy-loss rate. We accomplished this objective by exploiting not ‘direct’ but ultrafast ‘spin-exchange’ Coulomb interactions in magnetically doped QDs.3 The corresponding quantum efficiency measured at 2.5Eg is ~140%, almost three-fold enhancement versus undoped QDs, implying that the e-h pair creation energy is less than 1.25Eg.

Date: Oct. 30th, 2023 Time: 11:05 am – 12:05 pm Chair: Taehyun Kwon	Location: Zoom (ID: 833 6097 9676, PW: none)

C.V. of the speaker:

Nov. 2022 ~ Present	Research Assistant Professor	The University of New Mexico, NM/Visiting Scientist, Los Alamos National Laboratory, NM, USA
Aug. 2018 ~ Oct. 2022	Visiting Scientist	Los Alamos National Laboratory, NM/Postdoctoral Fellow, The University of New Mexico, NM, USA
Aug. 2017 ~ May 2018	Visiting Assistant Professor	Department of Chemistry, Westmont College, Santa Barbara, CA, USA
Jul. 2014 ~ Jun. 2017	Postdoctoral Research Associate	Department of Chemistry, Texas A&M University, College Station, TX, USA
Aug. 2012 ~ Jun. 2014	Postdoctoral Research Associate	Pohang University of Science and Technology (POSTECH), South Korea
Sep. 2007 ~ Aug. 2012	Ph.D. in Physical Chemistry	Pohang University of Science and Technology (POSTECH), South Korea
Mar. 2003 ~ Aug. 2007	B.S. in Chemistry	Pohang University of Science and Technology (POSTECH), South Korea

5-5. Youngseok Kwon (Sungkyunkwan University)

[Title] Strategies for Catalytic Control of Axial Chirality

[Abstract] Heterocycles containing nitrogen atoms are of interest as an important scaffold in the pharmaceutical and material science. Particularly, N-heterocyclic biaryls are frequently found in bioactive natural products and their usefulness are appreciated in the field of asymmetric catalysis utilizing inherent axial chirality. Among a variety of cyclization reactions for N-heterocycles, asymmetric Pictet-Spengler reaction has received considerable attentions due to its powerful ability to control the stereogenic center. However, to the best of our knowledge, atroposelective version of Pictet-Spengler reaction has not been developed yet. Herein, we report chiral phosphoric acid catalyzed Pictet-Spengler cyclizations to control the axial chirality around the C−N bond and C−C bond via dynamic kinetic resolution. We designed two new substrates that can undergo dynamic racemization around the prostereogenic bond. After the cyclization, the desired products would have high enough rotational barrier to fix stereo-configuration. To avoid any possible stereochemical bias from substituted aldehydes, we tested the reaction with paraformaldehyde as an anhydrous formaldehyde source. It was found that the ortho-substituent bearing hydrogen-bond donor ability was necessary in the bottom aromatic ring to form favorable interactions with the chiral phosphoric acid. Further screening of reaction parameters led to the optimized reaction conditions which were applicable with a variety of substrates with up to 99% e.e.

Date: Oct. 30th, 2023 Time: 14:00 pm – 15:00 pm Chair: Hyungjun Kim	Location: Zoom (ID: 369 977 0953, PW: none)

C.V. of the speaker:

2021.08 ~ Present	Assistant Professor	School of Pharmacy, Sungkyunkwan University, Suwon, Korea
2019.09 ~ 2021.08	Assistant Professor	Department of Chemistry, Sogang University, South Korea
2016.07 ~ 2019.08	Postdoctoral Associate	Department of Chemistry, Yale University, New Haven, United States
2016.03 ~ 2016.07	Postdoctoral Fellow	College of Pharmacy, Seoul National University, Seoul, South Korea
2011.03 ~ 2016.02	Ph.D. in Pharmacy	College of Pharmacy, Seoul National University, Seoul, South Korea
2009.03 ~ 2011.02	M.S. in Pharmacy	College of Pharmacy, Seoul National University, Seoul, South Korea
2005.03 ~ 2009.02	B.S. in Pharmacy	College of Pharmacy, Seoul National University, Seoul, South Korea

5-6. Jeyoung Park (Sogang University)

[Title] From Ideas to Realization of Sustainable Plastics

[Abstract] It has been 100 years in macromolecular chemistry since the first concept of macromolecules consisting of a large number of repeating units in 1920. Over the years, polymer science and the plastics industry have experienced exponential growth, currently producing a staggering 400 million tons annually. However, the alarming reality persists that only 9% of these plastics are being recycled. Looking ahead to 2050, it is projected that plastics will contribute to 15% of total carbon emissions. Consequently, the imperative for research in sustainable polymers has never been more pressing.

In this presentation, we aim to explore the realm of bioplastics, striving to close the loop of the carbon cycle, from conceptualization to realization, through the lens of polymer chemistry. We will introduce innovative research endeavors focused on the development of all-organic sustainable polymer nanocomposites, achieved via in situ polycondensation techniques designed to surmount existing limitations. These nanocomposites are synthesized using biorenewable monomers infused with natural cellulose nanowhiskers, minimizing their environmental impact. The subsequent polymerization process results in nanocomposites that exhibit more than a 1.5-fold increase in mechanical strength when compared to conventional methods like solution blending or melt blending. This enhancement is attributed to improved dispersion and interfacial stability between the reinforcing filler and polymer matrix.

As we embark on the next century of polymers and plastics, it is imperative that we prioritize sustainability at every stage, encompassing the design of novel chemical structures, polymerization processes, and applications geared towards achieving carbon neutrality.

Date: Oct. 31st, 2023 Time: 14:00 pm – 15:00 pm Chair: Gregory Peterson	Location: Zoom (ID: 838 9498 8537, PW: none)

C.V. of the speaker:

2022.09 ~ Present	Associate Professor	Department of Chemical and Biomolecular Engineering, Sogang University, Seoul, Korea
2020.07 ~ 2022.08	Affiliate Faculty	Division of Environment, Science and Engineering, POSTECH, Pohang South Korea
2014.09 ~ 2022.08	Principal Researcher	Research Center for Bio-based Chemistry, KRICT, Ulsan, South Korea
2016.03 ~ 2022.08	Associate Professor	Department of Advanced Materials and Chemical Engineering, UST, Daejeon, South Korea
2012.08 ~ 2014.08	Researcher	Chemical R&BD Center, SK Innovation, Daejeon, South Korea

C H E M I S T R Y

5-7. Sohyun Park (Sungshin Women's University)

[Title] Organic "Matterverse" for (Thermo)Electrics: from Molecules to Polymers

[Abstract] Global warming is getting worse now, and excess heat is accumulating on the earth. "Heat" is the biggest problem we need to solve. This waste heat can be converted into electricity, which is called the thermoelectric phenomenon. Therefore, research on thermoelectric materials is being actively conducted and there are many efforts to improve their performance. However, because of complexities arising from the complicated molecular structures of active components and the ill-defined interfaces of these thermoelectric devices, it is difficult to improve the performance. To realize applications of thermoelectric devices, the relationship between the chemical and electronic structures of active components and the thermoelectric performance of devices should be elucidated at a molecular scale.

Therefore, we aim to establish atomic-scale design rules for the development of efficient thermoelectric materials and optimization of device performance. For this, we developed a thermoelectric characterization technique to measure the thermoelectric performance of a selfassembled monolayer [Nano Lett. 2018]. Using this technique, we investigated how the thermopower of various molecules changes with different junction structures, such as backbone, length, substitution, spacer, anchor, and electrode. [Chem. Mater. 2019; ACS Cent. Sci. 2019; Adv. Mater. 2021; J. Phys. Chem. C 2021]. Based on these results, we identified some promising molecular structures that have high thermal stability and thermopower as potential future thermoelectric materials. [ACS Appl. Mater. Interfaces, 2022; Nano Lett., 2022; Nano Lett., 2022; Nano Lett., 2022]. In this presentation, we will cover how we developed a new thermoelectric measurement platform and what atomic-level structure-thermopower relationships we found.

Date: Oct. 30th, 2023 Time: 10:00 am – 11:00 am Chair: Taehyun Kwon	Location: Zoom (ID: 833 6097 9676, PW: none)

C.V. of the speaker:

Sep. 2023 ~ Present	Assistant Professor	School of Chemistry and Energy, Sungshin Women's University, South Korea
Oct. 2022 ~ July 2023	Postdoctoral fellow	Department of Chemistry, Massachusetts Institute of Technology (MIT), USA
Sep. 2017 ~ Aug. 2022	Ph.D. in Organic Chemistry	Korea University, South Korea
Mar. 2014 ~ Aug. 2017	B.S. in Chemistry (early graduation with great honors)	Korea University, South Korea
Mar. 2012 ~ Feb. 2014	(early graduation, gifted class of chemistry)	Gyeongnam Science High School, South Korea

CHEMISTRY

5-8. Jooyoung Sung (DGIST)

[Title] Ultrafast Carrier Dynamics in Perovskite Thin Films and Quantum Dot Solids Revealed by fs-Microscopy

[Abstract] The functional light-driven materials often exhibit a complex morphology consisting of various grains with short and long-range order and defects stemming from imperfect chemical composition, local strain and etc. Local structural and morphological heterogeneity results in distinct carrier dynamics at different local regions of energy materials. Unfortunately, the conventional spectroscopy techniques reveal only an incomplete picture of the carrier dynamics due to the intrinsic spatially averaged nature of time-resolved techniques. In other words, true structure-function relationships in complex energy materials cannot be reliably probed using conventional time-resolved spectroscopic techniques.

By utilizing time and space resolved technique, i.e., transient absorption microscopy (TAM), we were able to directly monitor local carrier dynamics of spatially heterogeneous systems. In this talk, I will briefly describe the basic operating principle of state-of-the-art ultrafast transient absorption microscopy. I will further discuss recent applications of TAM to thin film hybrid metal halide perovskites; 1) A direct monitoring of ballistic transport of non-equilibrium charge carriers in a series of MAPI perovskite thin film. 2) The effect of energetic disorder in a series of MAPI perovskite thin film.3 Finally, I will present recent interesting studies on unprecedent exciton dynamics in quantum dots films; 1) The early-time super-diffusive dynamics of exciton in a series of PbS quantum dot arrays. 2) Nonequilibrium carrier dynamics in quantum dot-in-perovskite.

Date: Oct. 30th, 2023 Time: 16:10 pm – 17:10 pm Chair: Hyungjun Kim	Location: Zoom (ID: 369 977 0953, PW: none)

C.V. of the speaker:

2021 ~ Present	Assistant Professor	Department of Physics and Chemistry, DGIST, South Korea
2017 ~ 2021	Postdoctoral Fellow	Cavendish Laboratory, University of Cambridge, UK
2016 ~ 2017	Postdoctoral Fellow	Physical and Theoretical Chemistry Laboratory, University of Oxford, UK
2012 ~ 2016	Ph.D. in Chemistry	Yonsei University, Seoul, South Korea
2009 ~ 2011	M.S. in Chemistry	Yonsei University, Seoul, South Korea
2004 ~ 2009	B.S. in Chemistry	Yonsei University, Seoul, South Korea

6

Poster Session

6-1. List of Participants (Physics)

	Name	Title of Poster Presentation
PHY01	임재승	Lateral Scanning White-light Phase Shifting Interferometry
PHY02	남기인	Plasmon Mediated Photoluminescence in MoS_2 on Metal Nanoparticles
PHY03	이희우	Thickness Characterization of SiO_2/Si Wafers Using Spectroscopic Rotating compensator Ellipsometer
PHY04	김성훈	Study on Confinement and Enhancement of Terahertz Waves Depending on the Coupling Angle of Metal Slot Antennas
PHY05	김나훈	Conformally transferred graphite-based terahertz metamaterial via viscoelastic support layer
PHY06	정진영	Measurement of carrier dynamics using pump-probe microscopy
PHY07	Namuundari Otgontamir	Effect of alkali metals alloying on kesterite $Cu_2ZnSn(S,Se)_4$ solar cells
PHY08	Matiur Rahman	Spray-based low band gap CIGSSe solar cell
PHY09	Enkhjargal ENKHBAYAR	Fabrication of Wide Band Gap of p-i-n Perovskite Solar Cell For Tandem Application
PHY10	박하정	Enhanced interaction of micron-sized two dimensional materials with millimeter waves using terahertz metamaterials
PHY11	김준경	Anti-symmetric Raman tensor derivation from incident beam polarization dependent raman spectra of magnon of Ca_2RuO_4
PHY12	황지윤	Polarization angle resolved Ranlman study of $(Pb,Bi)_2Sr_2CaCu_2O_{8+d}$
PHY13	김재준	Optical and electrical properties of 2-D semiconductors with varying layer numbers

6-2. List of Participants (Life Sciences)

	Name	Title of Poster Presentation
LIFE01	김나현	Reproductive Behavior of the ladybird spider, Eresus kollari
LIFE02	최진혁	Verification of Bee-vectoring working using fluorescent powder in Apis melifera, A. cer ana and Bombus terrestris
LIFE03	한상준	Unlocking novel RORγt inverse agonists through multidisciplinary AI-driven approach
LIFE04	국명욱	The ROSA26 BAC endogenous promoter enhance the synthesis of recombinant protein s
LIFE05	국명욱	Minimization of human β-interferon MARs in recombinant protein production systems
LIFE06	국명욱	Mitochondrial dysfunction caused by the 3C protease of coxsackievirus B3 in HeLa cell
LIFE07	이윤행	Identification of senescence rejuvenation and metabolic reprogramming by alpha–enol ase regulation
LIFE08	한연주	Establishment of a Screening System for Discovering Inhibitors against SARS-CoV-2
LIFE09	송은선	Discovery of new endogenous promoters in CHO cells through promoter trapping.
LIFE10	양소휘	Metabolic changes induced by estrogen supplementation in an ovariectomized mouse model
LIFE11	박영진	Effects of environmental temperature-induced stress on the lipids and volatile organic compounds profiles of sesame seeds

6-3. List of Participants (Marine Science)

	Name	Title of Poster Presentation
MA01	이연희	Evaluation of the toxicity of marine Antarctic-endemic copepods Tigriopus kingsejonge nsis by exposure to antifouling paint
MA02	엄혜진	Effects of extremely high concentrations of polystyrene microplastics on asexual reprod uction and nematocyst discharge in the jellyfish Sanderia malayensis
MA03	이소명	Acute and mutigenerational effects of environmental concentration of the antifouling a gent dichlofluanid on the mysid model, Neomysis awatschensis
MA04	권하영	Toxicity evaluation of antifouling biocides using marine mysids
MA05	박정인	Vibrio fischeri-based toxicity assay on biodegradable plastics in marine environments

6-3. List of Participants (Marine Science)

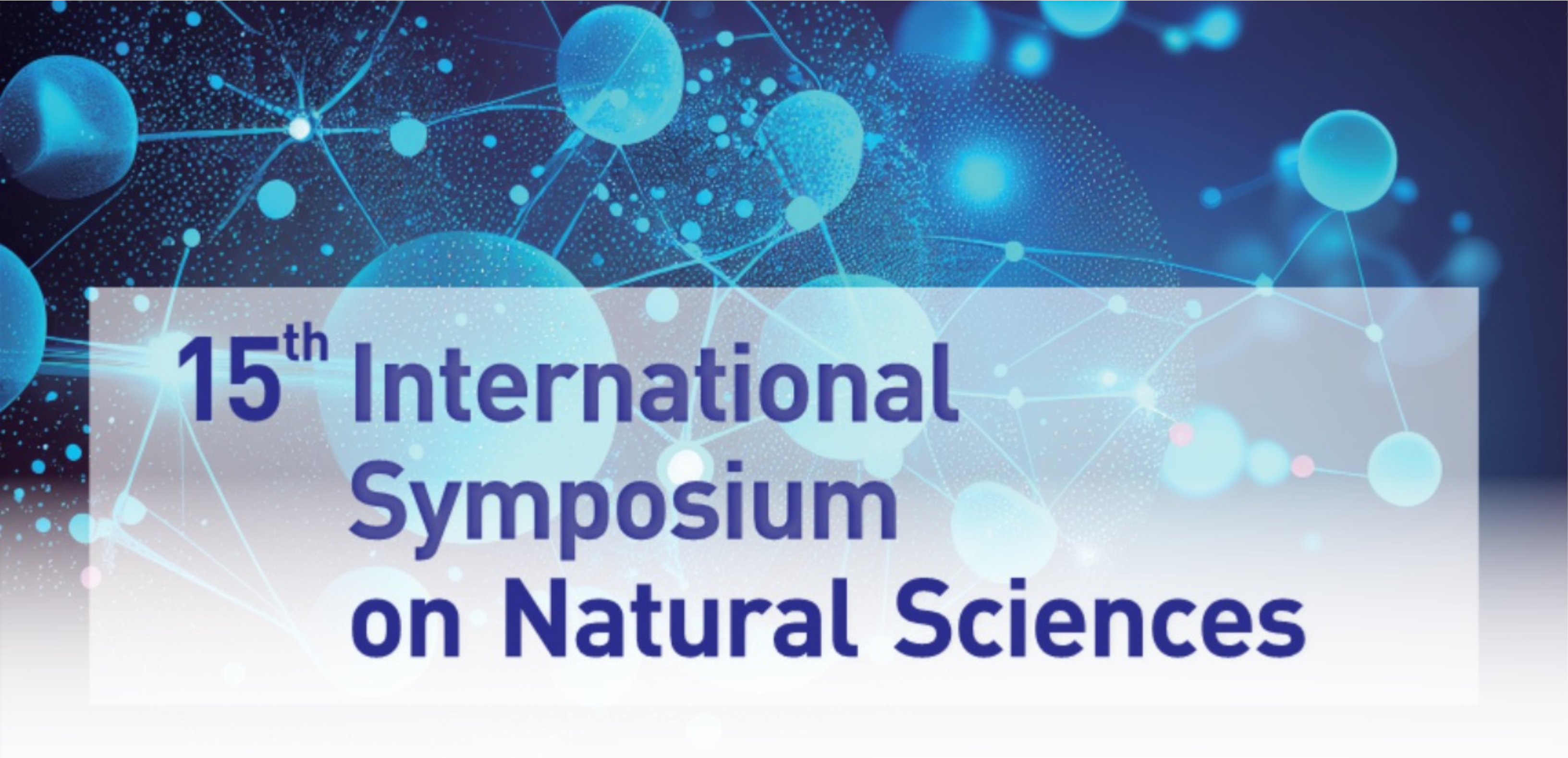
	Name	Title of Poster Presentation
MA06	도성덕	Developmental effect of Paralichthys olivaceus embryo and juvenile to short-chain chlorinated paraffins exposure
MA07	김준	Establishment of N2A Test Method for Screening Parasitic Shellfish Toxins in Recycled Shellfish
MA08	남상은	Monitoring of hazardous factors and antifouling effects in aquaculture through metabarcoding approach
MA09	심규영	Environmental DNA Surveillance of Biocontamination in a Drinking Water Treatment Plant
MA10	김규형	Detection of the sea nettle Chrysaora pacifica through RPA-CRISPR/Cas12a environmental DNA assay and its field validation in Jinhae Bay, South Korea
MA11	이나영	Effect of Microbubbles and Temperature on the Seed Germination of Suaeda maritima, a Saltmarsh Plant
MA12	신숙경	Assessing the Bioremediation capacities of Chondrus ocellatus, Gracilaria vermiculophylla, and Pyropia yezoensis under varied temperature and nutrient conditions

6-4. List of Participants (Chemistry)

	Name	Title of Poster Presentation
CHEM01	최지용	Polyphenylene-based cross-linked anion exchange membrane for water electrolysis with improved phase separation by introducing flexible chain
CHEM02	이예림	Development of x-PIM-SEBS anion exchange membrane for water electrolysis with excellent phase separation properties using microporous polymer
CHEM03	김상욱	A High-Performance Self-Healing Polymer Binder for Si Anodes based on Dynamic Carbon Radicals in Cross-linked Poly(acrylic acid)
CHEM04	김수현	Amplified spontaneous emission from quasi-type - II quantum dots under nanosecond optical pumping
CHEM05	김하늘	1,1,2,2-Tetrafluoroethyl-2,2,3,3-tetrafluoropropyl ether as an Interphase Modifier for SiOx-based lithium-ion batteries
CHEM06	박주휘	Acetal-functionalized electrolyte solvent as an interface stabilizer for Li-sulfur batteries
CHEM07	허준원	Oyster Shell-Coated Ni-rich NCM Cathode Material to Improve Electrochemical Performance for Lithium-ion Batteries
CHEM08	김수빈	One-Pot Synthesis of 1,3,4-Oxadiazines from Acylhydrazides and Allenoates
CHEM09	SANTANU MAITI	Cu-catalyzed aerobic oxidative dehydrogenation of tertiary indolines to indoles using azo/hydrazide redox

6-4. List of Participants (Chemistry)

	Name	Title of Poster Presentation
CHEM10	이종환	Impact of Solvent Environment on Singlet Fission Rate in Perylene Bisimide Dimers
CHEM11	황은호	Impact of Contortion on Singlet Fission Mechanism
CHEM12	최진원	Boosting Electrochemical Hydrogen Evolution under Neutral Media by Electrocatalysts with Exposed Hetero-interfaces
CHEM13	장희주	Microbiome isolation from Mealworm intestine that degrades polybutylene succinate(PBS)
CHEM14	김수연	Multiplexed detection of bacteria using barcoded-PEGDA-AA microparticles
CHEM15	Perumal Viswanathan	Multifunctional core@shell structured gold nanodendrites@gold nanoclusters: An efficient catalytic and sensor domain for environmental water remediation applications
CHEM16	KABIR Md Homayun	Biphenyl(isatin-co-trifluoroacetophenone)-based Copolymers Synthesized Usin g the Friedel–Crafts Reaction as Mechanically Robust Membranes for Efficient CO2 Separation
CHEM17	Kavya Adot Veetil	Developing mixed matrix membranes with good CO2 separation performance based on PEG-modified UiO-66 MOF and 6FDA-durene polyimide
CHEM18	RAJEEV KALAPPURAC KAL KRISHNA NKUTTY	Performance enhancement of carbon-coated SiNPs for lithium-ion batteries t hrough the generation of Lithophilic sites on carbon surfaces by a simple oxi dation process



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