

# Young Scientist Award of the Physical Society of Japan, 2023

Every year, the Physical Society of Japan presents Young Scientist Awards to young researchers who have made outstanding achievements in their early research careers. This year's winners were recently decided by the board of directors of the JPS according to the recommendations from the selection committees established in 19 divisions of the JPS. The maximum number of winners from each division has been determined based on the number of talks given at the Annual Meetings in the past three years. All the winners are to give an award lecture at the next Annual Meeting of the JPS scheduled for March 2023. Here is the list of winners and their research topics.

## **Theoretical Particle Physics:**

Shinichiro Akiyama(Institute for Physics of Intelligence, Faculty of Science, The University of Tokyo)

“Development of the tensor renormalization group approach for the lattice field theory”

Zixia Wei(Yukawa Institute for Theoretical Physics, Kyoto University)

“Causal structures and nonlocality in double holography”

Masataka Watanabe(Yukawa Institute for Theoretical Physics, Kyoto University)

“Development of the large charge expansion”

## **Experimental Particle Physics:**

Tomoko Ariga(Kyushu University)

“First neutrino interaction candidates at the LHC”

Takuya Nobe(International Center for Elementary Particle Physics, The University of Tokyo)

“Search for charginos and neutralinos in final states with two boosted hadronically decaying bosons and missing transverse momentum in pp collisions at  $\sqrt{s} = 13$  TeV with the ATLAS detector”

Yuto Minami(Research Center for Nuclear Physics, Osaka University)

“New Extraction of the Cosmic Birefringence from the Planck 2018 Polarization Data”

## **Theoretical Nuclear Physics:**

Yuki Kamiya(Helmholtz-Institut für Strahlen- und Kernphysik and Bethe Center for Theoretical Physics, Universität Bonn)

“ $K^{\Lambda p}$  correlation function from high-energy nuclear collisions and chiral SU(3) dynamics

Kazuki Yoshida(Advanced Science Research Center, Japan Atomic Energy Agency)

“Alpha clustering in atomic nuclei probed by alpha knockout reactions

## **Experimental Nuclear Physics:**

Satoshi Adachi(Cyclotron and Radioisotope Center (CYRIC), Tohoku University)

“Search for the  $\alpha$  condensed state in  $^{20}\text{Ne}$  and systematic study of inelastic  $\alpha$  scattering”

Yuki Kubota(RIKEN Cluster for Pioneering Research)

“Surface Localization of the Dineutron in  $^{11}\text{Li}$ ”

Niwase Toshitaka(High Energy Accelerator Research Organization (KEK))

“First direct mass measurement of superheavy nuclide”

## **Cosmic Ray and Astrophysics:**

Ken Ohashi(Graduate School of Science, Nagoya University)

“Effects of diffractive dissociation on ultra-high energy cosmic rays and measurements of diffractive dissociation using ATLAS and LHCf detectors”

Kawaguchi Kyohei(Institute for Cosmic Ray Research, University of Tokyo)

“Theoretical studies on electromagnetic radiation from binary neutron star mergers”

Hiromasa SUZUKI(Department of Physics, Faculty of Science and Engineering, Konan University)

“Study of time evolution of the efficiency of particle acceleration on supernova remnants with gamma-rays and thermal X-rays”

### **Beam Physics:**

Lei Guo(Nagoya University Synchrotron Research Center)

“Photo-cathodes Studies for High Performance Electron Linear Accelerator”

Katsuhiko Moriya(Japan Atomic Energy Agency, J-PARC center, Accelerator division)

“Studies on Beam Instability in Circular Accelerators Using a Linear Paul Trap”

### **Division 1 (Atomic and Molecular physics, Quantum Electronics, Radiation):**

Yuki Takeuchi(NTT Communication Science Laboratories, NTT Corporation)

“Quantum supremacy of measurement-based quantum computation and its verification”

Hiroyuki Tajima(Graduate School of Science, The University of Tokyo)

“Theoretical study of strongly-interacting multi-component Fermi gases”

Ernst David Herbschleb(Institute for Chemical Research, Kyoto University)

“Study of coherence in solid materials and its exploitation for quantum sensing”

### **Division 2 (Plasma):**

Naoki Kenmochi(National Institute for Fusion Science)

“Experimental study of non-local transport in magnetically confined plasmas”

Kazuki Matsuo(EX-Fusion Inc.)

“Experimental studies on electron thermal energy transport in magnetized high energy density plasma for fast ignition inertial confinement fusion”

### **Division 3 (Magnetism):**

Yutaka Akagi(Department of Physics, Graduate School of Science, The University of Tokyo)

“Theoretical studies on topological magnetism and its stabilization mechanism/emergent phenomena”

Ishikawa Hajime(The Institute for Solid State Physics, The University of Tokyo)

“Development of novel phases of quantum magnets via ligand field control”

Toshihiro Nomura(The Institute for Solid State Physics, The University of Tokyo)

“Ultrahigh-magnetic-field study on oxygen”

### **Division 4 (Semiconductors, Mesoscopic Systems and Quantum Transport):**

Nobuyuki Okuma(Yukawa Institute for Theoretical Physics, Kyoto University)

“Elucidation of topological origin of non-Hermitian skin effects and its extension”

Yuya Shimazaki(RIKEN Center for Emergent Matter Science)

“Exploration of physical properties in electrically controlled two-dimensional semiconductor heterostructures”

### **Division 5 (Optical Properties of Condensed Matter):**

Yuta Murakami(RIKEN, Center for Emergent Matter Science)

“Theoretical exploration of high harmonic generation in strongly correlated systems”

Naotaka Yoshikawa(Department of Physics, Graduate School of Science, The University of Tokyo)

“Investigation of light-driven electron systems by using intense mid-infrared and terahertz pulses”

### **Division 6 (Metal Physics (Liquid Metals, Quasicrystals), Low Temperature Physics (Ultralow**

#### **Temperatures, Superconductivity, Density Waves)):**

Takanobu Hiroto(Materials Analysis Station, National Institute for Materials Science (NIMS))

“Discovery of ferromagnetic long-range order and non-coplanar spin order in quasicrystal approximants”

Takahiko Makiuchi(Department of Applied Physics, School of Engineering, The University of Tokyo)

“Study of elastic anomaly in adsorbed molecular films as a probe of quantum phase transition”

### **Division 7 (Molecular Solids):**

Mari Einaga(KYOKUGEN, Graduate School of Engineering Science, Osaka University)

“Experimental Study of Sulfur Hydride Exhibiting Superconductivity above 200 Kelvin”

Daichi Kozawa(RIKEN)

“Study of exciton photophysics in low-dimensional nanomaterials”

### **Division 8 (Strongly Correlated Electron Systems):**

Takuya Aoyama(Department of Physics, Graduate School of Science, Tohoku University)

“Study on Spatial Inversion Symmetry Breaking Induced by Spin and Orbital Degrees of Freedom in Strongly Correlated Electron System”

Hisashi Inoue(National Institute of Advanced Industrial Science and Technology, Research Institute for Advanced Electronics and Photonics, Correlated Electronics Group)

“Synthesis and characterization of thin film magnetic topological materials”

Yusei Shimizu(International Research Center for Nuclear Materials Science, Institute for Materials Research, Tohoku University)

“Study on superconducting symmetry, magnetic properties, and non-Fermi-liquid metallic state of uranium heavy-fermion superconductors”

Hakuto Suzuki(Frontier Research Institute for Interdisciplinary Sciences, Tohoku University)

“Resonant inelastic x-ray scattering study of elementary excitations in strongly correlated materials”

### **Division 9 (Surfaces & Interfaces, Crystal Growth):**

Kazuki Sumida(Japan Atomic Energy Agency)

“Electronic structure of chalcogenide compounds studied by time-resolved photoemission spectroscopy and magnetic circular dichroism”

Kotaro Takeyasu(Faculty of Pure and Applied Sciences, University of Tsukuba)

“Studies on flow and controlling factor of energies in surface reactions”

### **Division 10 (Dielectrics, Ferroelectricity, Lattice Defects and Nanostructures, Phononic Properties, and X-ray and Particle Beams):**

Izumi Umegaki(High Energy Accelerator Research Organization)

“Establishment of techniques using muon beam to detect Li diffusion and metallic Li deposition in a Li-ion battery”

Shota Ono(Department of Electrical, Electronic and Computer Engineering, Gifu University)

“Dynamical stability of two- and three-dimensional metallic systems from first-principles calculations”

### **Division 11 (Fundamental Theory of Condensed Matter Physics, Statistical Mechanics, Fluid Dynamics, Applied Mathematics, Socio- and Econophysics) :**

Norihiro Oyama(TOYOTA CENTRAL R&D LABS)

“Unraveling the origin of universal properties of amorphous solids under shear”

Ryo Nagai(Department of Physics, The University of Tokyo)

“Development of machine-learning-based exchange correlation functional”

Ryo Hanai(Asia Pacific Center for Theoretical Physics)

“Study of non-reciprocal phase transitions in non-equilibrium systems”

Vu Van Tan(Faculty of Science and Technology, Keio University)

“Theoretical studies on the irreversibility in non-equilibrium thermodynamics”

### **Division 12 (Soft Matter Physics, Chemical Physics, Biophysics):**

Harukuni Ikeda(Faculty of Science, Gakushuin University)

“Numerical and theoretical study of glass and jamming transition”

Yuki Uematsu(Faculty of Computer Science and Systems Engineering, Kyushu Institute of Technology)

“Chemical physics and hydrodynamics of solution interfaces”

Naoyuki Sakumichi(Department of Bioengineering, School of Engineering, The University of Tokyo)  
“Discovery and elucidation of fundamental physical laws of rubbers and gels”

**Division 13 (Physics Education, History of Physics, Environmental Physics):**