

DIS2018 International Workshop

Y. Goto*¹ for the DIS2018 Local Organizing Committee

DIS2018 International Workshop was held from April 16th to 20th at Port Island, Kobe. It was the 26th in an annual series of International Workshops on Deep Inelastic Scattering (DIS) and Related Subjects covering an eclectic mixture of material related to quantum chromodynamics (QCD) and DIS as well as a general survey of the hottest current topics in high energy physics. The majority of the program was devoted to the most recent results from experiments at BNL, CERN, Fermilab, Jefferson Lab, and KEK. Relevant theoretical advances were also covered in detail.

On the first day, topics of this year were overviewed both theoretically and experimentally through plenary talks. This year, experimental reviews were presented for each topics of physics instead of each facility owing to the expansion of the community, which was dominated by LHC. The Electron Ion Collider (EIC) became more realistic and the nuclear physics community showed more interest in this future facility. First, the nucleon structure with unpolarized, polarized, and neutrino scatterings in various energies were reviewed. Next, hadron final states, hadron scatterings with perturbative QCD and jet, precision measurements, and the search of physics beyond the standard model (BSM) were reviewed and theoretical ideas were presented. In the last session, soft scatterings, fragmentation and exotic hadrons, three-dimensional (3D) hadron structure, and hadron structure with lattice QCD were discussed as non-perturbative QCD physics with emphasis on Japanese activities.

From the second to the fourth day, parallel sessions were held for the following working groups (WGs):

- WG1: structure functions and parton densities
- WG2: low x and diffractive physics
- WG3: Higgs and BSM physics in hadron collisions
- WG4: hadronic and electroweak observables
- WG5: physics with heavy flavors
- WG6: spin and 3D structure
- WG7: future of DIS

A special topic for this year's workshop was the discussion of the future projects of DIS regarding the submission of a document to the European Strategy Update for Particle Physics (ESUPP) led by the International Advisory Committee of the workshop. A special joint session for all working groups was held after the regular parallel sessions in the second day. Panelists from EIC, LHeC ($e+p$ collider at LHC), VHEep ($e+p$ collider with a plasma accelerator), and $e+p$ option of FCC (Future Circular Collider) presented their new accelerator facilities, theorists reviewed QCD and heavy-



Fig. 1. Group photo of the DIS2018 workshop.

ion theories motivating these projects with broad perspective, and participants discussed the involvement of these projects in the document.

On the last day (fifth day), summaries from each WG were given by the conveners of the WG in the morning session. Two future projects, EIC and LHeC, and related physics topics were reviewed to discuss important points from their point of view in the afternoon.

The workshop was organized by the Graduate School of Science, Kobe University, RIKEN Nishina Center, and KEK with support from Grant-in-Aid Scientific Research on Innovative Areas, MEXT, Japan: “New expansion of particle physics of post-Higgs era by LHC: revealing the vacuum and space-time structure,” and sponsored by DESY, CERN, Kobe Tourism Bureau & Kobe Convention Bureau, and Tsutomu Nakauchi Foundation for Promoting Conventions.

The workshop was held in two meeting locations: the Convention Hall of Kobe University for the plenary sessions and the Kobe International Convention Centre for the parallel sessions. A total of 254 participants demonstrated 256 presentations. A group photo is shown in Fig. 1. Slides shown in the workshop are available at <https://indico.cern.ch/event/656250/> and the proceedings of the workshop are published online at <https://pos.sissa.it/316>.

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RIKEN Open Day 2018

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RIKEN Open Day, where several laboratories showcased their experimental devices and research activity to the public in RIKEN Wako campus, was held on April 21, 2018. In the Nishina Center, 17 research groups, comprising 276 researchers participated in the event, as listed in Table 1. The leaflet that introduced the exhibition content in the Nishina Center is shown in Fig. 1. It was handed out to the visitors at RIBF. The radiation controlled area in the RIBF building was opened for visitors to display the superconducting cyclotron SRC and other experimental devices along with the exhibition of laboratories. Dr. Wakasugi, the group director of the Instrumentation Development Group, gave a scientific lecture titled “What we can see and do with the Storage Ring” at the Ohkochi Memorial Hall.

A total of 2533 and 7935 visitors came to RIBF and RIKEN, respectively.



Fig. 1. Leaflet for RIKEN Open Day provided by Nishina Center.

Table 1. List of exhibitions.

Laboratory/Group/Team	Exhibition theme	Participants
Accelerator Group	The World's Strongest Superconducting Ring Cyclotron	41
SLOWRI Team	Ion Trap and Ultra-Slow RI Production	6
BigRIPS Team	Superconducting RI Beam Separator BigRIPS	10
Rare RI-Ring Team	Precision Measurement of Nuclear Mass	10
Spin Isospin Laboratory.	Microscopes for Unstable Nuclei	22
SAMURAI Team	SAMURAI Magnetic Spectrometer	7
Nuclear Spectroscopy Laboratory	Tiny Magnets in Materials	12
Nishina Center	Nuclear Chart with LEGO Block	4
Nuclear Chemistry Research Team	Environmental Radiation and Useful Radiation	9
Ion Beam Breeding Team	Creating Amazing Plants	13
Superheavy Element Research Group	The Discovery of Nihonium	9
SCRIT Team	Handmade Spectrometer	9
Radioactive Isotope Physics Laboratory	Daruma Dolls Challenge	16
	See Radiation with Diffusion Cloud Chamber	
Radiation Laboratory	Enjoy Spinning a Variety of Tops	13
	Research Activities in the Experimental Hadron Physics	
High-energy Astrophysics Laboratory.	Dawn of Gravitational Wave Astronomy	37
Meson Science Laboratory	Introductory Meson Science	22
	Particle Physics Experience	
Quantum Hadron Physics Laboratory	Elementary Particles, Nuclei and the Universe	9
	Operation and Management	27

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Workshop on “The r-process and unstable nuclei in multi-messenger astronomy”

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The workshop on “The r-process and unstable nuclei in multi-messenger astronomy” (研究会「重力波観測時代の r プロセスと不安定核」) was held on 20–22 June 2018 at the RIKEN Nishina center. This workshop was sponsored by the RIKEN Nishina Center and “Priority Issue 9 to be Tackled by Using Post-K Computer” (JICFuS), and was supported by the members of RIBF Theory Forum.

The main scientific goal of the workshop was to summarize the recent progress on the study of the r-process, which is one of the most dominant nucleosynthesis processes for the cosmic origin of heavy elements beyond iron. The workshop was directly motivated by the recent (17 August 2017) successful observations of gravitational waves from a neutron-star merger event (GW170817) and the associated optical transient called *kilonova/macronova*, powered by r-process nucleosynthesis. We discussed several aspects of neutron-star mergers, focusing on nuclear physics, *e.g.*, experiments/theory of unstable nuclei, gravitational wave astronomy, optical observation, and the theoretical models of neutron-star mergers using supercomputers such as the K Computer.

The scientific program consisted of 8 sessions, *i.e.*, “multi-messenger astronomy of neutron-star-mergers,” “high-energy astronomy,” “the cosmic origin and evolution of r-process,” “the nuclear equation of state (EoS),” “nuclear masses,” “ β -decay,” “nuclear fission,” and “the studies of unstable-nuclei in large facilities in Japan.” They covered a wide range of research fields in both nuclear-physics and astrophysics, thus reflecting the multi-disciplinary culture of nucleosynthesis studies. More than hundred participants gathered in the RIBF lecture Hall (Fig. 1) to provide recent progress of their studies and to discuss the application to r-process studies. This included 18 invited talks, 17 oral contributions, 7 poster presentations.

The workshop started with a session for reporting the “multi-messenger” observation of GW170817 including the kilonova, which opened a new era of astronomy triggered by gravitational wave detection and a theoretical understanding of the neutron-star merger as the astrophysical site of the r-process. The re-



Fig. 1. Many interesting presentations were given at RIBF Conference Hall in the 3-day workshop.

maining problems relevant to the nuclear-physics properties and aimed toward the complete understanding of kilonovae (and thus GW events) were highlighted. Following the talks on astronomy, the results of unstable-nuclei, *e.g.*, the measurements of β -decay half-lives at RIBF and the plan of experiments targeting the nuclear masses and neutron-capture in RIBF were reported. Although there are still several gaps, it appears that the r-process can connect (terrestrial) nuclear-physics experiments with the transients in the sky.

GW170817 also imposes strict restrictions on the EoS of neutron stars obtained from the GW signals as well as traditional astronomical observation. Several talks focused on the physics of neutron stars and related astronomical phenomena with an emphasis on the GW observation. The future experimental plans regarding the EoS were given as well as the theoretical progress of the EoS were presented.

The presentation files are available on the workshop website.¹⁾ The next iteration of this workshop²⁾ is planned to be held at Yukawa Institute for Theoretical Physics in Kyoto University in May 2019. We will mostly focus on various topics in theoretical nuclear physics on such as the problems in r-process nucleosynthesis and (future) experiments of neutron-rich nuclei far from stability.

References

- 1) URL: <https://sites.google.com/view/rp2018/>
- 2) URL: <https://www2.yukawa.kyoto-u.ac.jp/~rp2019/>

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TESLA Technology Collaboration Meeting 2019 at RIKEN Nishina Center

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The mission of the TESLA Technology Collaboration¹⁾ (TTC) is to advance R&D on the SRF technology and related accelerator studies across diverse scientific applications, and to provide a bridge for the communication and sharing of ideas, developments, and testing across associated projects. The TTC meeting is held once/twice a year changing locations in Europe, Asia, and North America. This time, the TTC meeting (Fig. 1) was held from 26 June to 29 June, 2018 at RIKEN Nishina Center (RNC).²⁾

The TTC meeting covers subjects related to superconducting RF technology extensively. The timetable of this meeting is shown in Fig. 2. In each session, a specific subject chosen by the technical board members was discussed intensively, and the information obtained from experimental and theoretical studies at various laboratories and companies was exchanged (see Table 1). In this meeting, there were four working group sessions and one hot topic session as follows:

- WG1: What are the performance limits for low-beta resonators?
- WG2: How to improve the present specification for bulk Niobium?
- WG3: High Q and high gradient performance.
- WG4: Special applications of SRF cavities.
- Hot Topic: Warm vacuum sections between low beta cryomodules.

Note that since the meeting was hosted by RNC, subjects related to the low-beta ion accelerator were chosen for the WG1 and Hot Topic sessions. Eight plenary talks were conducted on these subjects: Overview on fabrication and treatment problems with Quarter- and Half-Wave Resonator (QWR, HWR), Spoke (Z. Conway, ANL), Overview talks for niobium material and specification (A. Palczewski, JLab), RIKEN overview and SRF activities (O. Kamigaito, RNC), Lessons learned



Fig. 1. Group photo taken during the meeting.

Time	Date	June, 26 (Tue)	June, 27 (Wed)	June, 28 (Thu)	June, 29 (Fri)
8:30 - 9:00		Registration			
9:00 - 9:30		Welcome/Introduction	Plenary talk 3	WG3 / WG4 (parallel)	Summary WG1/WG2
9:30 - 10:00		Plenary talk 1	Plenary talk 4		Summary WG3/WG4
10:00 - 10:30		Plenary talk 2	Plenary talk 5		TB/CB report
10:30 - 11:00		Coffee Break			
11:00 - 11:30		WG1 / WG2 (parallel)	WG1 / WG2 (parallel)	WG3 / WG4 (parallel)	Special Seminar 1
11:30 - 12:00					Special Seminar 2
12:00 - 12:30					Closing
12:30 - 14:00		Lunch			
14:00 - 14:30		WG1 / WG2 (parallel)	WG3 / WG4 (parallel)	Plenary talk 6	
14:30 - 15:00				Plenary talk 7	
15:00 - 15:30				Plenary talk 8	
15:30 - 16:00		Coffee Break			Lab. Tour
16:00 - 16:30		WG1 / WG2 (parallel)	WG3 / WG4 (parallel)	Hot Topics	
16:30 - 17:00					
17:00 - 17:30					
17:30 - 18:00					
18:00 - 18:30		CB meeting	TB meeting		
18:30 - 19:00				Dinner at RIKEN-Cafeteria	
19:00 - 19:30					
19:30 - 20:00					

Fig. 2. Timetable of the sessions for the TTC meeting at RNC.

Table 1. Statistics of registrants of TTC2018 at RNC.

Country	#	Labs and Companies
Brazil	1	CBMM
Canada	2	TRIUMF
China	19	IHEP, Peking U., IMP, NINGXIA
France	2	CEA-Saclay, CEA-Gif-sur-Yvette
Germany	14	DESY, HIM, HZB
Italy	3	INFN-LNL, SAES
Japan	55	KEK, RNC, JAEA, QST, MHI-MS, Tokyo Denka, SAES, TOSHIBA, ULVAC Miyoshi-Gokin, NEURON Japan, R-DEC, ScandiNova, Sojitz
Korea	4	Korea U., IBS
Sweden	4	ESS-ERIC, Uppsala U.
Switzerland	4	CERN
UK	1	STFC Daresbury
USA	34	Fermilab, JLab, SLAC, FRIB/MSU, BNL, ANL, NW U. Cornell U., OD U., Stony Brook U., ATI, II-VI, ISOHIM

during module assembly and first cool-down test in FRIB (T. Xu, MSU), Recent theoretical and experimental progress in N₂ doping and infusion (M. Checchin, Fermilab), Overview talks for Nb₃Sn and other thin film technology (G. Ereemeev, JLab), SC CH structure in Mainz/Frankfurt/Darmstadt (F. Dziuba, GSI), and Technical progress of crab cavity in fabrication and tests at CERN (M. Garlasche, CERN). Two special seminars were presented by H. Kawata from KEK and K. Sakamoto from QST, introducing the industrial applications in compact-ERL at KEK and the high intensity neutron source project at QST-Rokkasho.

The meeting was conducted successfully, and it had more than 120 participants. The next meeting will be held at TRIUMF (Vancouver, Canada) in February 2019.

References

- 1) <https://tesla-new.desy.de>.
- 2) <https://indico.desy.de/indico/event/20010/program>.

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Participation in Hokkaido Science Festival

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The year 2018 marked the 150th anniversary of the naming of “Hokkaido.” As part of a series of events commemorating the 150th anniversary, an event called “Hokkaido Science Festival” was hosted by the Hokkaido government.¹⁾ The purpose of the event was to evoke the challenging spirit of, in particular, young people in Hokkaido and to foster the youth into becoming globally competitive human resources. The event was held at the Hokkaido Prefectural Sports Center (also called “Hokkai Kitayell”) on August 6–7, 2018 in Sapporo, and persons of considerable prominence attended lectures that encouraged audience participation. Also, companies, universities, and research institutes participated and conducted various explanation exhibitions and experience-based programs. Figure 1 shows a venue in the Hokkaido Prefectural Sports Center.

The Nishina Center (more precisely, User Liaison Group) participated in the event, together with the Public Relations Office, and conducted a workshop for children and an exhibition. The Public Relations Office conducted an exhibition on “Kagakudo 100 books.²⁾”

We introduced the RIBF facility through the following three exhibitions. The first one was a participatory exhibition (i.e., workshop) entitled “Let’s make a nihonium nucleus with ironing beads.” In this workshop, using ironing beads, which are children’s toys, the participants constructed a three-dimensional nihonium pixel craft, after being explained about nuclear structures and how nihonium was discovered at the Nishina Center. The scene of the workshop is shown in Fig. 2.

The second one was a panel exhibition. Here, in addition to panels on the research at the RIBF facility, an oversized panel on SRC was also displayed. This extra-large SRC panel was aimed at getting the people to realize its scale while staying in Sapporo. Thus, by taking pictures in front of it, the visitors were able to



Fig. 1. A photograph taken at an exhibition hall in the Hokkaido Prefectural Sports Center

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take pictures as if they had actually come to the RIBF facility. This panel was particularly well-received by children and their parents.

The third one is the 3D nuclear chart made of Lego Blocks (Fig. 3). This 3D nuclear chart drew considerable attention, probably due to the familiarity of Lego Blocks and the rarity of the nuclear chart created with it. The 3D nuclear chart was a good exhibit, because it could generate interest owing to its interesting structure, and also because it allows researchers to make intuitive explanations using the actual nuclear chart. This display was also well received by the visitors.

Unfortunately, the location of our exhibition inside the venue was not good, and hence the exhibit that attracted the most participants was not ours. However, the visitors were able to thoroughly discuss the contents of the exhibition and enjoyed the display.



Fig. 2. A photograph taken at the workshop for making a nihonium nucleus with ironing beads.



Fig. 3. A photograph taken at the exhibition of a 3D nuclear chart made of Lego Blocks.

References

- 1) <http://www.pref.hokkaido.lg.jp/ss/tsk/hokkaido-sciencefestival.htm> .
- 2) <https://kagakudo100.jp/> .

QNP2018 International Conference

Y. Goto*¹ for the QNP2018 Local Organizing Committee

QNP2018 International Conference was held from November 13th to 17th in Tsukuba. It was the 8th one in a series of International Conference on Quarks and Nuclear Physics. The conference was held at the Tsukuba International Congress Center (EPOCHAL TSUKUBA). Experimentalists and theorists discussed recent developments in the field of hadron and nuclear physics.

The conference began with plenary talks on neutron stars and hadron physics. Recent progress in gravitational waves and dense baryonic matter, and the strangeness in neutron stars were discussed. In the plenary sessions, experimental reviews on quark and gluon structure of hadrons, hadron spectroscopy, hadron interactions and nuclear structure, and hot and dense matter were presented. Theoretical reviews were given for these subjects including reviews from lattice QCD. There were also plenary talks on experimental facilities, GSI-FAIR project, Jefferson Lab 12 GeV program, Belle-II project, J-PARC hadron project, and EIC project.

In four parallel sessions, following topics were covered:

Quark and gluon structure of hadrons
parton distribution functions, generalized parton distributions, transverse momentum distributions, and high-energy hadron reactions, among others.

Hadron spectroscopy
heavy quark physics, exotics, and N^* , among others.

Hadron interactions and nuclear structure
hypernuclear physics, kaonic nuclei, and baryon interactions, among others.

Hot and cold dense matter
quark-gluon plasma, color glass condensate, dense stars, strong magnetic field, mesons in nuclear medium, and hadronization, among others.

One of the highlights of the conference was the results from J-PARC on their first major project on strange nuclear physics. They obtained a large charge symmetry breaking effect in the hypernuclei, the first clear Ξ hypernucleus, and Kaonic nucleus. J-PARC physics covers wide areas of hadron physics, strangeness nuclear physics, exotic hadrons, hadrons in nuclear medium, nucleon structure functions, and quark-hadron matter.

Social events such as excursions to Tsukuba space



Fig. 1. Group photo of the QNP2018 conference.

center of JAXA and Belle-II of KEK, local sake brewery and Mt. Tsukuba, soba noodle cooking, and Kashima-Jingu shrine and historical Edo-taste downtown of Sawara were conducted, which were interactive. Participants also enjoyed good reception at the congress center and conference dinner at the hotel Grand Shinonome.

This conference was held with financial supports by KEK/J-PARC, RCNP, APCTP, JSPS Grant on Innovative Area: “Clustering as a window on the hierarchical structure of quantum systems,” Tsukuba Tourism and Convention Association, and Tsukuba City. We also received support from JAEA, RIKEN, and SOKENDAI.

A total of 216 participants from 25 countries attended the conference. There were 23 plenary talks and 128 parallel talks (including 15 invited keynote talks) in four parallel sessions. A group photo is shown in Fig. 1.

The full program and presentation files are available online at the conference website: <https://conference-indico.kek.jp/indico/event/33/> and the proceedings of the conference will be published online in JPS Conference Proceedings.

A satellite workshop on “hadron structure and interaction in finite density matter” was held from November 11th to 12th at KEK Tokai Campus hosted by KEK and JAEA (<http://j-parc-th.kek.jp/workshops/2018/11-11/>). Another workshop on the “progress on hadron structure functions in 2018” was held from November 18 to 19 at KEK Tsukuba Campus (<http://j-parc-th.kek.jp/workshops/2018/11-18/>).

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RIBF “Hodan-kai” meeting on the future of exotic nuclear physics

T. Matsumoto^{*1,*2} on behalf of the RIBF “Hodan-kai” meeting organizers

The second in the series of the RIBF “Hodan-kai” meeting by young researchers was held at Kobe campus of RIKEN, Integrated Innovation Building, from Feb. 18 to 20, 2019. The venue was in a relatively isolated place, and actually this was one of the key factors for the success of the meeting; the participants were forced to be in the meeting room and concentrate on physics. The RIBF “Hodan-Kai” meeting is organized by members of RIBF Theory Forum and supported by RIKEN Nishina Center, RIKEN iTHEMS, and JIC-FuS. This meeting is aimed at an intensive discussion based purely on curiosity, such as what is interesting and what we want to do in the future in a frank and low-pressure atmosphere. The style of “Hodan-kai” is thus different from a usual workshop.

The first “Hodan-kai” meeting was held at the same place from Jul. 21 to Aug. 2, 2017. In the first meeting, we focused on the latest theoretical research of nuclear physics. The number of presentations was 23, and we engaged in a heated debate. Although we shared recognition for the progress in theoretical research, we wanted more discussions with experimentalists and researchers in various fields in order to definitize a new agenda for the future of nuclear physics. The program and summary of the first “Hodan-kai” meeting can be seen in the web site.¹⁾

Based on the direction obtained at the first meeting, we arranged the second meeting as follows: 7 presentations on experimental research in nuclear physics, 6 presentations on theoretical research in nuclear



Fig. 2. Atmosphere of the banquet.

physics, and 12 presentations on some related fields, namely deep learning, quantum computing, computational physics, weak measurement, super-heavy elements, hadron physics, and laser physics. The number of presentations was 14 for invited and 11 for contributed. In the second meeting, there were 42 participants from various fields, and we had a heated discussion beyond the scheduled time. Thus, it was a very meaningful meeting. The program of the second “Hodan-kai” meeting can be seen in the web site.²⁾ Following the success of this meeting, we are planning to hold the next meeting in February 2020, and welcome many young researchers to join.

References

- 1) <https://indico2.riken.jp/event/2509/> .
- 2) <https://indico2.riken.jp/event/2864/> .



Fig. 1. Atmosphere of the 2nd “Hodan-kai” meeting.

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Symposium on “Science and Technology Explored with Periodic Table” celebrating the “IYPT2019 in Japan”

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The year 2019 is the 150th anniversary of Dmitry Mendeleev’s discovery of the periodic system and has thus been proclaimed to be the “International Year of the Periodic Table of Chemical Elements” (IYPT2019) by the United Nations General Assembly and UNESCO¹⁾. As the first official event at the IYPT2019 in Japan, a kick-off symposium titled “Science and Technology Explored with Periodic Table” was organized at the Science Council of Japan (SCJ), Tokyo, on February 23rd, 2019.²⁾

The symposium was coupled with an opening ceremony to celebrate the IYPT2019. Prof. Ken Sakai, chairman of the SCJ committees of the IYPT2019 and IUPAC, gave an opening introduction of the event. Celebration addresses were made by representatives of hosting and supporting organizations of the symposium, including SCJ, The Chemical Society of Japan, The Physical Society of Japan, and RIKEN. On behalf of RIKEN, Prof. Shigeo Koyasu, one of the executives, spoke about the history of RIKEN over a 100 years and highlighted the contributions made by RIKEN to the development of the periodic table.

Invited talks related to elements and the periodic table were given by distinguished chemists and physicists: Profs. Kouhei Tamao, Hideo Hosono, Susumu Kitagawa, Yoshiteru Maeno, Hiroko Tokoro, Kousuke Morita, and Kazuyuki Tatsumi. Prof. Morita presented a history of element finding and production and emphasized the role of RIKEN in the production of Element 113, “Nihonium.”



Fig. 1. Photo of the IYPT2019 symposium held at the hall of Science Council of Japan on February 23rd, 2019.



Fig. 2. Group photo of representatives of hosting organization with the speakers and organizers of the opening ceremony and symposium.

A discussion session was chaired by Prof. Hiroyoshi Sakurai. Questions about elements were raised by the audience, and answers were provided by speakers and organizers to help the general public understand elements better.

The closing remark was made by Prof. Mihoko Nojiri, vice chairman of the SCJ IYPT2019 committee and chairman of the SCJ IUPAC committee.

The symposium was open for public and the number of total participants was about 200, including media reporters.

The SCJ IYPT2019 committee acknowledges the many people, who supported the organization of the ceremony and symposium, as well as the administration and staff members at RIKEN Nishina Center for their support: Asako Takahashi, Yunike Shimizu, Kazushige Fukushima, Tetsuo Nayuki, Keiko Iwano, Kumiko Sugita, Midori Shishido, Tomomi Okayasu, Midori Yamamoto, and Mitsue Yamamoto. The symposium poster was designed by Narumasa Miyachi. Dr. Ryo Taniuchi was in charge of photography.

References

- 1) <https://www.iypt2019.org>.
- 2) <https://www.iypt2019.jp>.

*¹ RIKEN Nishina Center