

CHEP2015 - 21st International Conference on Computing in High Energy and Nuclear Physics

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The 21st international conference on Computing in High Energy and Nuclear Physics (CHEP2015) was held from 13th to 17th April, 2015 at the Okinawa Institute of Science and Technology (OIST) in Okinawa, Japan. It was jointly organized by High Energy Accelerator Research Organization (KEK), International Center for Elementary Particle Physics (ICEPP), The University of Tokyo, Okinawa Institute of Science and Technology Graduate University (OIST), Research Center for Nuclear Physics (RCNP), Osaka University, and RIKEN Nishina Center for Accelerator-Based Science, and supported by Ministry of Education, Culture, Sports, Science and Technology (MEXT), Okinawa Convention & Visitors Bureau (OCVB), and Okinawa Prefecture.

CHEP is a major series of international conferences for physicists and computing professionals from the High Energy and Nuclear Physics community, Computer Science, and Information Technology which provides an international forum to exchange the experiences and needs of the community, and to review recent, ongoing, and future activities. Since the first CHEP conference was held in 1985 Amsterdam, Netherlands, it is held in every one and half a year. It was the second time to be held in Japan since held in Tsukuba in 1991.

The scope of CHEP 2015 is represented by keywords which are categorized in two areas: Application and Technologies.

APPLICATION(13 keywords): DAQ, Trigger, Simulation, Reconstruction, Data analysis, Data Stores, Experiment frameworks for WAN distributed computing, Middleware and services for

production-quality infrastructures, Outreach, Multi-discipline/multi-experiment topic, Computing models, Data preservation, and Monitoring.

TECHNOLOGIES(18 keywords): Controls systems, Event processing frameworks, Data structures and algorithms, Data handling/access, Databases, Storage systems, Computing facilities and infrastructures, Software design, Software development process, Performance and validation tools, Continuous integration systems, Parallel programming, Networking, Collaborative tools, Cloud computing, Virtualization, High performance computing, and CPU architectures GPU FPGA.

In numbers, CHEP 2015 attracted a very high number of oral and poster contribution, 535 in total, and hosted 450 participants from 28 countries. There were 34 plenary talks and 254 oral presentations in 6 parallel sessions. Among 247 posters, eight posters presented by young scientists were selected as "Poster award", and lighting talks by each winner took place just before the closing session.

The conference proceedings have been published electronically in the Journal of Physics: Conference Series (JPCS), Volume 664 (2015) (doi:10.1088/1742-6596/664/00/001001).

The next 22nd CHEP conference will be held on October 12th-14th 2016, in San Francisco, hosted by SLAC and LBNL.



Fig. 1. Opening talk of the conference by Dr. Ken Peach



Fig. 2. Applause at the time of the conference end

TAN15 - 5th International Conference on the Chemistry and Physics of the Transactinide Elements

H. Haba* on behalf of the TAN15 Local Organizing Committee

The 5th International Conference on the Chemistry and Physics of the Transactinide Elements (TANs) was held on May 25–29, 2015, at the Urabandai Royal Hotel, located in the Urabandai area, in the northwest region of Fukushima prefecture, Japan. This conference was co-organized by the Nishina Center for Accelerator-Based Science, RIKEN (co-chair: Kosuke Morita) and the Advanced Science Research Center, Japan Atomic Energy Agency (co-chair: Yuichiro Nagame). TAN15 was the fifth in a series of conferences dedicated to the recent achievements in chemistry and physics of transactinide elements. The previous TAN conferences were held in Seeheim, Germany (1999), Napa, United States (2003), Davos, Switzerland (2007), and Sochi, Russia (2011). The scientific program covers both theories and experiments of 1) heaviest-element synthesis, 2) nuclear reactions, 3) nuclear structure, 4) chemistry, 5) atomic properties, and 6) other related topics.

The number of registrants was 86 from 13 countries. There were 2-special, 5-plenary, 12-invited, and 30-oral talks, and 20 poster presentations. In this report, the highlights from the RIKEN RI Beam Factory are briefly introduced.

Kosuke Morita (RIKEN/Kyushu University) claimed the discovery of element 113 by the cold fusion reaction of $^{209}\text{Bi}(^{70}\text{Zn},n)^{278}113$ based on the convincing three α -decay chains of $^{278}113$ which connected to the known nuclides of ^{266}Bh , ^{262}Db , and ^{258}Lr . Yasuo Wakabayashi (RIKEN) reported productions of new isotopes of ^{215}U and ^{216}U in the

^{136}Ba , ^{137}Ba , $^{138}\text{Ba} + ^{82}\text{Kr}$ reactions. Hiromitsu Haba (RIKEN) presented production and decay properties of ^{261}Rf , ^{262}Db , ^{265}Sg , and ^{266}Bh available for chemical studies using a gas-jet transport system installed to GARIS. Using unique pre-separated ^{265}Sg atoms, Alexander Yakushev (GSI Helmholtzzentrum für Schwerionenforschung GmbH) investigated the chemical synthesis and the gas-chromatographic separation of the first organometallic compounds of TANs, $\text{Sg}(\text{CO})_6$. Yukiko Komori (RIKEN) presented a rapid solvent extraction apparatus coupled to the GARIS gas-jet system for future aqueous chemistry studies of the heaviest TANs such as Sg and Bh. Yoshitaka Kasamatsu (Osaka University) investigated co-precipitation behavior of Rf with $\text{Sm}(\text{OH})_3$ as well as solvent extraction behavior of Rf in HCl solutions into Aliquat336. Toward the aqueous chemistry of Db at the RIKEN AVF cyclotron, Shin-ichi Goto (Niigata University) measured an excitation function for the $^{248}\text{Cm}(^{19}\text{F},5n)^{262}\text{Db}$ reaction. Daiya Kaji (RIKEN) demonstrated a performance of a new recoil separator, GARIS II. Michiharu Wada (RIKEN) introduced the Multi-reflection Time-Of-Flight (MR-TOF) mass spectrograph under development at GARIS II for precision mass measurements of TAN nuclei. Yuta Ito (RIKEN) received the Best Poster Award for his presentation “Development of a Gas Cell System for SHE-Mass Project at RIKEN”.

The next TAN conference will be organized by the German colleagues in 2019.



Fig. 1. Conference photo taken at a garden of the Urabandai Royal Hotel.

* RIKEN Nishina Center

The 9th Nishina School

H. Ueno*¹ and T. Kishida*¹

The Nishina School was initiated by the RIKEN Nishina Center (RNC) to promote international co-operation in the field of nuclear physics in the Asian Regions through human-resource development. Under this program, select undergraduate students from Peking University and Seoul National University have been participating in a two-week summer program since 2008 and 2012, respectively. They have been attending the Nishina School jointly since 2013.

The 9th Nishina School was held from July 27 to August 7, 2015. The curriculum of the School was designed to introduce the essence of nuclear physics to five undergraduate students from Peking University and five from Seoul National University. The program for the first week consisted of lectures and basic experimental training. During the second week, they gained hands-on experience in conducting experiments. On the last day of the School, the students gave presentations. The program timetable is shown in Fig. 1.

The management policy of the Nishina School has been decided by the Nishina School Steering Committee since its establishment in 2014. This year, the Committee meetings were held five times, on February 24, May 8, July 2, September 18, and December 16, 2015. Kishida, Principal of the Nishina School, also attended all of the meetings as an observer. The Committee decided to incorporate three different experimental trainings: i) mass spectroscopy of natural abundant Xe isotopes utilizing a part of the SCRIT system, ii) ion trapping of charged particles of aluminum powder with a simple trap electrode built by the students, and iii) X-ray and gamma-ray detection with advanced gas and semi-conductor detectors. Technical instructions for these experimental training were provided by the SCRIT Team, the SLOWRI Team, and the High Energy Astrophysics Laboratory.

All the students seemed to appreciate the invaluable experience and enjoy the School and life at RNC. Figure 2 shows a photograph taken at the opening ceremony on July 27.

First Week	Jul. 26 (Sun)	Jul. 27 (Mon)	Jul. 28 (Tue)	Jul. 29 (Wed)	Jul. 30 (Thu)	Jul. 31 (Fri)	Aug. 1 (Sat)
Morning (10:30-11:45)		Opening	Lecture 2: Communication (Kishida) e-learning	Lecture 4: Intro. of Nucl. Phys. (Ogawa)	Labwork instruction 1: Ion Trap (Wada)	Lecture 6: Accelerator (Kase)	
Afternoon 1 (13:30-14:45)		Lecture 1: Research at RIBF (Sakurai)	Lecture 3: Interaction of Particles in Materials (Doomenbal)	Lecture 5: Detectors (Sato)	Labwork instruction 2: Mass Separation (Wakasugi)	Lecture 7: Nucl. Astrophys. (Motobayashi)	
Afternoon 2 (15:30-16:45)		RIBF Tour	Training A: Oscilloscope, Coaxial Cable (Kishida)	Training B: Detector and Signals (Kishida)	Labwork instruction 3: Gamma & X-ray Detectors (Tamagawa)	Lecture 8: Safety Training (Tanaka)	
Second Week	Aug. 2 (Sun)	Aug. 3 (Mon)	Aug. 4 (Tue)	Aug. 5 (Wed)	Aug. 6 (Thu)	Aug. 7 (Fri)	Aug. 8 (Sat)
Morning (10:30-11:45)		Labwork: Group-A: Mass Separation (Wakasugi) Group-B: Ion Trap (Wada) Group-C: Gamma & X-ray Detectors (Tamagawa)			self learning day	Report preparation	
Afternoon 1 (13:30-14:45)						Student presentation	
Afternoon 2 (15:30-16:45)		Student interim review				Closing	

Fig. 1. The curriculum and timetable of the Nishina School. The lectures and experimental training are indicated in blue and red, respectively.



Fig. 2. Photograph of the Nishina School 2015 participants.

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HIAT2015-13th International Conference on Heavy ion Accelerator Technology[†]

N. Sakamoto*¹ and O. Kamigaito*²

The 13th International Conference on Heavy ion Accelerator Technology (HIAT2015) was held at WORKPIA YOKOHAMA in the downtown of the city of Yokohama city from September 7 to 11, 2015. It was jointly hosted by the RIKEN Nishina Center, RCNP (Osaka Univ.), NIRS, University of Tsukuba and JAEA-Takasaki.

HIAT2015 was the 13th in a series of conferences, dating back to 1973 first held in Daresbury and followed by Strasbourg (1977), Oak Ridge (1981), Buenos Aires (1985), Strasbourg-Heidelberg (1989), Legnaro (1992), Canberra (1995), Argonne (1998), Delhi (2002), Brookhaven (2005), Venice (2009), and Chicago (2012). HIAT is an international conference dedicated to the design, construction, development and operation of heavy-ion accelerators and their components. It focuses on the operational experience of existing facilities, achievements in heavy-ion accelerator physics and technology, progress on the implementation of new projects and infrastructure upgrades, and trends in the proposal and design of heavy ion accelerators as well as their main systems and components. The conference is mainly devoted to the accelerator teams of any institution, laboratory or university which are running or developing heavy ion facilities or their components for studies in the fields of nuclear physics and astrophysics as well as the applications of heavy ion beams in medicine, accelerator mass spectrometry, material analysis and processing, nuclear waste management, dynamics of nuclear fusion and fission, radiation science and dosimetry, development and production of radionuclides, environmental metrology, etc.

The topics of HIAT2015 were the subjects featured at the first conference that have been modified as

follows: 1)Electrostatic Accelerators, 2)Room Temperature and Supraconducting Linacs, 3)Room Temperature and Supperconducting Cyclotrons, 4)Synchrotrons and Storage Rings, 5)Radioactive Ion Beam Facilities, 6)Ion Sources and Traps, 7)Main Accelerator Systems and Components (e.g. Radiofrequency, Cavities, Magnets, Vacuum, Control, Beam Diagnostics, Cryogenics, Radioprotection, Mass Spectrometry, Microbeam Facilities).

Prior to the conference, a welcome reception was held on Sunday and posters were presented by students who successfully received financial support from the organizing committee. The conference started on Monday with the welcome address by the director of the Nishina Center, Hideto En'yo. In the sessions that followed, the current status on commissioning of new facilities, progresses on accelerator devices, new design of heavy-ion accelerators and their components etc. were widely discussed. There were 18 invited talks and 32 contributed oral presentations. One of the common issues was how to realize very intense heavy-ion beams with highly efficient accelerators. On Monday and Wednesday, poster sessions were held. 47 posters were presented and technical issues were discussed actively. On Friday Richard C. Pardo presented a summary of the conference.

The number of registrants was 120 (not including the number of exhibitors and accompanying persons), from 14 countries. Fig. 1 shows a conference photo taken on Thursday. The HIAT2015 conference turned out to be a great success and it is worth noting that the research activities in this field have become much more vibrant since the last HIAT conference.

The conference proceedings has been published in JACoW(<http://www.jacow.org/>). The next HIAT conference hosted by IMP will be held in 2018.

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Fig. 1. Conference photo taken in the plenary hall

RIBF Users Meeting 2015

N. Imai,^{*1} T. Sumikama,^{*1} S. Ota,^{*1} M. Asai,^{*1} P. Fallon,^{*1} T. Isobe,^{*1} N. Itagaki,^{*1} Y. Kanada-En'yo,^{*1} M. Kimura,^{*1}
 Y. Kondo,^{*1} J. Lee,^{*1} H. Miyatake,^{*2} T. Nakamura,^{*1} A. Obertelli,^{*1} K. Ogata,^{*1} H. Sakurai,^{*3,4} S. Shimoura,^{*5}
 T. Uesaka,^{*3} H. Ueno,^{*3} K. Yako,^{*1} K. Yoneda,^{*3} and K. Yoshida^{*1}

The RIBF Users Meeting 2015¹⁾ was successfully held on September 10 and 11 in 2015. This meeting aims at mutual understanding among RIBF users through discussion on latest results obtained every year at RIBF. The number of participants was 140, which was more than the number registered. We discussed actively the topics of relevant fields. At the RIBF Users Meeting 2013 held in June 2013, it was decided that the next meeting will be scheduled for March 2015 for the convenience of the users outside Japan. However, the cancellation of NP-PAC scheduled to be held in the June 2015, the Users Meeting was also postponed to September. The Users meeting is usually held during the RIBF collaboration days where the users discuss the ideas of experimental proposals in advance of the NP-PAC meeting.

Since the range of each experimental field varies widely depending on the nuclei interest and the energies of the beams, we allocated 10 minutes for discussion time following 15 minutes talk for each contribution to gain understanding of each other's field. The program mainly consists of reports from large collaborations, i.e., Rare-RI Ring, SUNFLOWER, SAMURAI, EURICA, GARIS, KISS, CRIB, SHARAQ and OEDO. Newly introduced was a new activity of the ImPACT program which attempts to establish a nuclear transmutation method to dispose long lived fission products produced by nuclear power plants. As the last session of the first day, the poster session was hosted by the director of the Nishina Center. We enjoyed discussion during poster presentation in a relaxed atmosphere served with refreshments

Two winners of the RIBF Thesis Awards 2015 were also celebrated at the event. Originally started as the RIBF Users Group Thesis Awards in 2012, this was the fourth time for the Awards to be presented. The Awards honor the achievements of young scholars who earned their doctoral degrees based on experiments and theoretical works related to the physics research conducted at RIBF. Starting from 2015, the Awards were co-hosted by the director of the Nishina Center and RIBF UEC, and name changed to the RIBF Thesis Awards. The winners were Dr. Z.Y. Xu (Univ. of Hong Kong), and Dr. Y. Ito (RIKEN Nishina Center) for the thesis titled "Beta-decay spectroscopy on neutron-rich nuclei in a range of $Z = 26 \sim 32$ " and "A multi-reflection

time-of-flight mass spectrograph for high-precision mass measurements of short-lived nuclei", respectively. After the ceremony, Dr. Xu presented a talk on the thesis. Dr. Ito will give a talk at the next Users Meeting.

We also allocated time for two special sessions. One featured the introduction of the activities of GREY in USA by Dr. P. Fallon. The highlights of their achievements up to now as well as the prospect of future development were presented. Though the current main γ -ray spectrometer at RIBF, DALI-2, is composed of approximately 200 NaI(Tl) crystals, we should change to spectrometers which has finer energy resolution like germanium detectors. The reason is that the level density will increase in the high-Z region and the level scheme will be complex in the odd nuclei. We agreed to continue with discussion on this issue.

Topics of the other was the upgrade plan of RIBF. Since overseas facilities such as FRIB and FAIR will be commissioned from around 2020, the time has come to discuss the future direction of RIBF. Prof. H. Sakurai from the Nishina Center presented a plan to increase the beam intensity by one order of magnitudes. The plan calls for the construction of a superconducting injector linac and a new fRC in order to bypass the old RRC (RIKEN Ring Cyclotron). Users, on the other hand, requested to install the experimental devices to make full use of the high primary beam intensity. After the meeting, mostly domestic users continued to discuss with the Nishina Center on this issue and finally agreed to the updated plan which includes several experimental devices. The plan was submitted to Science Council Japan in March 2016 to be reviewed.

The next RIBF Users Meeting will be held at the beginning of September in 2016. Though we allocated 10 minutes discussion for each contribution, it turned out that the time was still not sufficient. At the next Users Meeting, we will reduce the number of collaboration reports and instead secure more time for discussion.

Reference

1) <http://indico2.riken.jp/indico/conferenceOtherViews.py?view=standard&confId=1961>

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Quark Matter 2015

Y. Akiba,^{*1} H. Hamagaki^{*2} and T. Hatsuda^{*1}

The Quark Matter 2015 (QM2015) is the XXV international conference on ultrarelativistic heavy-ion collisions. The aim of this conference series held every year and a half is to unravel the mystery of strongly interacting matter at extreme environments created in the ultrarelativistic heavy-ion collisions in the early universe and the central core of super dense stars. From September 27 to October 3, 699 physicists from 33 countries gathered in Fashion Mart, Kobe, Japan.

QM2015 was hosted by the Science Council of Japan and the Physical Society of Japan, and co-hosted by the RIKEN Nishina Center and the Center for Nuclear Study, the University of Tokyo. 19 domestic and foreign institutions, 9 domestic and foreign companies, and 2 foundations from Kobe city had made substantial contributions and financial supports to organize QM2015. The conference was chaired and co-chaired by the present authors.

Major scientific topics of QM2015 included (1) QCD at High Temperature, (2) Baryon Rich QCD Matter, (3) QGP in Small Systems, (4) Initial State Physics and Approach to Equilibrium, (5) Jets and High p_T Hadrons, (6) Open Heavy Flavors and Strangeness, (7) Quarkonia, Electromagnetic Probes, (8) Collective Dynamics, (9) Correlations and Fluctuations, (10) Quark Matter in Astrophysics, (11) Relations to Other Strongly Coupled Systems, (12) New Theoretical Developments, and (13) Future Experimental Facilities, Upgrades, and Instrumentation.

The QM2015 program started on September 27 with the public lectures by Ryugo Hayano (Univ. Tokyo) and Hiroshi Ooguri (Caltech/IPMU) concurrently with the student day lectures. More than 240 students and postdocs attended the student day lectures. After the opening talk by Gordon Baym (Univ. Illinois) on September 28, the first three days (Sep.28-Sep.30) were devoted to parallel sessions and poster sessions. Plenary sessions followed for the last three days (Oct.1-Oct.3). There were 168 parallel talks, 410 poster entry and 32 plenary talks. In addition, 8 flash talks selected from the posters were presented on the last day. The Young Scientist Prize for Nuclear Physics was awarded to the select individuals who gave parallel talks, namely, Natasha Sharma (Univ. of Tennessee), Darren McGlinchey (Univ. of Colorado), Zhenyu Chen (Rice Univ.), and Alexander Rothkopf (Heidelberg Univ.). Moreover, the Zimanyi Medal granted to a young theoretical physicist under 40 who has made extraordinary contributions to the field of high energy nuclear physics, was awarded to Chihiro Sasaki (Wroclaw Univ.). Details of the scientific contents and presentation slides can be viewed online: <http://qm2015.riken.jp/>

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Fig. 1 and Fig.2 show some statistics regarding the QM2015 participants. The blue and the red correspond to male and female participants, respectively.

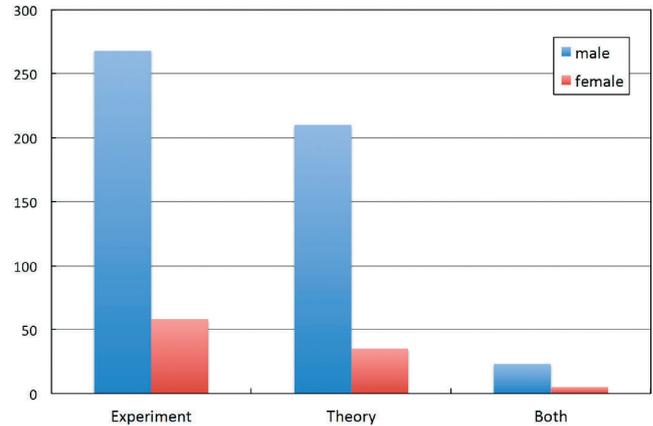


Fig. 1. Number of experimentalists and theorists participating in QM2015.

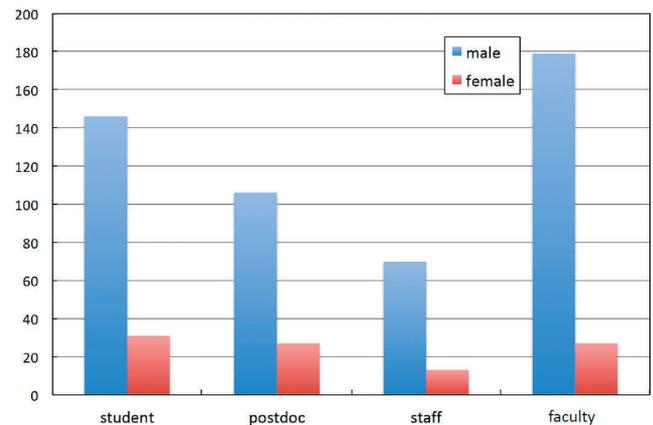


Fig.2. Number of students, postdocs and staffs/faculties participating in QM2015.



Physics with Fragment Separators - 25th Anniversary of RIKEN Projectile Fragment Separator (RIPS25)

Reported by T. Kubo

A symposium entitled “Physics with Fragment Separators - 25th Anniversary of RIKEN Projectile Fragment Separator (RIPS25)” was held on December 6-7, 2015 at Shonan Village Center in Hayama, Kanagawa, Japan to celebrate the 25th anniversary of the RIKEN Projectile-Fragment Separator, RIPS, at RIKEN Nishina center.

With the RIPS separator producing its first RI beams in November 1989, the physics programs using RI beams at intermediate energies started in January 1990. Since then, the RIPS facility has been pioneering in a variety of key experiments in RI-beam physics, such as those of reaction studies of exotic nuclei with RI beams as well as with spin-polarized RI beams. The RIPS25 symposium celebrated the great achievements that the RIPS separator had contributed in making in the last 25 years, reviewing how RI-beam physics has been established as one of the key fields of nuclear physics. Furthermore the future directions of the fields were discussed as well.

The RIPS25 symposium was jointly organized by RIKEN Nishina Center and the Center for Nuclear Study (CNS), Univ. of Tokyo, chaired by Toshiyuki Kubo, RIKEN and co-chaired by Susumu Shimoura, CNS. A total of 65 participants joined the symposium, which included 16 from foreign institutes, 23 from domestic institutes, and 26 from RIKEN. Figure 1 shows a group photograph of the participants. The numbers of oral and poster presentations were 25 and 13, respectively.

The invited speakers and invited participants (labeled by *) are listed as follows:

N. Aoi (RCNP, Osaka U.)

T. Aumann (TU Darmstadt / GSI)
 D. Beaumel (IPN Orsay)
 A. Chakrabarti (VECC, India)
 M. Fukuda (Osaka U.)
 A. Gade (NSCL, MSU)
 H. Geissel (GSI)
 K. I. Hahn (Ewha Womans U., S. Korea)
 I. Hamamoto (RIKEN / U. of Lund)
 M. Ishihara (RIKEN)
 Y. Kondo (Tokyo Tech.)
 D. J. Morrissey (NSCL, MSU)
 A. C. Mueller (CNRS)
 E. Yu. Nikolski (Kurchatov Institute)
 S. Nishimura (RIKEN)
 K. Ogata (RCNP, Osaka U.)
 N. A. Orr (LPC CAEN)
 T. Otsuka (U. of Tokyo)
 S. Sakaguchi (Kyushu U.)
 H. Ueno (RIKEN)
 M. Wada (RIKEN)
 Y. Ye (Peking U.)
 *W. Henning (RIKEN/Argonne)
 *J. A. Nolen (Argonne)
 *A. Ozawa (U. of Tsukuba)
 *H. Sakai (RIKEN)
 *Y. Yano (RIKEN)

The speakers from the organizer side were as follows:

T. Kubo (RIKEN)
 H. Sakurai (RIKEN)



Fig. 1. Group photograph of the symposium