## Evaluation of Incorporated Administrative Agency

Japan Atomic Energy Agency (JAEA) was established as one of Incorporated Administrative Agency. JAEA's annual activity is reviewed in the Evaluation Committee set up by the government. In the fiscal year 2010, Advanced Science Research Center (ASRC) earned a S rating (highest rate) for our research activities. In addition to the research performances, the management approach including the promotion for an internationalization has been highly valued.

## Reimei Research Program

ASRC aims to be an international center of excellence (COE) for basic research on advanced nuclear science (in the 2nd midterm goal). In pursuit of this aim, Reimei Research Program is conducted after the proposals from the world to explore the frontier of atomic energy science. The five research subject shown below were selected in the FY2011 and have been carried out in collaboration with JAEA.

**Research theme accepted for Reimei Research Program 2011**

| Research theme | Project Director (Applicant) | Affiliation |
|---|---|---|
| New approach to the exotic phases of actinides compounds under unconventional experimental conditions | Arno Hiess | Institut Laue Langevin |
| New fission mechanism peculiar to proton-rich nuclei | Andrei Andreyev | University of the West of Scotland |
| Exploration of new biological specific function by heavy elements stimulus | Lynne E. Macaskie | University of Birmingham |
| Synthesis, magnetic and transport studies of Li(Zn,Mn)As and other doped I-II-V magnets | Yasutomo J. Uemura | Colombia University |
| Theoretical studies in spintronics and multifunctional materials | Timothy Ziman | Institut Laue Langevin |

## Prizes

※ R.G. = Research Group

### External Award

◆Young Investigator Award (Society of Muon and Meson Science of Japan)
「Muon spin relaxation and quadrupolar ordering in f-electron system $PrPb_3$」
／ Takashi Ito (R.G. for Condensed Matter Physics of Heavy Element Systems )

◆The Fifth Asia Pacific Conference on Few Body Problem in Physics 2011
Outstanding Young Scientist Presentation Award
「Search for $\Theta^+$ via the pion induced reaction at J-PARC: J-PARC E19」／Kotaro Shirotori (R.G. for hadron Physics・Post-Doctoral Fellow)

◆Young Scientist Award of the Physical Society of Japan
「Contributions to the progress of reflection high-energy positron diffraction」 ／ Yuki Fukaya (R.G. for Spin-Palarized Positron Beam)

◆JFY2010 HUA Master Thesis Award (J-PARC Hadron Hall Users' Association)
「Sigma-p scattering experiment with a proton measurement system of a multi-fiber tracking detector」
／ Ryotaro Honda (R.G. for Hadron Physics・Fellow of Advanced Science)

◆Poster Award of The 54th Annual Meeting of JSRC (Japanese Society of Radiation Chemistry)
「Unpaired Electron Species in DNA Film and DNA Modification Induced by Nitrogen and Oxygen K-Shell Photoabsorption」
／ Toshitaka Oka (R.G. for Radiation and Biomolecular Science・Post-Doctoral Fellow)

### JAEA Award

◆2011 JAEA President's Award
「Theory on novel thermoelectric phenomena」
／ Jun'ichi Ieda※1, Hiroto Adachi※1, Bo Gu※2 (R.G. for Condensed Matter Theory・Senior Post-Doctoral Fellow※1, Special Topic Researcher※2)
「Actinide materials research under high-pressure」／ Naoyuki Tateiwa (R.G. for Actinide Materials Science)

◆2010ASRC Director General's Award
「Theory of spin Seebeck effect」／ Hiroto Adachi (R.G. for Condensed Matter Theory・Senior Post-Doctoral Fellow)
「Actinide materials research under high-pressure」／ Naoyuki Tateiwa (R.G. for Actinide Materials Science)
「Biomineralization process of REEs by microorganism」／ Mingyu Jiang (R.G. for Bioactinide・Fellow of Advanced Science)
「Study of adsorption and oxidation of heavy elements by biogenic manganese oxides」
／ Kazuya Tanaka (R.G. for Bioactinide・Post-Doctoral Fellow)
「Study of surface superstructures by means of reflection high-energy positron diffraction」
／ Yuki Fukaya (R.G. for Spin-Polarized Positron Beam)
「Theory of spin Hall effect」／ Bo Gu (R.G. for Condensed Matter Theory・Special Topic Researcher)
「Study on radiolysis of liquid water relevant to radiation track structure and its dynamics」
／ Shinichi Yamashita (R.G. for Radiation and Biomolecular Science・Post-Doctoral Fellow)

## Press Release

※ Detail is available on web site
http://www.jaea.go.jp/02/press1.shtml

Jan. 25, 2011 " **Observation of symmetry breaking in the hidden order state of a uranium compound $URu_2Si_2$** "
Yoshihiro Haga, Tatsuma Matsuda, Etsuji Yamamoto (R.G. for Actinide Materials Science)

Feb. 15, 2011 " **A flow of spins from rotational bodies** "
Mamoru Matsuo, Jun'ichi Ieda (R.G. for Condensed Matter Theory), Eiji Saitoh (R.G. for Mechanical Control of Materials and Spin Systems), Sadamichi Maekawa (Director General of ASRC)

Jun. 9, 2011 " **Improvements to specialized valves that separate spin and electron currents – The significant progress for development of higher-density magnetic media –**"
Sadamichi Maekawa (Director General of ASRC)

Jun. 23, 2011 " **Discovery of a new spin injection method available into all types of materials – The significant progress for development of next-generation energy-saving devices –**"
Jun'ichi Ieda (R.G. for Condensed Matter Theory), Sadamichi Maekawa (Director General of ASRC), Eiji Saitoh (R.G. for Mechanical Control of Materials and Spin Systems)

Aug. 5, 2011 " **Development of new magnetic semiconductor – Application to spintronics devices –**"
Wataru Higemoto, Takashi Ito (R.G. for Condensed Matter Physics of Heavy Element Systems), Bo Gu (R.G. for Condensed Matter Theory), Sadamichi Maekawa (Director General of ASRC)

Aug. 19, 2011 " **Long range spin Seebeck effect and acoustic spin pumping – Significant progress for next generation energy saving devices –**"
Hiroto Adachi (R.G. for Condensed Matter Theory), Sadamichi Maekawa (Director General of ASRC), Eiji Saitoh (R.G. for Mechanical Control of Materials and Spin Systems)

Sep. 15, 2011 " **Direct observation of magnetic fluctuations in exotic superconductors – Progress in clarification of superconductivity via magnetic fluctuations –**"
Hironori Sakai (R.G. for Condensed Matter Physics of Heavy Element Systems)

## ASRC Seminar

| No | Date | Speaker | Title |
|---|---|---|---|
| 419 | Nov. 9, 2010 | Oleg P. Sushkov (The University of New South Wales, Australia) | Spin spirals in underdoped cuprates:theory and experiment |
| 420 | Nov. 22, 2010 | Janez Bonca (The Jožef Stefan Institute, Slovenia) | Numerical study of interacting systems driven by a constant electric field |
| 421 | Dec. 1, 2010 | Koki Takanashi (Institute for Materials Research, Tohoku University) | Spin current and Spintronics |
| 422 | Dec. 1, 2010 | Dmitri Fedorov (Advanced Industrial Science and Technology) | Development of the quantum-mechanical method suitable for systems with 20000 atoms |
| 423 | Dec. 28, 2010 | Shinichi Uchida (The University of Tokyo) | A tale of two oxygens: Two types of oxygens in high-Tc cuprates observed by STM |
| 424 | Jan. 13, 2011 | Yasui Shigehiro (High Energy Accelerator Research Organization(KEK)) | Exotic charmed hadrons and charmed nuclei |
| 425 | Jan. 17, 2011 | Kiyohiko Kawai (The Institute of Scientific and Industrial Research, Osaka University) | Radiation and photo-induced oxidative DNA damage |
| 426 | Feb. 8, 2011 | Isao Maruyama (Osaka University) | Matrix product state in discretized and continuous space -Density renormalization group, Bethe Ansatz, Z2 topological invariant - |
| 427 | Feb. 7, 2011 | Yasushi Kino (Tohoku University) | Exotic atom and molecule including supersymmetric stau particles and catalyzed nuclear fusion |
| 428 | Mar. 3, 2011 | Kouji Miwa (Tohoku University) | $\Sigma p$ scattering experiment project at J-PARC |
| 430 | Mar. 8, 2011 | Fedir A. Ivanyuk (Institute for Nuclear Research, Ukraine) | The transport coefficients for the large scale nuclear collective motion |

# ASRC Schedule

| No | Date | Speaker | Title |
|---|---|---|---|
| 434 | Mar. 11, 2011 | Jan A. Martinek<br>(Polish Academy of Science, Poland) | Molecular spintronics: Spin polarized transport through quantum dots and molecules |
| 435 | Mar. 11, 2011 | Lev Vidmar<br>(The Jožef Stefan Institute, Slovenia) | Nonequilibrium quantum dynamics of a charge carrier doped into Mott insulator |
| 436 | May. 30, 2011 | Toshio Motoba<br>(Osaka Electro-Communication University) | Progress in the gamma spectroscopy of *p*-shell hyper nuclei and the prospects for the *sd*-shell region |
| 437 | May. 25, 2011 | Nobuyoshi Akimitsu<br>(Radioisotope Center, The University of Tokyo) | Functional analysis of nuclear non-coding RNAs in mammalian cells |
| 438 | Jun. 14, 2011 | Shunichi Tanaka<br>(Former Special Advisor to the President of JAEA) | Accident of the Fukushima Daiichi Nuclear Power Plant |
| 439 | Jun. 14, 2011 | Stewart E. Barnes<br>(University of Miami, USA) | Origin of spin-motive-forces |
| 440 | Jun. 16, 2011 | Yong Hee Chung<br>(Hallym University, Korea) | Current status of Korea Isotope Accelerator |
| 441 | Jun. 16, 2011 | Pham Nam Hai<br>(University of Tokyo) | Iron-based n-type electron-induced ferromagnetic semiconductor |
| 442 | Jun. 29, 2011 | Takeshi Matsunaga, Toshihiko Ohnuki<br>(JAEA)<br>Takumi Saito<br>(The University of Tokyo)<br>Noriko Tomioka<br>(National Institute for Environmental Studies)<br>Kazuya Tanaka<br>(Hiroshima University) | 7th JAEA Actinide Network workshop: "Behavior of nuclear fission products in environment" |
| 443 | Jul. 1, 2011 | Masayuki Niiyama<br>(Kyoto University) | Hadron physics at LEPS and LEPS II |
| 444 | Jul. 21, 2011 | Satoshi Chiba, Katsuhisa Nishio, Hiroyuki Koura<br>(JAEA) | Shell structure and fission of exotic heavy nuclei |
| 445 | Jul. 22, 2011 | Hiroshi Toki<br>(Osaka University) | Extended Brueckner-Hartree-Fock theory in many body system - Importance of pion in nuclei- |
| 446 | Jul. 13, 2011 | Yuzuru Miyazaki<br>(Tohoku University) | Thermoelectric materials and its applications |
| 447 | Jul. 25, 2011 | Kouhei Washiyama<br>(Universite Libre de Bruxelles, Belgique ) | Description of heavy-ion fusion reactions near the Coulomb barriers based on a mean-field approximation |
| 448 | Aug. 1, 2011 | Oleg P. Sushkov<br>(The University of New South Wales, Australia) | Magnetic properties of lightly doped antiferromagnetic YBCO |
| 449 | Aug. 24, 2011 | Ryohei Amano, Kohshin Washiyama, Akihiko Yokoyama<br>(Kanazawa University)<br>Masahiko Watanabe<br>(FUJIFILM RI Pharma Co., Ltd.)<br>Noriko Ishioka, Ichiro Nishinaka<br>(JAEA) | Study for nuclear medicine using the tandem accelerator of JAEA-Tokai<br>-Aim at the new cancer medical treatment by α-emitting radioisotopes- |
| 450 | Sep. 15, 2011 | Atsufumi Hirohata<br>(University of York, UK) | Schottky barrier distribution in a single Fe/GaAs junction |
| 451 | Sep. 9, 2011 | Takashi Inoue<br>(Nihon University) | Recent lattice QCD simulation on the *H*-dibaryon |
| 452 | Sep. 27, 2011 | Jon P. Omtvedt<br>(University of Oslo, Norway) | The SISAK system and on-line liquid-liquid extraction<br>On-line LS alpha-detection system for continuous flow |
| 453 | Oct. 3, 2011 | Eric Colineau<br>(Institute for Transuranium Elements, German) | $^{237}$Np Mössbauer studies on actinide superconductors and related materials |
| 454 | Oct. 14, 2011 | Jason T. Burke<br>(Lawrence Livermore National Laboratory, USA) | Overview of the surrogate reactions program at LLNL |
| 455 | Oct. 5, 2011 | Taku Gunji<br>(Center for Nuclear Study, University of Tokyo) | Experimental studies of hot and dense QCD medium at LHC-ALICE |

## Invited Scientists

| Term | Name / Affiliation | |
|---|---|---|
| Feb. 7 ~ 19, 2011 | Ricardo R. Urbano | Florida State University, National High Magnetic Field Laboratory (FSU-NHMFL), USA |
| Feb. 7 ~ 19, 2011 | Gerry H. Lander | Institut Laue-Langevin(ILL), France |
| Feb. 15 ~ 27, 2011 | Arno Hiess | Institut Laue-Langevin(ILL), France |
| Feb. 15 ~ 22, 2011 | Dai Aoki | Commissariat à l'énergie atomique(CEA) Grenoble, France |
| Feb. 15 ~ 19, 2011 | Jean-Pascal Brison | Commissariat à l'énergie atomique(CEA) Grenoble, France |
| Feb. 15 ~ 19, 2011 | Filip Ronning | Los Alamos National Laboratory (LANL), USA |
| Feb. 15 ~ 26, 2011 | Nicola Magnani | Lawrence Berkeley National Laboratory, USA |
| Feb. 12 ~ 24, 2011 | William Knafo | Laboratoire National des Champs Magnétiques Intenses, France |
| Feb. 15 ~ 19, 2011 | Andrei Rogalev | European Synchrotron Radiation Facility (ESRF), France |
| Feb. 15 ~ 19, 2011 | Olivier Pauvert | Institute for Transuranium Elements, Germany |
| Mar. 6 ~ 19, 2011 | Fedir A. Ivaniuk | National Academy of Science of Ukraine, Ukraine |
| Mar. 6 ~ 19, 2011 | Jan A. Martinek | Polish Academy of Science, Poland |
| Jun. 21 ~ Aug. 22, 2011 | Agnieszka A. Czeszumska | University of California Berkeley, USA |
| Jun. 12 ~ 18, 2011 | Stewert E. Barnes | University of Miami, USA |
| Jun. 15 ~ 17, 2011 | Yong Hee Chung | Hallym University, South Korea |
| Jul. 24 ~ Aug. 16, 2011 | Stewert E. Barnes | University of Miami, USA |
| Jul. 27 ~ Aug. 6, 2011 | Oleg P. Sushkov | The University of New South Wales, Australia |
| Sep. 22 ~ 29, 2011 | Jon P. Omtvedt | University of Oslo, Norway |
| Oct. 11 ~ 15, 2011 | Jason T. Burke | Lawrence Livermore National Laboratory, USA |

## Editor's note

We are pleased to deliver the "Notes on Basic Science -Quest for the future-" for the first time after a great earthquake disaster on March 11. In addition to a interviews and notes which give a comprehensive introduction of our research activities at the center, the Fukushima support-related articles are also reported. Saitoh GL's enthusiasm to integrate spin currents into physics of matter is talked in his interview. The accumulation of such studies will give new alternatives of the future mentioned in the article "Overcome the earthquake disaster" by Director General of our center. As a part of our approach towards internationalization, the English version is to be issued from this volume. We hope the Notes reached wider audience. (T.S.)