

News

IPMU's Research Building Completed

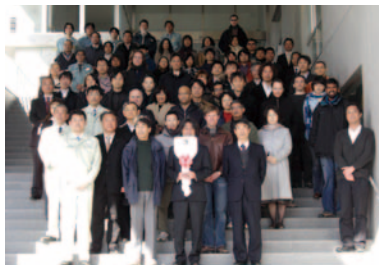
To celebrate the completion of IPMU's Research Building, construction of which began at the University of Tokyo's Kashiwa Campus in February 2009, a tape-cutting ceremony was held on December 22, 2009, attended by IPMU researchers and administrative staff as well as engineers from the University of Tokyo's Facilities Management Department and the construction company. After the tape-cutting, the construction company handed the key to the Director's Office (actually an enlarged plastic copy) to IPMU Director Hitoshi Murayama.

The five-story building with a floor area of slightly less than 6,000 m² has a unique design, called "Spiraling Academia" by Professor Hidetoshi Ohno of the University of Tokyo, the architect who designed the building (see page 4). The building features a large and comfortable space for interaction on the third floor, giving an impression of cafés surrounding a town square in Europe. It represents an ideal environment for researchers; everywhere inside the building as well as on the rooftop, researchers feel a comfortable atmosphere that is conducive to interaction and discussion. The building represents a dream come true for IPMU researchers.

On January 18, 2010, the IPMU

Administration Office, previously housed in the basement of Kashiwa Campus's General Research Building, moved to the new IPMU building. IPMU researchers also began relocating, and a tea time at 3:00 pm was also held on the same day in the interaction space.

The Inauguration Ceremony of the IPMU Research Building will be held on February 23 with its interaction space as a venue.



A group photo taken after the ceremony.

At 3rd Site Visit, UT President Junichi Hamada to Make IPMU a Permanent Entity

The third site visit by observers from JSPS and MEXT was conducted on January 21 and 22 at the new IPMU Research Building, to follow up on IPMU's progress toward the formation of a World Premier International (WPI) Research Center. Members of the delegation included WPI Program Director Toshio Kuroki, Program Officer in charge of IPMU Ichiro Sanda, five Working Group members (Tuneyoshi Kamae, Hikaru Kawai, Tetsuji Miwa, John Peacock, and Matthias Staudacher), and officers from the S&T Policy Bureau of MEXT, Itaru Watanabe (Senior Deputy Director-General), Shigeo Okaya (Director, Strategic Programs Division), and Ei Takeuchi (Director, Office of S&T for a Safe and Secure Society). The observers heard progress reports from the IPMU Director, some of the principal investigators and researchers. They also interviewed a number of young researchers. From the University

of Tokyo Directorate, Managing Director and Executive Vice President Yoichiro Matsumoto attended on the first day, and President Junichi Hamada on the second.

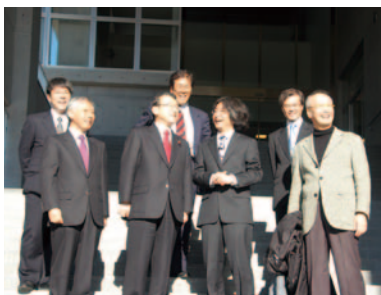
Of particular note this time was a statement by President Hamada to the delegates that he is committed to making IPMU one of the University of Tokyo's "Institutes for Advanced Study," the creation of which is being discussed by the University's Board. This would integrate IPMU into the University of Tokyo as a permanent entity, and a subset of the IPMU faculty would effectively be given tenure. To date, it has not been clear how IPMU would continue after the ten years (plus an additional 5 years for high-performing WPI centers) of support from MEXT. Moreover, IPMU does not have tenured faculty positions. To some extent, these issues did influence the hiring of the highest caliber scientists. The WPI Program Committee had pointed out that IPMU needs to improve in this area, and consequently President Hamada's statement had a strong impression on the delegation and was very welcome.



Senior Vice Minister of MEXT Visits IPMU

Senior Vice Minister of Education, Culture, Sports, Science and Technology Masaharu Nakagawa, visited IPMU on January 8, 2010. Mr. Nakagawa was accompanied by MEXT officers Shinichiro Izumi (Director General, S&T Policy Bureau) and Shigeo Okaya (Director, Strategic Programs Division, S&T Policy Bureau). IPMU Director Hitoshi

Murayama explained IPMU's research programs and the progress it has made in its efforts to become an internationally visible research center. After discussion, Mr. Nakagawa and MEXT officers visited the new IPMU Research Building, guided by its architect, Prof. Ohno. They also joined IPMU researchers for tea and particularly enjoyed a relaxed conversation with foreign researchers.



Government Revitalization Unit Reevaluates Government-Funded Research Programs

The cabinet of Japanese Prime Minister Yukio Hatoyama, inaugurated in September, 2009, has proposed drastic budget cuts and created a Government Revitalization Unit. Working groups re-evaluated government-funded programs in public hearings in November. Most S&T programs, including the WPI, were no exceptions, and faced deep proposed cuts in their budget. WPI Program Director, Toshio Kuroki, was very concerned about this critical situation and urgently conveyed a message "Crisis of Science in Japan" (<http://www.ipmu.jp/node/559>). IPMU also released a statement "Funding Cuts Threaten Globalization of Japanese Science, Scientists Fear" (<http://www.ipmu.jp/node/555>). IPMU also appealed to the public to respond to the MEXT's call for public comments about the Government Revitalization Unit's recommendations for the WPI Program, in particular (<http://www.ipmu.jp/node/566>). In addition, IPMU asked prominent scientists such

as Nobel laureates and Fields Medal recipients to write a letter to Mr. Hatoyama, providing international praise for the WPI Program and requesting continued support for it. Four other WPI institutes also made similar efforts. As a result of these efforts, although the WPI Program will receive a budget cut next Japanese fiscal year (the average budget for each WPI institute will be reduced by 50 million yen from the current budget of 1.4 billion yen), it would not cause significant damage to the Program. IPMU is grateful to those who supported it in this matter.

University of Tokyo and UC Berkeley Sign Comprehensive Academic Exchange Agreement

The University of Tokyo (UT) and the University of California, Berkeley (UCB), have signed a comprehensive academic exchange agreement on December 17, 2009. The two universities will encourage more research and educational exchanges between their campuses. At UT, the Division for International Relations in the Office



President Junichi Hamada, signing the agreement at UT



Chancellor Robert J. Birgeneau, signing the agreement at UCB

of the President directly pursued this agreement, in cooperation with IPMU and School of Science. IPMU Director Hitoshi Murayama is also affiliated with UCB, and acted as an intermediary to make the agreement possible. The photographs show the UT's President and UCB's Chancellor signing the agreement. Actually, Murayama brought two original copies of the agreement signed in advance by the UT's President Junichi Hamada to Berkeley, and the UCB's Chancellor Robert J. Birgeneau signed the agreement with Murayama's computer sitting next to him showing the picture of President Hamada signing.

IPMU Establishes Satellite on UC Berkeley Campus

IPMU signed an agreement with University of California, Berkeley on December 17, 2009 to establish an IPMU satellite on the Berkeley campus. This agreement became possible following a broader agreement between The University of Tokyo and UCB. IPMU is conducting a joint project using the satellite with Department of Physics of UCB, involving particle physics, cosmology, and mathematics. The joint project will be managed by the two Research Directors, under the supervision of IPMU Director Hitoshi Murayama. From IPMU, Principal Investigator Tsutomu Yanagida has been nominated Research Director. From UCB, Director of Berkeley Center for Theoretical Physics, Lawrence Hall, who is also Visiting Senior Scientist of IPMU, has been nominated Research Director. Initial activity at the satellite focuses on theoretical particle physics, both string theory and phenomenology. The establishment of the satellite enables IPMU not only to support collaborative research on the Berkeley campus, but also to make the recruitment of scientists easier in the United States.

Hirosi Ooguri Awarded 2009 Nishina Memorial Prize

On November 9, the Nishina Memorial Foundation announced that Hirosi Ooguri, IPMU Principal Investigator and Fred Kavli Professor of California Institute of Technology, won the 2009 Nishina Memorial Prize. Ooguri has been awarded the Prize for his work on topological string theory. With his collaborators, Ooguri established the foundations of topological string theory and developed its computational techniques. This made it possible for them to carry out superstring computation that had been regarded as impossibly difficult using existing techniques. The awards ceremony was held on December 4, 2009.

XMASS Anticipates Launch in April

Given the physics we know, astronomical observations of the motion of stars and distribution of galaxies only make sense if we postulate the existence of matter that we cannot see - Dark Matter (DM). The XMASS experiment in the Kamioka mine will use liquid Xenon to clarify the nature of DM. If DM is made of a certain type of particles, XMASS is designed to yield a direct measurement of their interactions. The experiment is led by Yoichiro Suzuki, Professor at ICRR and Deputy Director of IPMU, the University of Tokyo. At IPMU Kai Martens (Associate Prof.) and Jing Liu (postdoc) are also actively involved in XMASS.



The heart of the experiment can be seen in the picture: The two half spheres will soon be combined so that the scintillation light sensors mounted in the copper matrix can watch a little over 800kg of liquid xenon that the sphere will be filled with. The experiment will start taking data in April this year.

IPMU-ICRR Joint Public Lecture: "Probing the Universe"

On October 10, 2009, the second IPMU-ICRR (Institute for Cosmic Ray Research, The University of Tokyo) joint public lecture entitled "Probing the Universe" was held at the Hitotsubashi Hall of Japan Education Center, near Jinbocho, Tokyo. More than 300 people attended. IPMU Director Hitoshi Murayama gave a lecture on "Beyond the Observed Universe," and Prof. Masayuki Nakahata of ICRR spoke about "The Universe Probed from Underground at Kamioka." Nakahata, also IPMU Principal Investigator, referred to how the experiments conducted in the Kamioka mine are related to IPMU's research program. After the lecture, each speaker stepped down into the audience for a lively Q&A session.



IPMU Director Hitoshi Murayama answering questions from the audience

IPMU Takes Part in Open House at UT Kashiwa Campus

An open house of the Kashiwa Campus of The University of Tokyo was held on October 30-31. On the 6th floor of the campus's General Research Building, IPMU displayed a computer

simulation "The Growth of the Large-Scale Structure of the Universe" and a large block of crystal glass with "a large structure of the universe" engraved inside, a video of Director Hitoshi Murayama introducing IPMU, a computer demonstration offering visitors a virtual experience of gravitational lensing effects, and panels detailing IPMU activities. On the second day, IPMU Associate Prof. Masahiro Takada gave a lecture titled "Looking the Dark Side of the Universe by Means of Gravitational Lensing." After the lecture, the audience enjoyed a relaxed Q&A session with the lecturer.



IPMU Associate Prof. Masahiro Takada giving a lecture

JSPS Fellow at IPMU Participates in JSPS Science Dialogue

JSPS Fellow Marcos Valdes, who is currently at IPMU, took part in a JSPS Science Dialogue held on October 30, 2009 at Seishin High School in Kashima City, Ibaraki Prefecture. Valdes gave a talk on the history of the Universe and his own research.

The JSPS Science Dialogue is a program to invite young foreign researchers who are in Japan with the support of a JSPS Fellowship, and to give them an opportunity to talk about their research at nearby high schools. This program aims at giving high-school students the chance to hear scientific talks in English, thereby stimulating their interest in both science and international communications. At the same time, the program seeks to provide JSPS Fellows

with opportunity to meet with local communities and strengthen their ties to Japan.



Marcos Valdes giving a lecture with the aid of interpreter Hiroyuki Furuya, a staff member of the IPMU International Relations Section of the Administration Office

IPMU Participates in SpaceExpo "SORAHAKU 2009"

One of the official events recognized by the International Year of Astronomy 2009 Japan Committee, SpaceExpo "SORAHAKU 2009" was held on December 3-6, 2009 at the Tokyo International Forum in Marunouchi, Tokyo. IPMU had a booth at this event, while IPMU Director Hitoshi Murayama gave a public lecture titled "Will the Universe Ever End?" on the last day.

The aim of SORAHAKU 2009 is to convey to the audience in an easy-to-understand manner the cutting-edge science that is being developed to solve the mysteries of the Universe, and the spin-off revolution in environmental energy engineering. A total of 26,372 people visited SORAHAKU 2009 over four days, and actively engaged with the scientists.



IPMU Director Hitoshi Murayama talking with visitors at SORAHASKU 2009

Santa Claus is Coming to Donguri from IPMU!!

Professor Mark Vagins at IPMU turned into Santa Claus and visited Donguri Nursery School in Kashiwa campus on December 18th, handing a present to each child. The children were very excited to see a Santa Claus who seemed to have popped out from a picture book.



Focus Week: Statistical Frontiers of Astrophysics

A workshop titled "Statistical Frontiers of Astrophysics" was held at IPMU for five days, from September 28 to October 2, 2009. The workshop focused on several astrophysics topics (including cosmology, exoplanet studies, and large-scale galaxy surveys) plus state-of-the-art statistical techniques (such as Bayes' theorem and Markov Chain Monte Carlo methods) most relevant to them. The workshop successfully encouraged intensive and stimulating interactions between the participating astrophysicists and statisticians.

Workshop on Quantizations, Integrable Systems and Representation Theory

Quantizations are fundamental concepts in quantum mechanics. At this workshop participants discussed the evolution of these concepts in the context of the relationship between mathematics and physics, in particular, from the point of view of integrable systems and representation theory. Weyl quantizations based on representations

of Heisenberg groups, geometric quantizations in Gromov-Witten theory and deformation quantizations were dealt with, and stimulating discussions between mathematicians and physicists were held.

Workshop on Recent Advances in Mathematics at IPMU

A mini-workshop was held to introduce new mathematics in IPMU from November 16 to November 18, 2009. The subject covered various areas of mathematics such as Schroedinger equations, Fano varieties, Teichmueller spaces, Mapping class groups, and various discontinuous and hyperbolic groups and their associated geometry. The workshop was a success with active and fruitful discussions.

Focus Week on the Epoch of Reionization

See p. 20.

Focus week on Indirect Dark Matter Search

See p. 21.

IPMU Seminars

Information on IPMU seminars is posted on IPMU website (http://db.ipmu.jp/seminar/?mode=seminar_recent). You will find detailed information and request form (when needed) there.

1. "Fractional calculus of Weyl algebra and its application to ordinary differential equations on the Riemann sphere"
Speaker: Toshi Oshima (Graduate School of Mathematical Sciences, The University of Tokyo)
Date: Sep 08, 2009
2. "1st lecture: Deep inelastic scattering, parton distributions and parton showering"

- Speaker: Bryan Webber (Cambridge)
Date: Sep 08, 2009
3. "Oscillating Neutrinos and Oscillating Decay Probabilities"
Speaker: Stuart Freedman (University of California, Berkeley, Lawrence Berkeley National Laboratory, and IPMU)
Date: Sep 09, 2009
 4. "2nd lecture: Jet fragmentation, hadronization and hadron-hadron processes"
Speaker: Bryan Webber (Cambridge)
Date: Sep 14, 2009
 5. "Topological strings, black holes and matrix models"
Speaker: Minxin Huang (IPMU)
Date: Sep 15, 2009
 6. "Quantization in semi-infinite Hodge theory"
Speaker: Hiroshi Iritani (Kyushu University)
Date: Sep 17, 2009
 7. "Volumes of moduli spaces of algebraic curves"
Speaker: Peter Zograf (PDMI)
Date: Sep 18, 2009
 8. "Fast Reionization Simulations for LOFAR"
Speaker: Rajat Mani Thomas (IPMU)
Date: Sep 24, 2009
 9. "p-adic strings"
Speaker: Paul H. Frampton (UNC and IPMU)
Date: Sep 25, 2009
 10. "The Evolution of Giant Molecular Clouds in Global Disk Galaxy Simulations"
Speaker: Elizabeth Tasker (University of Florida/NAOJ)
Date: Oct 02, 2009
 11. "Heterotic Orbifold Phenomenology: Status and Prospects"
Speaker: Saul Ramos-Sanchez (DESY)
Date: Oct 07, 2009
 12. "The MICE simulations: Abundance of Massive Clusters and Large Scale Clustering"
Speaker: Martin Crocce (Institute of Space Sciences, Barcelona)
Date: Oct 09, 2009
 13. "2d Liouville correlators from 4d gauge theories"
Speaker: Yuji Tachikawa (IAS)
Date: Oct 09, 2009
 14. "1st lecture: Neutrino Masses and Mixings"
Speaker: Paul Frampton (UNC, IPMU)
Date: Oct 14, 2009
 15. (No title)
Speaker: Maxim Kontsevich (IHES)
Date: Oct 15, 2009
 16. "Higgs Exempt No-Scale Supersymmetry"
Speaker: Jason Evans (IPMU)
Date: Oct 15, 2009
 17. (No title)
Speaker: Maxim Kontsevich (IHES)
Date: Oct 16, 2009
 18. "Finite size effects in integrable models: planar AdS/CFT"
Speaker: Zoltan Bajnok (Hungarian Academy of Sciences)
Date: Oct 20, 2009
 19. "2nd lecture: Studies of T Flavor Symmetry"
Speaker: Paul Frampton (UNC, IPMU)
Date: Oct 21, 2009
 20. "General Gauge Mediation with Gauge Messengers"
Speaker: Matt Sudano (IPMU)
Date: Oct 21, 2009
 21. "A model independent method to measure velocity dispersion of galaxies"
Speaker: Issha Kayo (IPMU)
Date: Oct 22, 2009
 22. "Perturbative gauge theory results from strings in AdS₅xS⁵"
Speaker: Romuald Janik (Jagiellonian University)
Date: Oct 22, 2009
 23. "Supersymmetric deformations, gauged supergravities"
Speaker: Bernard de Wit (Utrecht University)
Date: Oct 27, 2009
 24. "Brownian motion in AdS/CFT"
Speaker: Masaki Shigemori (Amsterdam)
Date: Nov 02, 2009
 25. "3rd lecture: Cyclic Cosmology and Infinite Past"
Speaker: Paul Frampton (UNC, IPMU)
Date: Nov 04, 2009
 26. "Horizon Thermodynamics and Einstein Equations"
Speaker: Rong-Gen Cai (Institute of Theoretical Physics, Chinese Academy of Sciences, and College of Mathematics and Physics, Chongqing University of Posts and Telecommunications)
Date: Nov 5, 2009
 27. "Fuzzy spheres and M2-M5 systems in ABJM"
Speaker: Horatiu Nastase (Tokyo Institute of Technology)
Date: Nov 10, 2009
 28. "4th lecture: Identifying Dark Matter as Black Holes"
Speaker: Paul Frampton (UNC, IPMU)
Date: Nov 18, 2009
 29. "Towards a Quantum Theory of Leptogenesis"
Speaker: Marco Drewes (Lausanne)
Date: Nov 19, 2009
 30. "Chiral Algebras of (0,2) Models: Beyond Perturbation Theory"
Speaker: Junya Yagi (Rutgers University)
Date: Nov 24, 2009
 31. "To the local beginning of inflation and beyond"
Speaker: Alexei A. Starobinsky (Landau Institute, Resceu)
Date: Nov 24, 2009
 32. "Scalar field in the anisotropic Universe"
Speaker: Masato Minamitsuji (Sogang University)
Date: Nov 24, 2009
 33. "Apparent cosmological acceleration,

- dark energy and inhomogeneities”
 Speaker: Antonio Enea Romano (YITP)
 Date: Nov 24, 2009
34. “5th lecture: Conformality from AdS/CFT at TeV Scale; Axigluon as Explanation of Top Asymmetry in p-pbar Collisions”
 Speaker: Paul Frampton (UNC, IPMU)
 Date: Nov 25, 2009
35. “Next-to-Leading Order Jet Physics with BlackHat”
 Speaker: David Koswer
 Date: Nov 26, 2009
36. “Microlocal condition for non-displaceability of Lagrangian submanifolds”
 Speaker: Dmitry Tamarkin (Northwestern University)
 Date: Nov 27, 2009
37. “System of uniformization equations and hyperelliptic integrals”
 Speaker: Jiro Sekiguchi (Tokyo University of Agriculture and Technology)
 Date: Dec 01, 2009
38. “Signature of primordial non-Gaussianity on large scale structure”
 Speaker: Tsz Yan Lam (IPMU)
 Date: Dec 03, 2009
39. “Discrete R Symmetries and Low Energy Supersymmetry”
 Speaker: Michael Dine
 Date: Dec 04, 2009
40. “Shaving the black hole”
 Speaker: Yogesh Srivastava (IPMU)
 Date: Dec 04, 2009
41. “Periodic cyclic homology in deformation quantization”
 Speaker: Giovanni Felder (ETH Zurich)
 Date: Dec 04, 2009
42. “Holographic quantum liquids in 1+1d”
 Speaker: Janet Hung (Perimeter Institute)
 Date: Dec 07, 2009
43. “Modified supergravity and

- dynamical dark energy”
 Speaker: Sergey Ketov (Tokyo Metropolitan University)
 Date: Dec 08, 2009
44. “Flavor Mixing, Neutrino Masses and Neutrino Oscillations”
 Speaker: Harald Fritzsch (Universitaet Muenchen)
 Date: Dec 10, 2009
45. “Deformation quantization and branes”
 Speaker: Giovanni Felder (ETH Zurich)
 Date: Dec 10 and 11, 2009
46. “Gravitational Wave Detection with Atom Interferometry”
 Speaker: Surjeet Ragendran (MIT)
 Date: Dec 14, 2009
47. “Non-linear SUSY and Hidden Gravity”
 Speaker: Ryuichiro Kitano (Tohoku University)
 Date: Dec 17, 2009
48. “Remarks on pavings of the Siegel modular varieties”
 Speaker: Shushi Harashita (Kobe University)
 Date: Dec 28, 2009

IPMU Komaba Seminars

Mathematics seminars are also held at the University of Tokyo Komaba Campus (<http://info.ms.u-tokyo.ac.jp/seminar/ipmusem/>).

1. Differential Graded Categories and heterotic string theory”
 Speaker: Makoto Sakurai (The University of Tokyo)
 Date: Nov 09, 2009
2. Chiral Algebras of (0,2) Models: Beyond Perturbation Theory”
 Speaker: Junya Yagi (Rutgers University)
 Date: Nov 30, 2009
3. “Geometric quantization on noncompact manifolds”

- Speaker: Weiping Zhang (Chern Institute of Mathematics, Nankai University)
 Date: Dec 07, 2009
4. “Gaudin subalgebras and stable rational curves”
 Speaker: Giovanni Felder (ETH Zurich/IPMU)
 Date: Dec 08, 2009

Personnel Changes

IPMU Professor José M. Figueroa-O’Farrill, who was at IPMU on sabbatical, has returned to the University of Edinburgh following the expiration of the contract with The University of Tokyo. Figueroa-O’Farrill was with IPMU from May 1 to December 31, 2009.

Also, the following four IPMU postdoctoral fellows have left IPMU to work at other institutes. Their time at IPMU is shown in the parentheses.

Shushi Harashita has taken a position as assistant professor at the Department of Mathematics, Graduate School of Science, Kobe University (April 1, 2008 – September 30, 2009).

Brian Powell has taken a position as staff scientist at the Institute for Defense Analyses, USA (September 1, 2008 – October 4, 2009).

Simon Dedeo moved to the Santa Fe Institute as a postdoctoral fellow (April 16, 2009 – December 31, 2009).

Rajat Mani Thomas moved to the Canadian Institute for Theoretical Astrophysics (CITA) at the University of Toronto as a CITA postdoctoral fellow (May 16, 2009 – January 18, 2010).