

## Recipient of President's Award for Operational Improvement

A four-person Working Group made up of IPMU Administrative Division staff headed by Midori Ozawa, head of the International Relations Section, has received the 2008 President's Award for operational improvement in the University of Tokyo. The award was given in recognition of the group's establishment of a website designed to promote the hiring of foreign researchers at the Kashiwa Campus.

IPMU accepts many researchers who are foreign nationals. However, most of the English language websites designed for foreigners staying in Japan focus on providing information for travelers, and there is not enough information available about living in Japan. This meant that it was necessary to respond individually to the many inquiries submitted by foreign researchers prior to assuming their posts. Posting wide-ranging



Awards Ceremony held on Friday, December 19, 2008 at Yasuda Auditorium at the University of Tokyo.

information about living in Japan on the IPMU website has helped to alleviate the concerns of researchers planning to come to Japan, and it has also reduced the number of inquiries, making business operations more efficient.

## IPMU Open Lecture Presentation "Will the Universe Ever End?"

On January 24, 2009, an open lecture presentation entitled "Will the Universe Ever End?" was held at Yayoi Auditorium Ichijo Hall on the University of Tokyo Hongo Campus. The lecture was limited to the first 300 persons to apply and was sold out by the deadline for advance registration.

The lecture by IPMU Director Hitoshi Murayama was followed by a question and answer period, after which a discussion period designed to facilitate dialogue between Hitoshi and the attendees was held. The atmosphere was relaxed, with tea and sweets being served, and the attendees asked Hitoshi many questions about space-related matters.



IPMU Director Murayama talks with attendees during the discussion period

## "Science Café: The Universe" at Tamarokuto Science Center

"Science Café: The Universe" is being held every Saturday from February 14 through March 14 at the Tamarokuto Science Center in the

city of Nishi-Tokyo, Tokyo. Sponsored jointly by IPMU and the Tamarokuto Science Center, each week's event features a presentation by one of five IPMU Principal Investigators: Naoshi Sugiyama, Katsuhiko Sato, Kunio Inoue, Hitoshi Murayama and Hiroshi Ooguri. The presentations are aimed at the general public and discuss the origin, evolution and future of the universe in an accessible manner. Science Café emphasizes interaction with attendees; the lecture and question and answer period are followed by the opportunity for attendees to talk with the lecturer in a relaxed atmosphere. Each Science Café has been attended by 100 persons.



Science Café at Tamarokuto Science Center

## Masayuki Nakahata Receives the 2008 Inoue Prize for Science

Masayuki Nakahata, Professor at the Institute for Cosmic Ray Research of the University of Tokyo and IPMU Principal Investigator, has been awarded with 25th Inoue Prize for Science (for 2008) in recognition of his work on the observation of solar neutrinos and study of neutrino oscillation. Professor Nakahata had conducted front-line research into solar neutrinos in the Kamiokande and Super-Kamiokande experiments conducted using large water Cherenkov detectors. The award was presented in recognition of his outstanding experimental skill that

has produced many contributions to neutrino research and elementary particle physics. The awards ceremony for the Inoue Prize for Science was held on February 4, 2009.

#### **Kunio Inoue Receives the 5th JSPS Prize**

On January 30, 2009, the Japan Society for the Promotion of Science (JSPS) announced that the 5th JSPS Prize (for 2008) has been awarded to Professor Kunio Inoue, Director of the Tohoku University Neutrino Science Research Center and IPMU Principal Investigator. Professor Inoue has played a leadership role in serving as site supervisor for the KamLAND Project, conducted to observe the electron antineutrinos produced in power plant reactors. The prize was awarded in recognition of his "Precision Measurement of Reactor Neutrino Oscillations" that succeeded in proving for the first time that the measured rate of neutrinos from reactors varies depending on neutrino energy. The awards ceremony was held on March 9, 2009.

#### **Naoshi Sugiyama Awarded 2008 Astronomical Society of Japan Hayashi Chushiro Prize**

On January 31, 2009, the Astronomical Society of Japan announced that the 2008 Hayashi Chushiro Prize has been awarded to Naoshi Sugiyama, Professor at the Nagoya University Graduate School of Science and IPMU Principal Investigator. The prize was awarded to Professor Sugiyama for his theoretical research into cosmic microwave background radiation.

Professor Sugiyama achieved a numerical solution for the time evolution of density and temperature fluctuations in the expanding

universe, obtaining detailed and accurate theoretical predictions of the temperature fluctuations of cosmic microwave background radiation and identifying the elementary physical processes involved in their generation. He also provided a clear explanation of the ways in which the spatial patterns of temperature fluctuations are dependent on curvature of space and other cosmological parameters. The awards ceremony was held on March 25 during the General Assembly at the Society's 2009 Annual Spring Meeting.

#### **WPI Program Site Visit**

The second site visit was conducted over two days, December 9 and 10, 2008, to follow up the IPMU activities toward the formation of a World Premier International Research Center. Toshio Kuroki, overall WPI Program Director (PD), Ichiro Sanda, IPMU Program Officer (PO) who chairs the Working Group for the assessment of IPMU, and five Working Group members (Heisuke Hironaka, Tuneyoshi Kamae, Hikaru Kawai, John Peacock, and Matthias Staudacher) visited the Kashiwa Campus. Ministry of Education, Culture, Sports, Science and Technology (MEXT) official in charge of the WPI Program, Shigeo Okaya, Director of the Strategic Program Division in the MEXT Science and Technology Policy Bureau attended the site visit delegation. The observers reviewed efforts to assemble researchers at IPMU, the current state of research and so on in order to evaluate the progress at IPMU. The results of the site visit were reported to the WPI Follow-up Committee meeting held on March 17, 2009 as reference data for evaluation purposes.

#### **Completion of Kamioka Satellite Research Building**

On February 18, 2009, the Kamioka Satellite Research Building was completed. This is a 2-story building with an area of approximately 500 m<sup>2</sup>.



Kamioka Satellite Research Building

#### **Construction of IPMU Research Building Begins**

Construction of the new IPMU Research Building began on February 9, 2009. This will be a 5-story building with an area of approximately 6,000 m<sup>2</sup>, and its interior will include a spacious area for interchange. The design concept aims to achieve large, bright open area and full array of research equipment that can be found at major theoretical research institutes such as the Kavli Institute for Theoretical Physics at Santa Barbara and the Berkeley Center for Theoretical Physics. The resulting building will provide an attractive research environment for researchers from around the world. The new building is scheduled to be completed and opened for occupancy before the end of the year.

#### **Workshop Report**

A workshop entitled "Supersymmetry in Complex Geometry" was held at IPMU for six days, January 4 - 9, 2009. The workshop focused on the recent developments in new structure

in complex geometry such as generalized Kähler structures, with both mathematicians and physicists participating in the discussion.

### Future Conference

#### Focus Week:

#### Non-gaussianity in Cosmology

“Focus Week: Non-gaussianity in Cosmology” will be held for five days, April 6 - 10, 2009, at the Media Hall in the Kashiwa Library on the Tokyo University Kashiwa Campus.

Why is the universe as big as it is? How did the structure of the universe such as galaxies come into being? The Inflation Theory of the Universe attempts to answer the essential components of these simple questions. Recent observational advances have confirmed the predictions of the Inflation Theory with considerable precision. However, this theory is dependent upon many theoretical models. Identifying these models observationally is a task of pressing importance, and non-Gaussian fluctuations are thought to be an effective way of accomplishing this goal. There are various issues that need to be resolved: determining the limits to non-gaussianity by means of observations of cosmic background radiation and the large-scale structure of the universe, constructing inflation models with significant non-gaussianity, and so on. The aim of this Focus Week is to bring together researchers working on the front lines of this research in order to achieve new progress.

### IPMU Seminars

1. “A pair of non-birational but derived equivalent Calabi-Yau manifolds from non-Abelian

- gauge theories”  
Speaker: Kentaro Hori (University of Toronto / IPMU)  
Date: December 1, 2008
2. “The boundary state from open string fields”  
Speaker: Yuji Okawa (University of Tokyo)  
Date: December 3, 2008
3. “Immersed Lagrangian Floer theory”  
Speaker: Manabu Akaho (Tokyo Metropolitan University)  
Date: December 11, 2008
4. “Science and Instrumentation of ASTRO-H Mission: Next Generation X-ray / Gamma-ray Satellite Mission”  
Speaker: Hiro Tajima (Stanford Linear Accelerator Center)  
Date: December 15, 2008
5. “Halo Properties of Groups and Clusters via Weak Gravitational Lensing in COSMOS”  
Speaker: Alexie Leauthaud (LBL)  
Date: December 16, 2008
6. “The Mass-Dependent Role of Mergers in Galaxy Evolution”  
Speaker: Kevin Bundy (UC Berkeley)  
Date: December 16, 2008
7. “Big-bang nucleosynthesis and a hint to solve problems in astrophysics, cosmology and particle physics”  
Speaker: Kazunori Kohri (Lancaster)  
Date: December 18, 2008
8. “On the geometry of supersymmetric AdS solutions”  
Speaker: Nakwoo Kim (Kyung Hee University)  
Date: December 18, 2008
9. “New Developments in d=4, N=2 Superconformal Field Theories”  
Speaker: Yuji Tachikawa (IAS)  
Date: December 24, 2008
10. “Brane Tilings and M2 Branes”

- Speaker: Amihay Hanany (Imperial College)  
Date: December 24, 2008
11. “Journey Toward Gravitational Wave Astronomy”  
Speaker: Seiji Kawamura (NAOJ)  
Date: January 5, 2009
12. “Weak lensing by large scale structure”  
Speaker: Henk Hoekstra (Leiden)  
Date: January 7, 2009
13. “M(T2)-assisted on-shell reconstruction of missing momenta and application to spin measurement at the LHC”  
Speaker: Kiwoon Choi (KAIST)  
Date: January 8, 2009
14. “An Index for Non-relativistic Superconformal Field Theories”  
Speaker: Yu Nakayama (UC Berkeley)  
Date: January 8, 2009
15. “Fedosov quantization in algebraic and holomorphic setting”  
Speaker: Dmitry Kaledin (Steklov Institute)  
Date: January 9, 2009
16. “Hidden Charged Dark Matter and Its Relics”  
Speaker: Haibo Yu (University of California, Irvine)  
Date: January 15, 2009
17. “Planckian dissipation”  
Speaker: Jan Zaanen (Leiden University)  
Date: January 15, 2009
18. “On Harvey’s curve complex”  
Speaker: Kenneth Shackleton (IPMU)  
Date: January 16, 2009
19. “The SDSS Quasar Lens Search and its use as a dark energy probe”  
Speaker: Masamune Oguri (Stanford)  
Date: January 22, 2009
20. “Moduli of Bridgeland semistable objects on the projective plane”

- Speaker: Ryo Ookawa (Tokyo Institute of Technology)  
Date: January 22, 2009
21. "Debris Disks"  
Speaker: Amaya Moro-Martin (Princeton)  
Date: January 23, 2009
  22. "The First Billion Years"  
Speaker: Andrea Ferrara (Scuola Normale Superiore, Pisa, Italy)  
Date: January 27, 2009
  23. "CFT Duals for Extreme Black Holes"  
Speaker: Tatsuma Nishioka (Kyoto University)  
Date: January 29, 2009
  24. "Black Holes and Blackfolds in Higher Dimensions"  
Speaker: Roberto Emparan (ICREA & U.Barcelona)  
Date: February 4, 2009
  25. "Complementarity of Future Dark Energy Probes"  
Speaker: Jiayu Tang (IPMU)  
Date: February 5, 2009
  26. "The deformation philosophy of quantization, singleton physics and noncommutative analogues of space-time structures"  
Speaker: Daniel Sternheimer (Keio University)  
Date: February 5, 2009
  27. "Self-similar growth of black holes in the Friedmann universe"  
Speaker: Hideki Maeda (Centro de Estudios Científicos)  
Date: February 9, 2009
  28. "String Theory and the Very Early Universe"  
Speaker: Robert Brandenberger (McGill)  
Date: February 9, 2009
  29. "R-axion: A new physics signature involving muon pairs"  
Speaker: Masahiro Ibe (SLAC)  
Date: February 12, 2009
  30. "Reactor neutrino experiments and future prospects"

- Speaker: Yifang Wang  
Date: February 12, 2009
31. "Supernova light"  
Speaker: Sergei Blinnikov  
Date: February 16, 2009
  32. "Supersymmetric Dark Matter in Cosmology and at Colliders"  
Speaker: Frank Daniel Steffen (Max Planck Institute of Physics)  
Date: February 18, 2009
  33. "0-dimensional cusps of the Kahler moduli of a K3 surface"  
Speaker: Shouhei Ma (University of Tokyo)  
Date: February 19, 2009
  34. "LOFAR - a major new low frequency observatory: science drivers, challenges and some pilot facility results"  
Speaker: A.G. de Bruyn (ASTRON, Dwingeloo and Kapteyn Institute Groningen)  
Date: February 24, 2009
  35. "Probing the End of the Universe's Dark Ages with LOFAR"  
Speaker: Saleem Zaroubi (Kapteyn Astronomical Institute, Groningen)  
Date: February 24, 2009
  36. "Double Compact Object Binaries"  
Speaker: Ashley J. Ruiter (New Mexico State Univ)  
Date: February 25, 2009
  37. "SYZ conjecture for hyperkaehler manifolds"  
Speaker: Misha Verbitsky (Institute of Theoretical and Experimental Physics)  
Date: February 26, 2009
  38. "The cosmological constant as a manifestation of the conformal anomaly"  
Speaker: Federico Urban (UBC)  
Date: February 26, 2009
  39. "Three Stringy Realizations of Fractional Quantum Hall Effect"  
Speaker: Wei Li (IPMU)  
Date: February 26, 2009

40. "The end of the cosmological constant problem!"  
Speaker: Niayesh Afshordi (Perimeter Institute)  
Date: February 27, 2009
41. "Observational Evidence for Cosmological-Scale Extra Dimensions"  
Speaker: Ghazal Geshnizjani (Perimeter Institute)  
Date: February 27, 2009

### Personnel Changes

IPMU postdoctoral fellow Shinya Wanajo has left IPMU to become a visiting researcher at Technische Universität München in Munich, Germany. He was at IPMU from April 16, 2008 to March 6, 2009. We wish him health and success in his future endeavors.

### Corrections/Errata to the Printed Version of IPMU NEWS No. 4

(These corrections/errata do not apply to the web version of IPMU NEWS No. 4.)

- Page 8, 1st column: in the line 7 of the 1st paragraph, "indivisibly from" should read "individually with"
- Page 14, 2nd column: In the 5th – 7th lines from the bottom, "My grandfather on my mother's side was an accountant..." should be replaced by "My grandparents on my mother's side were accountants ..."
- Page 16, 4th column: In the 9th - 10th lines, "... is related to series of bundles with connections ..." should be replaced by "... is related to bundles with connections ..."
- Page 17, 1st column: In the 3rd line, "limited" should read "limiting"