

FY2011 Site Visit

FY2011 site visit by observers from MEXT and JSPS was conducted on August 4 and 5, 2011. Members of the delegation included WPI Program Director Toshio Kuroki, Program Officer in charge of IPMU Ichiro Sanda, five Working Group members, officers from Research Promotion Bureau of MEXT, Mitsuyuki Ueda (Director, World Premier International Research Center Initiative/ Basic Research Promotion Division) and others. From the University of Tokyo Directorate, Managing Director and Executive Vice President Yoichiro Matsumoto attended on the second day. Also TODIAS (Todai Institute for Advanced Study) Director Sadanri Okamura attended both days.

The objective of the FY2001 site visits to the five WPI centers selected in FY2007 was to assess the state of their project implementations as of FY2010, through Q&A sessions with the project members and site observations, so as to contribute to their respective interim evaluations.

The working group consisted of six members. Three of them, Tetsuji Miwa, Tuneyosi Kamae, and Matthias Staudacher visited IPMU on the last site visit. Others are Yutaka Hosotani (successor to Hikaru Kawai), Anthony Tyson (successor to John Peacock),

and Hiraku Nakajima (newly appointed, absent this time).



IPMU Director Hitoshi Murayama reports to the delegation

On this site visit, ample time was allocated to the oral presentations of research reports by principal investigators and faculty members, and also to poster presentations by young researchers including postdoctoral fellows and graduate students. Interdisciplinary researches and new attempts were particularly emphasized in the presentations and discussions.



Poster session on the second day.

Fourth Meeting of the IPMU External Advisory Committee

Prior to the WPI site visit, the fourth meeting of the IPMU External Advisory Committee "EAC 2010" was held on July 26, 2011, with Roberto Peccei (UCLA, chair), John Ellis (CERN), Steve Kahn (Stanford/SLAC), and David Morrison (UC Santa Barbara) in attendance. The committee heard Director Hitoshi Murayama's report on the IPMU activities in FY2010 and research reports from eight IPMU

researchers in various fields. The committee also looked at the poster presentations of 35 IPMU researchers. The committee reviewed the IPMU's past activities, both administrative and research, and gave valuable suggestions for the future.



EAC members (front row, from left to right) John Ellis, Roberto Peccei, Steve Kahn, David Morrison

Kyoji Saito Awarded the MSJ 2011 Geometry Prize

The Mathematical Society of Japan (MSJ) announced that IPMU Professor Kyoji Saito, who is also an IPMU Principal Investigator, had won the 2011 Geometry Prize for his "contributions in modernizing the theory of period integrals," such as the theory of primitive forms and the theory of Frobenius manifolds (flat structure). Professor Saito's achievements were based on modernizing the theory of elliptic integrals and period integrals by Euler, Abel, Jacobi, and others in the 18th and 19th centuries. His achievements have great influence not only on various fields of mathematics, but also on the developments in the frontier of theoretical physics. He is a leading mathematician with wide international influence, and continues to be active in research.

The award ceremony was held on September 29, 2011 at the MSJ autumn meeting at Shinshu University.

Laser Guide Star Adaptive Optics Sharpens Subaru Telescope's Eyesight and Opens a New Vision of the Distant Universe

The Laser Guide Star Adaptive Optics (LGSAO) system of the Subaru telescope, which has been recently completed, enables the compensation for atmospheric turbulence to achieve ~10 times higher spatial resolution than has been hitherto achieved, in particular, for imaging observations of most of the distant galaxies and quasars. With this system, Masamune Oguri, an assistant professor of IPMU, and his colleagues observed the double quasar SDSS J1334+3315 to directly detect a foreground galaxy that causes the gravitational lensing effect producing the two images of a single background quasar. This observation demonstrates well the power of the LGSAO system.

The results of this research have been published in *Astrophysical Journal*, Vol. 738 on August 10, 2011.

Cosmic Dust Is Produced at Stellar Explosions—Discovery of Massive Dust in SN1987A

An international research group consisting of 23 astronomers (Mikako Matsuura at the University College of London, Takaya Nozawa at IPMU, and their collaborators) observed SN 1987A in the Large Magellanic Cloud with the Herschel Space Observatory. They found that extremely cold dust grains of temperatures lower than -250 Celsius are shining in SN 1987A with 200 times the energy emitted by the Sun. The total mass of the dust corresponding to the observed temperature and energy is more than 200,000 times the Earth's mass, indicating that the explosion of SN 1987A produced a large amount of dust. So far, the origin of cosmic dust

has been one of the big mysteries in astronomy, but this discovery implies that supernovae are primary sources of dust in the universe. These results provide key clues in understanding the evolution of the solid materials throughout the cosmic age, as well as the origin of the Earth on which we live.

The results of this research have been published in *Science*, Vol. 333 on September 2, 2011.

2011 Symposium to Encourage Female Students to Study Science "Come and Hear with Your Parents! Science Frontier III"

This symposium was held at Yayoi Auditorium Ichijo Hall on the University of Tokyo Hongo Campus on August 6, 2011. The program included lectures by female researchers, introductions of research laboratories, and opportunities to interchange with female graduate students. It was hosted by the University of Tokyo's "Liaison Group for Encouraging Students to Choose S&T Course." This group, started in January, 2009, with initially seven, and later three more, S&T related graduate schools and institutions including IPMU, has been organizing symposia, visits to research facilities, opportunities for interchange with researchers, and so on, to encourage junior and senior high school female students to choose S&T courses. The Liaison Group, supported by JST (Japan Science and Technology Agency), is also undertaking such activities in FY2011.

Saga Prefectural CHIENKAN Senior High School Students Visited IPMU

About 40 eleventh-grade students of Saga Prefectural CHIENKAN Senior

High School visited the University of Tokyo Kashiwa Campus, and IPMU in particular, on August 22, 2011. After the lecture entitled "What is Needed for Forefront Researchers?" given by IPMU postdoc Masayuki Tanaka, they enjoyed a Q&A session about the universe at the interaction area Piazza Fujiwara on the 3rd floor of the IPMU building, where IPMU assistant professor John Silverman and IPMU postdoc Charles Steinhardt also joined. The students were actively asking questions about the universe as well as IPMU.



IPMU assistant professor John Silverman (right) and IPMU postdoc Masayuki Tanaka (left) at the Q&A session

First SuMIRe Collaboration Meeting for PFS

The first SuMIRe (Subaru Measurement of Images and Redshifts) Collaboration Meeting for PFS (Prime-Focus Spectrograph) was held at IPMU for three days, July 11 – 13, 2011. The exploitation of PFS is currently undertaken under the initiative of IPMU. In this meeting, those international SuMIRe-PFS partners who already have an outline agreement with the core PFS team were invited to discuss various problems in the PFS construction such as the schedule and quality control.

Future Workshop: Curves and Categories in Geometry and Physics

IPMU Workshop on "Curves and

Categories in Geometry and Physics” will be held for five days, October 31 - November 4, 2011 at IPMU.

**Future Workshop:
6th Asian Winter School on
Strings, Particles and Cosmology**

This winter school will be held from January 10 to 20, 2012 at Kusatsu, Gunma, Japan. It is jointly sponsored by IPMU, The Graduate University for Advanced Studies (Sokendai), High Energy Accelerator Research Organization (KEK), and Asia Pacific Center for Theoretical Physics (APCTP).

**Future Workshop:
Testing Gravity with Astrophysical
and Cosmological Observations**

IPMU workshop “Testing Gravity with Astrophysical and Cosmological Observations” will be held from January 23 to February 3, 2012 at IPMU.

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. “Green-Schwarz superstring with conformal symmetry”
Speaker: Yoichi Kazama (University of Tokyo, Komaba)
Date: Jul 05, 2011
2. “Anisotropic scalings and a theory of quantum gravity”
Speaker: Anzhong Wang (Baylor University)
Date: Jul 06, 2011
3. “Modeling the Electromagnetic Signature of Merging Supermassive Black Holes”

- Speaker: Takamitsu Tanaka (Columbia University / Max Planck Institute for Astrophysics)
Date: Jul 07, 2011
4. “A Road to Supermassive Black Hole Merger”
Speaker: Kimitake Hayasaki (Kyoto University)
Date: Jul 07, 2011
 5. “Exact results in 3d gauge theories and M-theory”
Speaker: Yosuke Imamura (Titech)
Date: Jul 12, 2011
 6. “Cosmic Near Infrared Background”
Speaker: Eiichiro Komatsu (Texas University)
Date: Jul 14, 2011
 7. “Some results from Hodge theory”
Speaker: Christian Schnell (IPMU)
Date: Jul 19, 2011
 8. “Signs of a Hidden Sector from Supersymmetry(s)”
Speaker: Clifford Cheung (University of California, Berkeley)
Date: Jul 20, 2011
 9. “Probing the Epoch of Reionization”
Speaker: Masami Ouchi (ICRR)
Date: Jul 21, 2011
 10. “Mirror symmetry and non-complete-intersection Calabi-Yau manifolds”
Speaker: David Morrison (University of California, Santa Barbara)
Date: Jul 25, 2011
 11. “Ultra High Energy Cosmic Rays: latest results from the Pierre Auger Observatory”
Speaker: Maximo Pernas (KIT)
Date: Jul 26, 2011
 12. “Inflation in Gauge Mediation and Gravitino Dark Matter”
Speaker: Yuichiro Nakai (YITP)
Date: Jul 27, 2011

13. “New insights on galaxy evolution since $z \sim 1.2$ from the CFHT Legacy Survey”
Speaker: Jean Coupon (Tohoku University)
Date: Jul 28, 2011
14. “A Chiral Magnetic Effect from AdS/CFT with Flavor”
Speaker: Tatsuma Nishioka (Princeton University)
Date: Aug 02, 2011
15. “SYZ mirror symmetry for toric Calabi-Yau manifolds”
Speaker: Siu Cheong Lau (IPMU)
Date: Aug 05, 2011
16. “F-theory and elliptic fibrations; physics intro & casual discussion of math aspects”
Speaker: Taizan Watari (IPMU)
Date: Aug 09, 2011
17. “Linear Sigma Models and Heterotic Vacua”
Speaker: Jock McOrist (University of Cambridge)
Date: Aug 15, 2011
18. “Constraints on modified gravity from future surveys”
Speaker: Daisy Suet-Ying Mak (University of Southern California)
Date: Aug 16, 2011
19. “Asymmetric Dark Matter”
Speaker: Kathryn Zurek (University of Michigan)
Date: Aug 23, 2011
20. “Super-Planckian scattering at the LHC”
Speaker: Seong-Chan Park (Chonnam National University)
Date: Aug 24, 2011
21. “The formation of the first stars and galaxies”
Speaker: Thomas Greif (Max Planck Institute for Astrophysics)
Date: Aug 25, 2011
22. “The monopole-vortex complex: dual gauge symmetry from flavor”

- Speaker: Kenichi Konishi (Pisa University)
Date: Aug 26, 2011
23. “ABCD of 4d/2d correspondence”
Speaker: Jaewon Song (Caltech)
Date: Aug 30, 2011
24. “Noncommutative Geometry and the Hirzebruch-Riemann-Roch Formula”
Speaker: Raphael Ponge (Seoul National University)
Date: Aug 31, 2011
25. “Planck Early Measurements of the Cosmic Infrared Background Anisotropies”
Speaker: Olivier Dore (NASA JPL)
Date: Sep 01, 2011
26. “Universalities of Theories with Tri-vertices”
Speaker: Noppadol Mekareeya (Imperial College London)
Date: Sep 06, 2011
27. “21-cm Cosmology”
Speaker: Tzu-Ching Chang (ASIAA, Taiwan)
Date: Sep 08, 2011
28. “Aspects of Higgs searches in CP-violating MSSM at the Large Hadron Collider”
Speaker: Priyotosh Bandyopadhyay (KIAS)
Date: Sep 14, 2011
29. “WFIRST and Euclid”
Speaker: Jason Rhodes (NASA JPL)
Date: Sep 15, 2011
30. “Holographic Entanglement Entropy”
Speaker: Rob Myers (Perimeter Institute)
Date: Sep 27, 2011
31. “Holographic C-theorems”
Speaker: Rob Myers (Perimeter Institute)
Date: Sep 27, 2011
32. “A New View of the CMB from the Atacama Cosmology

- Telescope”
Speaker: Sudeep Das (BCCP/UC Berkeley/LBL)
Date: Sep 28, 2011
33. “Looking for cracks in the standard cosmological model: neutrinos and non-Gaussianity”
Speaker: Tristan Smith (UC Berkeley)
Date: Sep 29, 2011

Personnel Changes

Moving Out

The following people left IPMU to work at other institutes. Their time at IPMU is shown in square brackets:

IPMU postdoctoral fellow Cosimo Bambi [September 1, 2008 – August 31, 2011] moved to Ludwig-Maximilians-Universität München as a postdoctoral fellow.

IPMU postdoctoral fellow Jing Shu [September 1, 2008 – August 31, 2011] moved to SISSA at Trieste, Italy as a postdoctoral fellow.

IPMU postdoctoral fellow Kwokwai Chan [January 1, 2011 – September 15, 2011] moved to The Chinese University of Hong Kong as an assistant professor.

IPMU postdoctoral fellow Chuan-Ren Chen [May 1, 2008 – August 14, 2011] moved to Argonne National Laboratory as a postdoctoral fellow.

IPMU postdoctoral fellow Won Sang Cho [February 1, 2010 – August 14, 2011] moved to The University of Florida as a postdoctoral fellow.

IPMU postdoctoral fellow Wei Li [August 16, 2008 – August 15, 2011] moved to Max Planck Institute for Gravitational Physics as a postdoctoral fellow.

IPMU postdoctoral fellow Domenico Orlando [October 1, 2008 – September 30, 2011] moved to CERN as a CERN fellow.

IPMU postdoctoral fellow Susanne Reffert [October 1, 2008 – September 30, 2011] moved to CERN as a CERN fellow.

Emille Ishida and Rafael Da Silva De Souza, who were at IPMU between September 16, 2010 and August 29, 2011, under the auspices of the Brazilian government’s postdoctoral program, returned to Brazil.

Appointment

Yuji Tachikawa, who was IPMU Assistant Professor until April 9, 2011, was again appointed to IPMU Assistant Professor on August 8, 2011. For his research interests, refer to IPMU NEWS No. 12, page 11.

Cornelius Schmidt-Colinet, who stayed IPMU as a Swiss National Science Foundation postdoctoral fellow until January 20, 2011 was appointed to an IPMU postdoctoral fellow on April 16, 2011. For his research interests, refer to IPMU NEWS No. 11, page 12.