

FY2013 WPI Site Visit

A FY2013 WPI site visit was conducted on September 5 and 6 at the Kavli IPMU on the Kashiwa campus (the first day) and Ito Hall on the Hongo campus (the second day). In addition to the usual observation of the state of progress as a WPI center, this time the delegation discussed with the University of Tokyo's Executive Vice President for Research Yoichiro Matsumoto and the Kavli IPMU administration on how the University of Tokyo, which hosts the Kavli IPMU, considers to perpetuate this institute after the expiration of the supporting period by the government. Partly because of this, the delegation of observers consisted of as many as 25 members; WPI Program Director (PD) Toshio Kuroki, Program Officer (PO) in charge of the Kavli IPMU Ichiro Sanda, newly appointed Deputy PD Akira Ukawa, members of the Working Group in charge of the Kavli IPMU, some of the WPI Program Committee members (Hiroo Imura, chair, Hiroto Ishida, Robert Aymar, Richard Dasher, and Ian Halliday), MEXT officers from the Research Promotion Bureau (Yoshiaki Ando, Director, Basic Research Promotion Division, Hideki Iwabuchi, Director, Office for the Promotion of Basic Research, the Basic Research

Promotion Division, and others), JSPS officers, and other scientists.



On the first day of site visit, PO Ichiro Sanda giving an introductory talk to the delegates and Kavli IPMU researchers.

Sixth Meeting of the Kavli IPMU External Advisory Committee

The sixth meeting of the Kavli IPMU External Advisory Committee was held on June 6, 2013. From this meeting, Steve Kahn (Stanford/SLAC) chaired the Committee, taking over Roberto Peccei who had stepped down as a committee member. John Ellis (King's College London), Sadayoshi Kojima (Tokyo Tech), David Morrison (UC Santa Barbara), Sadanori Okamura (Hosei), and Nigel Smith (SNOLAB) were in attendance.

This time, the Committee was specifically asked advice on how the Kavli IPMU as a WPI center can secure a five year extension of the support from the government after the initial 10 years, and on how it can plan its continuity as a permanent entity in the University of Tokyo. The committee gave valuable suggestions for its future.



Director Murayama reporting to the Committee members, (from left to right) S. Kojima, N. Smith, J. Ellis, S. Kahn (chair), S. Okamura, and D. Morrison.

Toshitake Kohno Awarded the MSJ 2013 Geometry Prize

Toshitake Kohno, Professor at the Graduate School of Mathematical Sciences, the University of Tokyo, and Principal Investigator at the



Toshitake Kohno

Kavli IPMU, won the Mathematical Society of Japan's 2013 Geometry Prize for "A Series of Works in Geometric Representation Theory for Quantum Groups." The award ceremony was held on September 25, 2013 at the MSJ autumn meeting at Ehime University, and Professor Kohno presented a special lecture.

It is noteworthy that Kavli IPMU mathematicians had won the MSJ Geometry Prize also in 2011 (Kyoji Saito, see IPMU News No. 15, p. 22) and in 2012 (Yukinobu Toda, see Kavli IPMU News No. 19, p. 26).

Science Café 2013 "Approaching the Mystery of the Universe with Mathematics and Physics"

The Science Café 2013 "Approaching the Mystery of the Universe with Mathematics and Physics," fifth in this series, was held at the Tamarokuto Science Center (TSC) in Nishi-Tokyo City, jointly sponsored by the Kavli IPMU and the TSC.

This year, Tetsuo Hatsuda (Chief Scientist at RIKEN and Visiting Senior Scientist at Kavli IPMU) gave the first lecture, entitled "Structure of Matter: The World of Quarks," on June 15. In the lecture room, which was filled to capacity, he started his lecture by discussing fundamental concepts like "What is physics?" and "What is matter?" He then explained the Standard Model of particle physics using colored balls that represent

the quarks. His lively talk occasionally made the audience laugh. This lecture was video recorded and it is open to the public on the web site of the Japan Science and Technology Agency (JST) at <http://sc-smn.jst.go.jp/playprg/index/M130011063>.



Tetsuo Hatsuda giving a lecture.

The second lecture, entitled “Geometry and Symmetry of the Universe,” was delivered by Kavli IPMU Associate Professor in mathematics, Yukinobu Toda, on June 22. He started with an explanation of the basics of geometry, and the latter half of his lecture touched on the role that geometry plays in theoretical physics, such as superstring theory. He conveyed how the research at Kavli IPMU is conducted through the cooperation of mathematicians and physicists aiming to elucidate the mystery of the universe. Many of the audience were taking notes with a serious look, which was impressive.



Yukinobu Toda giving a lecture.

Since the last lecture was delivered in the evening of July 6, the day before the Star Festival (Tanabata), the venue was specially chosen as the TSC’s planetarium dome, known as the “Science Egg,” and Kavli IPMU Associate Professor Keiichi Maeda (who is now associate Professor

at Kyoto University) talked on “Supernovae – Gigantic Explosion Connecting Stellar Evolution and Cosmological Evolution.” He explained the important role of the supernova explosion in the history of the universe, with the use of images, such as an impressive simulation of a supernova explosion, projected onto the planetarium dome. After the lecture, a Q&A session was held with all people moved to the TSC’s café corner. Even after the Q&A session, many people were standing in line to ask questions till the closing time of TSC.

The first and second lectures were delivered in a room with a capacity of 80 people, while in the third lecture the number of people admitted into the planetarium dome was 100. Many junior high school and high school students attended each time. This seems to indicate their keen interest in mathematics, physics, and astronomy.



Keiichi Maeda in a Q&A session.

Kavli IPMU Researchers Talked at the SSH Students Fair 2013

Kavli IPMU ran a booth, exhibiting its research activities, at the Super Science High School Students Fair 2013 held on August 7 and 8, 2013 at Pacifico Yokohama. Also, two young researchers working on the SuMIRe Project (FIRST Murayama Project, see IPMU News No. 10, p. 20), Kavli IPMU Assistant Professor Masamune Oguri (now Assistant Professor at the School of Science, the University of Tokyo) and Kavli IPMU Postdoctoral Fellow Jun Nishizawa, jointly presented a

mini lecture, entitled “Dark Universe ‘Seen’ with the Subaru Telescope” in “FIRST/WPI Researchers Live! Young×Young” Program, on the second day.

Their mini lecture was well attended by as many as 230 students, with many of them standing. There were many questions from the audience, such as on the future prospects of research using the Subaru Telescope and HSC (see, pp. 10 – 13), and the lecturers’ motivations for becoming researchers as well as their high-school days. It was a great success.



A student of the high school, from which Oguri graduated, asking a question to the lecturers, Masamune Oguri (left) and Jun Nishizawa (right).

Kavli IPMU Seminars

1. “Gravitational collapse in Horava-Lifshitz theory of Gravity”
Speaker: Anzhong Wang (Baylor U)
Date: Jun 19, 2013
2. “Killing-Yano symmetry of higher-dimensional black holes”
Speaker: Tsuyoshi Houri (Rikkyo U)
Date: Jun 20, 2013
3. “On the higher Chow group of product of curves”
Speaker: Satoshi Kondo (Kavli IPMU)
Date: Jun 20, 2013
4. “Counting disks in toric varieties”
Speaker: Hsian-Hua Tseng (Ohio State U)
Date: Jun 24, 2013
5. “High Energy Scattering in AdS/CFT – Applications to $N = 4$ SYM and to low-x QCD”
Speaker: Miguel S. Costa (U Porto)
Date: Jun 25, 2013
6. “Progenitors of Type Ibc supernovae”

- Speaker: Sung-Chul Yoon (Seoul National U)
Date: Jun 26, 2013
7. "New applications of de-Sitter geometry in astrophysics II"
Speaker: Marcus Werner (Kavli IPMU)
Date: Jun 27, 2013
 8. "Natural GUT scale mass ratios"
Speaker: Martin Spinrath (SISSA)
Date: Jun 27, 2013
 9. "The Andromeda Galaxy: Hierarchical Galaxy Formation, Stellar Populations, and the Interstellar Medium"
Speaker: Puragra Guhathakurta (UC Santa Cruz)
Date: Jun 27, 2013
 10. "Orientation data and quantization"
Speaker: Zheng Hua (U Hong Kong)
Date: Jul 01, 2013
 11. "Cellular structure on the Hecke-Clifford superalgebras"
Speaker: Masaki Mori (U Tokyo)
Date: Jul 02, 2013
 12. "Evolution of the most massive asymptotic giant branch star as a progenitor for electron capture supernovae"
Speaker: Koh Takahashi (U Tokyo)
Date: Jul 04, 2013
 13. "Embedded contact homology of circle bundles"
Speaker: David Farris (Indian Inst of Science)
Date: Jul 04, 2013
 14. "CP and Flavor Symmetries: Ideas and Models"
Speaker: Claudia Hagedorn (U Padua)
Date: Jul 08, 2013
 15. "New Views of Galaxy Evolution: The Young and The Dusty"
Speaker: Matt Malkan (UCLA)
Date: Jul 08, 2013
 16. "Universal hydrodynamic description of quantum critical points with Lifshitz scaling"
Speaker: Bomsoo Kim (Tel Aviv U)
Date: Jul 09, 2013
 17. "Higher Spin 3d Gravity: Beyond AdS"
Speaker: Michael Gary (TU Wien)
Date: Jul 10, 2013
 18. "Dimer models and homological mirror symmetry"
Speaker: Kazushi Ueda (Osaka U)
Date: Jul 11, 2013
 19. "SYZ for local mirror symmetry"
Speaker: Kwok-Wai Chan (CUHK)
Date: Jul 12, 2013
 20. "Topological defects and generalised orbifolds"
Speaker: Nils Carqueville (Simons Center)
Date: Jul 16, 2013
 21. "Gauss-Bonnet braneworld redux: A novel scenario for the bouncing universe"
Speaker: Hideki Maeda (Rikkyo U, CECs)
Date: Jul 16, 2013
 22. "Mass hierarchy and physics beyond the Standard Model"
Speaker: Ignatios Antoniadis (CERN)
Date: Jul 17, 2013
 23. "Cosmic sound, near and far"
Speaker: Martin White (UC Berkeley)
Date: Jul 17, 2013
 24. "How Galaxies are Made, from $z=0$ to $z=8$ "
Speaker: Peter Behroozi (Stanford U)
Date: Jul 18, 2013
 25. "Phase structures of Chern-Simons matter theory on $S^1 \times S^2$ "
Speaker: Tomohisa Takimi (Tata)
Date: Jul 18, 2013
 26. "B-twisted sigma-model and Calabi-Yau geometry"
Speaker: Si Li (Boston U)
Date: Jul 22, 2013
 27. "Symplectic cohomology and duality for the wrapped Fukaya category"
Speaker: Sheel Ganatra (Stanford U)
Date: Jul 23, 2013
 28. "Higgs characterisation framework"
Speaker: Kentaro Mawatari (Vrije U Brussel)
Date: Jul 24, 2013
 29. "Non-abelian theta functions and unitarity of the hitchin connection"
Speaker: Joergen E. Andersen (Aarhus U)
Date: Jul 24, 2013
 30. "Floer theory on Lefschetz fibrations and empty symplectic manifolds"
Speaker: Maksim Maydanskiy (Stanford U)
Date: Jul 25, 2013
 31. "Nonabelian Hodge theory in positive characteristic"
Speaker: Mao Sheng (USTC)
Date: Jul 25, 2013
 32. "New Insights regarding the Stellar Mass Assembly of Galaxies across Cosmic Time"
Speaker: Frank Vandenbosch (Yale U)
Date: Aug 01, 2013
 33. "A master solution of the quantum Yang-Baxter equation and classical discrete integrable equation"
Speaker: Vladimir Bazhanov (ANU)
Date: Aug 05, 2013
 34. "Inhomogeneous Holography"
Speaker: Moshe Rozali (U British Columbia)
Date: Aug 05, 2013
 35. "Primitive forms for affine cusp polynomials"
Speaker: Yuuki Shiraishi (Osaka U)
Date: Aug 06, 2013
 36. "Black Holes and the Generalized Uncertainty Principle"
Speaker: Bernard Carr (Queen Mary, U of London)
Date: Aug 07, 2013
 37. "A uniqueness theorem for Frobenius manifolds and Gromov-Witten theory for orbifold projective lines"
Speaker: Yuuki Shiraishi (Osaka U)
Date: Aug 08, 2013
 38. "Branching laws for discretely decomposable restrictions"
Speaker: Yoshiki Oshima (Kavli IPMU)

- Date: Aug 15, 2013
39. "Triangulated surfaces in triangulated categories"
Speaker: Mikhail Kapranov (Yale U)
Date: Aug 23, 2013
 40. "Dunkl operators"
Speaker: Anatol Kirillov (RIMS, Kavli IPMU)
Date: Aug 26, 2013
 41. "Young-Baxter algebras and Quantum Cohomology"
Speaker: Vassily Gorbounov (U Aberdeen)
Date: Aug 27, 2013
 42. "Nucleosynthesis beyond iron: supernovae vs. neutron star mergers"
Speaker: Shinya Wanajo (NAOJ)
Date: Aug 27, 2013
 43. "How Does Galaxy Environment Influence AGN Activity?"
Speaker: Emil Khabiboulline (Caltech)
Date: Aug 28, 2013
 44. "The Evolution of Star-Forming Galaxies over Cosmic Time"
Speaker: Josh Speagle (Harvard U)
Date: Aug 28, 2013
 45. "BPS spectrum of Argyres-Douglas theory via spectral network"
Speaker: Chan Y. Park (Caltech)
Date: Sep 10, 2013
 46. "SUSY searches based on long-lived particle signatures at the LHC"
Speaker: Shimpei Yamamoto (ICEPP/CERN)
Date: Sep 11, 2013
 47. "Affine Artin groups"
Speaker: Todor Eliseev Milanov (Kavli IPMU)
Date: Sep 12, 2013
 48. "Spectra of coset sigma models"
Speaker: Vladimir Mitev (Humboldt U)
Date: Sep 17, 2013
 49. "Calabi-Yau 3-folds with infinite fundamental group and mirror symmetry"
Speaker: Atsushi Kanazawa (U of British Columbia)
Date: Sep 24, 2013

50. "Electroweak Baryogenesis beyond the high temperature expansion"
Speaker: Ran Huo (Kavli IPMU)
Date: Sep 25, 2013
51. "Reconstruction and convergence results in quantum K-theory"
Speaker: Valentin Tonita (Kavli IPMU)
Date: Sep 26, 2013

Kavli IPMU Komaba Seminars

1. "Elliptic genera and two dimensional gauge theories"
Speaker: Richard Eager (Kavli IPMU)
Date: Jul 08, 2013
2. "Homological Mirror Symmetry for toric Calabi-Yau varieties"
Speaker: Daniel Pomerleano (Kavli IPMU)
Date: Jul 17, 2013

Personnel Changes

Reappointment

Former Kavli IPMU Postdoctoral Fellow Yu Nakayama was reappointed on February 1, 2013. He told "I've returned to Kavli IPMU after



Yu Nakayama

my one-year leave at Caltech. My recent research interest is the renormalization group and the structure of space-time. I'm also an editor for IJMPA and MPLA. I welcome your submission for publication from Kavli IPMU."

Moving Out

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

Chang-Kee Jung [January 16, 2013 – August 31, 2013] has been on a leave of absence from Stony Brook University, and has served as a Kavli

IPMU Professor during this period.

Kavli IPMU Associate Professor Keiichi Maeda [December 16, 2007 – December 15, 2012 as an IPMU Assistant Professor, and then – August 31, 2013 as a Kavli IPMU Associate Professor] moved to the Graduate School of Science, Kyoto University as an Associate Professor.

Kavli IPMU Assistant Professor Masamune Oguri [April 16, 2011 – August 15, 2013] moved to the Department Physics, the University of Tokyo as an Assistant Professor.

Kavli IPMU Assistant Professor Masahito Yamazaki [June 1, 2013 – August 31, 2013] moved to the Institute for Advanced Study as a postdoctoral member. (He will be reappointed as a Kavli IPMU Assistant Professor in a year.)

Kavli IPMU postdoctoral fellow Yoshiaki Oshima [April 1, 2013 – August 31, 2013] moved to the Institute for Advanced Study as a postdoctoral member. (He will be reappointed as a Kavli IPMU postdoctoral fellow in a year.)

Kavli IPMU postdoctoral fellow Hanindyong Kuncarayakti [April 1, 2013 – July 30, 2013] moved to the University of Chile as a postdoctoral fellow.

Kavli IPMU postdoctoral fellow Charles Steinhardt [September 1, 2010 – August 31, 2013] moved to California Institute of Technology as a postdoctoral scholar.

Kavli IPMU postdoctoral fellow Emir Gumrukcuoglu [September 10, 2010 – September 30, 2013] moved to the University of Nottingham as a postdoctoral researcher.

Kavli IPMU postdoctoral fellow Brian Feldstein [September 1, 2010 – September 30, 2013] moved to the University of Cambridge as a postdoctoral fellow.