

News

Kavli IPMU Celebrated the 10th Anniversary of its Foundation

The Kavli IPMU celebrated its tenth anniversary in October 2017. It was launched on October 1, 2007 as a WPI center, named the IPMU, and after four and half years, it was renamed the Kavli IPMU. On October 16-18, the Kavli IPMU 10th anniversary symposium was held at the Mitsui Garden Hotel near the Kashiwanoha Campus Station (see pp. 20-23). In the afternoon of the first day (October 16), a ceremony to commemorate the 10th anniversary was held at the Kavli IPMU research building on the Kashiwa campus (see cover page and pp. 4-19).

10th Kavli IPMU External Advisory Committee

In conjunction with Kavli IPMU's tenth anniversary, the 10th meeting of the Kavli IPMU External Advisory Committee was held in the afternoon on October 18, 2017. Chairman Steve Kahn (Stanford/SLAC) and committee members, John Ellis (King's College London), Sadayoshi Kojima (Tokyo Institute of Technology), David Morrison (UC Santa Barbara), Sadanori Okamura (Hosei University), and Nigel Smith (SNOLAB), were present.

As a five-year extension of the WPI support to the Kavli IPMU until the

end of FY 2021 had already started this year, the Committee was asked to discuss and advise on an appropriate faculty composition, and the present status and future direction of the current research projects. The Committee provided many useful comments and suggestions. (Also see photo in Director's Corner on p. 3.)

Inauguration of the Next-Generation Neutrino Science Organization (NNSO)

The University of Tokyo's Kavli IPMU, Institute for Cosmic Ray Research (ICRR), and School of Science partnered to form the Next-Generation Neutrino Science Organization (NNSO) on October 1, 2017. ICRR Director and Kavli IPMU Principal Investigator Takaaki Kajita has been assigned as the Director of the NNSO. The Organization aims to pioneer the future of neutrino physics through the development of neutrino research techniques and detector technologies. In particular, it aims to advance the Hyper-Kamiokande project. It will work to lead collaborations between theoretical and experimental researchers and to establish a center for the world's neutrino research so that when the Hyper-Kamiokande project is realized, its research program will proceed smoothly.

On November 8, an inaugural ceremony of NNSO was held at the ICRR's Kamioka Observatory in Hida City, Gifu Prefecture.



A group photo of the participants in the NNSO inauguration ceremony, taken in front of the Kavli IPMU's Kamioka Branch Office (Credit: NNSO).

Director Murayama Receives Research Award from Alexander von Humboldt Foundation

Kavli IPMU Director Hitoshi Murayama receives a Research Award from the Alexander von Humboldt Foundation (AvH)



Hitoshi Murayama

in Germany; it was announced in October. The award is one of up to 100 the AvH grants every year to internationally renowned academics from abroad in recognition of their achievements to date; particularly academics whose fundamental discoveries, new theories, or insights have had a significant impact on their own discipline and who are expected to continue producing cutting-edge achievements in the future.*1

The award ceremony will be held in June 2018 at the Annual Meeting of AvH.

David Spergel and Eiichiro Komatsu Awarded the 2018 Breakthrough Prize in Fundamental Physics

On December 3, 2017, the Breakthrough Foundation announced the 2018 Breakthrough Prize in Fundamental Physics to be awarded to



David Spergel

Charles L. Bennett, Gary Hinshaw, Norman Jarosik, Lyman Page Jr., David N. Spergel, and the Wilkinson Microwave



Eiichiro Komatsu

Anisotropy Probe (WMAP) Science Team for detailed maps of the early universe that greatly improved our knowledge of the evolution of the cosmos and the fluctuations that seeded the formation of galaxies.

One of the five leading WMAP

*1 <https://www.humboldt-foundation.de/web/humboldt-award.html>

scientists, David Spergel is Professor of Astronomy at Princeton University and Kavli IPMU Principal Investigator. Also, Max Planck Institute for Astrophysics Director and Kavli IPMU Principal Investigator Eiichiro Komatsu is among the remaining 22 members of the WMAP science team.

Takaaki Kajita Awarded the 4th Berkeley Japan Prize

ICRR Director and Kavli IPMU Principal Investigator Takaaki Kajita was awarded the 2017-2018 Berkeley Japan Prize. This Prize is a lifetime achievement award from the Center for Japanese Studies to an individual who has made significant contributions in furthering the understanding of Japan on the global stage.^{*2} (Also see Director's Corner on p. 3.)



Takaaki Kajita

The past recipients of this prize are: Haruki Murakami (inaugural, 2008-2009), Hayao Miyazaki (2nd, 2009-2010), and Ryuichi Sakamoto (3rd, 2013-2014).

Yasunori Nomura Named New American Physical Society Fellow

Director of the Berkeley Center for Theoretical Physics at UC Berkeley and Kavli IPMU Principal Investigator Yasunori Nomura has been named a new fellow of the American Physical Society (APS). He was recognized for his pioneering contributions to a variety of areas of particle theory, including gauge unification in extra dimensions, electroweak symmetry breaking, supersymmetric models, dark matter, the multiverse, foundations of quantum mechanics, and black holes.^{*3}



Yasunori Nomura

^{*2} http://ieas.berkeley.edu/cjs/berkeley_japan_prize.html

^{*3} <https://www.aps.org/programs/honors/fellowships/archive-all.cfm>

Daisuke Kaneko Receives Young Scientist Award from the Physical Society of Japan

Kavli IPMU postdoctoral fellow Daisuke Kaneko is one of several researchers who have received the 2018 Physical Society of Japan Young Scientist Award. He has been recognized for his Ph.D. thesis on the search for $\mu^+ \rightarrow e^+ \gamma$ decay in the MEG experiment at the Paul Scherrer Institute in Switzerland. In this experiment, the world's most stringent limit was obtained. A positive observation of this decay would be evidence of physics beyond the Standard Model, and currently, the MEG experiment is being upgraded to the MEG II experiment.



Daisuke Kaneko

Long Time Kavli IPMU Supporter Hamamatsu Photonics Honored by the University of Tokyo

In recognition of establishing the first endowed professorship for fundamental science and their support for Kavli IPMU research into dark matter and dark energy, Hamamatsu Photonics was awarded the "University Of Tokyo Shokumon Award" on October 10, 2017 (see photo in Director's Corner on p. 3).

This is the second time an organization associated with the Kavli IPMU has received a Shokumon Award. Fred Kavli, representing the Kavli Foundation, received this Award in 2012 (see *Kavli IPMU News* No. 20, p. 25, where the story of "Shokumon" from Chinese history is also briefly explained).

Kavli IPMU Staff Receive 2017 President's Award for Business Transformation

For their risk management work in

normalizing harassment prevention education, a group of Kavli IPMU staff, represented by Project Specialist Rieko Tamura, has been awarded the 2017 University of Tokyo President's Award for Business Transformation (see photo in Director's Corner on p. 3).

The Kavli IPMU team was commended for developing a harassment education video and online quiz in English. The team and their families (and one cat) developed the education video's storyboard, script, props, and starred in the video.

The video was made for researchers within the institute, half of whom are from overseas, and was also uploaded to the university's E-learning system to allow researchers on overseas trips to take part in university activities. Moreover, the video and quiz also became accessible to all University of Tokyo researchers with access to the university portal site.

Open Campus Kashiwa 2017

At the Kashiwa campus of the University of Tokyo, open campus is an annual event held in October to introduce research and education of the Graduate School of Frontier Sciences and various institutes, including the Kavli IPMU, on campus. In 2017, it was held for two days, on October 27 and 28. As usual, the Kavli IPMU offered a rich program. In particular, the lectures delivered at the lecture hall were very popular. On the first day, Kavli IPMU Assistant Professor Chiaki Hikage talked about "Dark matter and dark energy: probing the invisible universe by the Subaru Telescope," and on the second day, Kavli IPMU Associate Professor Takeo Higuchi talked on "Belle II will start soon—an electron-positron colliding-beam experiment opens

new elementary-particle physics—.”

In two days, a total of 8,800 people visited the campus. The Kavli IPMU attracted more than 3,100 people.



Chiaki Hikage, giving a lecture.



Takeo Higuchi showing how to assemble a component of the Bell-II detector, and Kavli IPMU postdoctoral fellow Tomoko Morii assisting with his lecture.

17th Kavli IPMU/ICRR Joint Public Lecture

On November 3, 2017, the Kavli IPMU and ICRR presented the 17th joint public lecture at the Ito Hall on the University of Tokyo’s Hongo campus with the catchphrase “Circus of waves and grains: A look at the tiny phenomena with big effects on the Universe.” There was an audience of about 370 people including junior high-school and high-school students.

The first lecture, entitled “Gravitational wave—Einstein’s song created by the notes in the Universe,” was given by ICRR Professor Seiji Kawamura, who works on the Large-scale Cryogenic Gravitational wave Telescope (KAGRA) located underground in Kamioka. Kavli IPMU Assistant Professor Mark Hartz then talked about “Probing the nature of neutrinos with the Tokai-to-Kamioka (T2K) experiment and beyond.” He spoke in English with a simultaneous interpretation service into Japanese.

After the lectures, a discussion was held between the lecturers and attendees, and many of them eagerly asked questions.



After the lectures, Mark Hartz (left) and Seiji Kawamura (right) answered each other’s questions. They also answered questions from the audience.

Event: “Actually I Really Love Physics! —Career Paths of Female Physics Graduates”

This year again, the University of Tokyo’s Kavli IPMU, Institute for Solid State Physics, and Institute for Cosmic Ray Research jointly hosted an event called “Actually I Really Love Physics! —Career Paths of Female Physics Graduates” at the Kavli IPMU. The event was held on November 18, 2017, and there were 19 participants. (See *Kavli IPMU News* No. 36, p. 25 for last year’s event).

Kavli IPMU Seminars

1. “Braiding statistics / Link invariants of Quantum Matter in 2+1 and 3+1 dimensions”
Speaker: Juven Wang (IAS)
Date: Jul 12, 2017
2. “Highlights from the Gordon Research Conference”
Facilitator: Young-Kee Kim (U Chicago), Speakers: Hitoshi Murayama, Masahiro Takada, Michihisa Takeuchi, Po-Yen Tseng, and Benda Xu
Date: Jul 13, 2017
3. “Categorical dynamical systems on derived categories of K3 surfaces”
Speaker: Genki Ouchi (Kavli IPMU)
Date: Jul 13, 2017
4. “New physics searches in ATLAS,

the latest results from Run-2 and beyond”

Speaker: Osamu Jinnouchi (TITECH)
Date: Jul 14, 2017

5. “Shuffle algebras and integrable systems”
Speaker: Boris Feigin (HSE Moscow)
Date: Jul 19, 2017
6. “LHC as an Axion Factory: Probing an Axion Explanation for $(g-2)_\mu$ with Exotic Higgs Decays”
Speaker: Matthias Neubert (MITP)
Date: Jul 19, 2017
7. “Multi-Messenger Implications of High-Energy Cosmic Particles”
Speaker: Kohta Murase (Penn State)
Date: Jul 20, 2017
8. “Cluster Cosmology with the South Pole Telescope”
Speaker: Tijmen de Haan (UC Berkeley)
Date: Jul 21, 2017
9. “Dark Energy: constant or time variable? (...and other open questions)”
Speaker: Bharat Ratra (Kansas State U)
Date: Jul 28, 2017
10. “Categorifying non-commutative deformation theory”
Speaker: Agnieszka Bodzenta (Edinburgh U)
Date: Aug 04, 2017
11. “Mixed Hodge structure of character varieties”
Speaker: Fernando Villegas (ICTP Italy)
Date: Aug 08, 2017
12. “How to efficiently use effective field theories”
Speaker: Xiaochuan Lu (UC Davis)
Date: Aug 09, 2017
13. “Gaugino Condensation and Holomorphic BF Theory”
Speaker: Richard Eager (U Heidelberg)
Date: Aug 10, 2017
14. “The Quest for Neutrinoless

- Double-Beta Decay”
Speaker: Jason Detwiler (U Washington)
Date: Aug 18, 2017
15. “W-algebras, moduli of sheaves on surfaces, and AGT”
Speaker: Andrei Negut (MIT)
Date: Aug 22, 2017
 16. “Cubic fourfold, its variety of lines, and their gauged linear sigma models”
Speaker: Sergey Galkin (HSE Moscow)
Date: Aug 22, 2017
 17. “Supersymmetric Twin Higgs”
Speaker: Keisuke Harigaya (UC Berkley)
Date: Aug 23, 2017
 18. “Stellar twins and Galactic phylogenetics”
Speaker: Paula Jofre (Cambridge U)
Date: Aug 29, 2017
 19. “Fusion structures on Temperley-Lieb algebras”
Speaker: Kenji Iohara (U Lyon)
Date: Aug 29, 2017
 20. “Triggering on Physics Signatures and Recent Physics Highlights from the LHC-ATLAS experiment”
Speaker: Yu Nakahama (Nagoya U)
Date: Aug 30, 2017
 21. “Strongly-coupled Infrared Fixed Points, Confinement and Chiral Symmetry Breaking”
Speaker: Kenichi Konishi (U Pisa)
Date: Aug 30, 2017
 22. “ $b \rightarrow sll$ decays, from the Standard Model to New Physics”
Speaker: Sebastien Descotes-Genon (CNRS & U Paris-Sud)
Date: Sep 06, 2017
 23. “Physics of Gravitational Redshifts in Clusters of Galaxies”
Speaker: Nick Kaiser (U Hawaii)
Date: Sep 07, 2017
 24. “Cosmic gamma-ray lines: observations, lessons, and puzzles”
Speaker: Roland Diehl (MPE)
Date: Sep 12, 2017
 25. “The formation of massive black-hole binaries: understanding the Advanced LIGO detections”
Speaker: Philipp Podsiadlowski (U Oxford)
Date: Sep 19, 2017
 26. “Braids, fences, and quadratic algebras”
Speaker: Anatol Kirillov (RIMS, Kyoto U)
Date: Sep 19, 2017
 27. “Magnetizing the Universe during the Epoch of Reionization”
Speaker: Daegene Koh (Stanford U)
Date: Sep 19, 2017
 28. “Cosmology with X-ray Galaxy Clusters”
Speaker: Hans Boehringer (MPE)
Date: Sep 20, 2017
 29. “Random Matrices in Classical and Quantum Chaos”
Speaker: Masanori Hanada (Kyoto U)
Date: Sep 21, 2017
 30. “Decoding the Apparent Horizon”
Speaker: Netta Engelhardt (Princeton U)
Date: Sep 26, 2017
 31. “Galactic Astroarchaeology: Chemical Abundances and Evolution of Galaxies”
Speaker: Francesca Matteucci (Trieste)
Date: Sep 28, 2017
 32. “Maximizing Inference from Galaxy Observations”
Speaker: Peter Behroozi (U Arizona)
Date: Oct 03, 2017
 33. “Multiple zeta values in deformation quantization”
Speaker: Brent Pym (U Edinburgh)
Date: Oct 03, 2017
 34. “Halo-independence with quantified maximum entropy at DAMA/LIBRA”
Speaker: Andrew Fowlie (Monash U)
Date: Oct 04, 2017
 35. “Continuing the Legacy of Supernova Cosmology”
Speaker: Ryan Foley (UC Santa Cruz)
Date: Oct 05, 2017
 36. “Enhancements in derived and triangulated categories”
Speaker: Alice Rizzardo (U Liverpool)
Date: Oct 05, 2017
 37. “Yangian Symmetry for Fishnet Feynman Graphs”
Speaker: Florian Lobbart (Humboldt U)
Date: Oct 10, 2017
 38. “Conformal Bootstrap At Large Charge”
Speaker: Alexander Zhiboedov (Harvard U)
Date: Oct 12, 2017
 39. “The role of radial migration in the chemical evolution of the Milky Way”
Speaker: Nicolas Prantzos (Institut d’Astrophysique de Paris)
Date: Oct 12, 2017
 40. “Higher Chow groups, van Geemen lines, and mirror symmetry for open strings”
Speaker: Dave Morrison (UCSB)
Date: Oct 19, 2017

Personnel Changes

Promotion

John Silverman, who was Kavli IPMU Assistant Professor, became Kavli IPMU Associate Professor on October 1, 2017.



John Silverman

Moving Out

Kavli IPMU Postdoctoral Fellow James Wallbridge has moved to Hitachi, Ltd. as a Senior Researcher. He was with the Kavli IPMU from August 1, 2013 to December 31, 2017.