

## Hiroshi Ooguri Elected to the Japan Writers' Association

Hiroshi Ooguri, Kavli IPMU Principal Investigator and Fred Kavli Professor at Caltech, has been elected to the Japan Writers' Association on June 23, 2017. He has written several popular science books, including "Introduction to Superstring Theory," which received the 2014 Kodansha Prize for Science Books, the most prestigious prize for science books in Japan (see *Kavli IPMU News* No. 27, p. 23).



Hiroshi Ooguri

The Japan Writers' Association was established in 1926. The Founding Chair was Kan Kikuchi, a well-known writer and founder of the major publishing company Bungeishunju Ltd. Though the association was disbanded during World War II, it was re-established in 1946 as a professional organization to promote literature, protect freedom of expression, and support writers. Its membership consists of writers, playwrights, critics, essayists, translators, and poets.

## 2017 WPI Site Visit to Kavli IPMU

For the FY 2017 WPI site visit to the Kavli IPMU, WPI Program Director (PD) Akira Ukawa, Program Officer (PO)

in charge of the Kavli IPMU, Ichiro Sanda, WPI Academy<sup>\*1</sup> Director (AD) Toshio Kuroki, and several JSPS officers visited the institute on July 19, 2017. PD Ukawa was newly appointed at the beginning of this Fiscal Year, taking over the position from the now former PD Toshio Kuroki, who was in turn appointed as WPI AD. The site-visit team examined the Kavli IPMU's progress plan for the five-year extension period based on its achievements in the past 10 years, and the host university's vision and support.

To begin with, the site-visit team heard Director Murayama's presentation on the progress of the nine challenges for the extension period. Subsequently, the University of Tokyo Managing Director and Executive Vice President Toshihiko Koseki explained the University's vision, University-wide ripple effects caused by the Kavli IPMU's systemic reform, and University's support to the Kavli IPMU in the future. Then, there were active question and answer exchanges between the site-visit team and the Kavli IPMU/University of Tokyo side. The two-hour site visit concluded with comments from the PD, PO, and AD.



<sup>\*1</sup> In FY 2017, MEXT established the new WPI Academy. The WPI centers that have achieved "world-premier status" are the initial members of the WPI Academy. See [https://www.jspss.go.jp/english/e-toplevel/18\\_academy.html](https://www.jspss.go.jp/english/e-toplevel/18_academy.html).

## MEXT Vice Minister Todani, Director General Seki, and Director Ohora visit Kavli IPMU

In July, August, and September, 2017, several notable visitors from MEXT (Ministry of Education, Culture, Sports, Science and Technology) visited the Kavli IPMU. (See photos in the Director's Corner on page 3.)

On July 21, Director General Yasunao Seki of the Research Promotion Bureau and two officers visited the Atmosphere and Ocean Research Institute, Institute for Cosmic Ray Research, Graduate School of Frontier Sciences, Institute for Solid State Physics, and Kavli IPMU on the University of Tokyo's Kashiwa campus. At the Kavli IPMU, after hearing an overview and research of the institute from Director Murayama, they toured the Kavli IPMU building and observed interaction of researchers at tea time.

On August 21, Director of the Office for the Promotion of Basic Research, the Basic Research Promotion Division, Ryuuma Oohora, and Unit Chief Yuuki Shigeta, both from the Research Promotion Bureau, visited the Kavli IPMU. After Director Murayama's overview presentation, they were guided through the Kavli IPMU building. When they entered the interaction area, Piazza Fujiwara, on the third floor, where researchers gather for daily tea time breaks, Mr. Ohora showed interest in a book which he found on a table. It was "*Quest for Truth—Interaction of Buddhism and Astrophysics*" (published by Gentosha Inc.), which Kavli IPMU Principal Investigator Hiroshi Ooguri wrote with Buddhism scholar Shizuka Sasaki.

On September 15, MEXT Vice Minister Kazuo Todani visited the Kavli IPMU, accompanied by Director of the Office for the Promotion of

Basic Research Ryuuma Ohora, and Deputy Director of the Office of Vice Minister, General Affairs Division, Susumu Ideshio. Mr. Todani listened to Director Murayama as he introduced the institute, and the research being carried out here. He showed interest in the institute's goal to improve the university system in Japan, and asked Murayama questions about how the Kavli IPMU looks after its overseas researchers and processes their pension and insurance paperwork. Following a tour of the Kavli IPMU building, Mr. Todani joined in the institute's daily tea time break, and talked to a number of the researchers.

### Second Lecture at "Science Café Universe 2017"

Every year, the Kavli IPMU and Tamarokuto Science Center co-hosts "Science Café Universe" at Tamarokuto Science Center in Nishi-Tokyo City. This year's Science Café 2017 was the ninth in this series, and non-Japanese Kavli IPMU researchers gave lectures in English without any translation into Japanese. This public lecture style was a first for the Kavli IPMU. This year's first lecture was already given on June 24 (see *Kavli IPMU News* No. 38, p. 19). On July 8, Kavli IPMU postdoctoral fellow David Stark gave the second lecture, entitled "The Birth, Growth, and Death of Galaxies." There were about 40 attendees; 40% of them were junior high-school and high-school students.

In the first part of the lecture, David showed a number of pictures and simulations to introduce how galaxies grow through attraction of gas into dark matter halos which consist of dark matter. The last part of the lecture was devoted to the death of galaxies, and David explained what mechanism causes grown-up

galaxies to stop forming stars and turn into inactive galaxies. Finally, David discussed that there are several theories about why galaxies cease forming new stars. No definite answer for this problem has been obtained yet, and he introduced his own research working on this problem.

Despite English being the only language used throughout the lecture and subsequent Q&A session, participants left comments in the questionnaire such as, "The English was difficult to understand, but I could tell how enthusiastic the lecturer was about his research," and, "I would like to hear a lecture given in English again." Also, a number of attendees remained after the lecture to ask questions to the lecturer in English. Overall, we think this trial of "Science Café in English" was a success, which will aid future planning of similar public events by the Kavli IPMU.



### Kavli IPMU Science Café "What Can a Particle Accelerator Discover?"

On July 15, 2017, the Kavli IPMU hosted Science Café "What Can a Particle Accelerator Discover?" There were about 40 attendees including junior high-school and high-school students.

This event started at the lecture hall with a screening of the documentary film "Particle Fever" (Kavli IPMU version with Japanese subtitles; for more details, see *Kavli IPMU News* No. 30, p. 23). This film follows the lives of six physicists over the course of

five years as they search for the Higgs particle at CERN.

After the movie, people moved to the Kavli IPMU's interaction area, Piazza Fujiwara, on the third floor, and there was a science café lecture in English by Chicago University Professor and Kavli IPMU Principal Investigator Young-Kee Kim. Kim has a long career in high-energy physics experiments using high-energy accelerators, including the ATLAS experiment, which contributed to the discovery of the Higgs particle at CERN's Large Hadron Collider. She talked about the importance of this discovery as well as upcoming next-generation high-energy physics experiments after the Higgs discovery. Further, she mentioned ongoing and planned high-energy physics experiments in Japan, such as the SuperKEKB/Belle II experiment, Hyper-Kamiokande project, and ILC project. After the lecture, a discussion to facilitate dialog between Kim and the attendees was held. Some attendees were seen to talk with her in English.



### Booth at the 2017 Super Science High School Student Fair

On August 9 and 10, the 2017 Super Science High School Student Fair was held at the Kobe International Exhibition Hall in Kobe, Hyogo Prefecture. The Kavli IPMU and other 8 WPI centers jointly ran a booth exhibiting their research activities.

## Learning and Creating Physics— From High School to the Forefront Research of the Universe

On August 19, 2017, a Collaborative Knowledge Creation Practical Learning Course “Learning and Creating Physics—From High School to the Forefront Research of the Universe” for junior high-school and high-school science teachers was held at the Seihoku Gallery of the Yayoi Auditorium Annex on the University of Tokyo’s Hongo campus. It was co-hosted by the Kavli IPMU and the University of Tokyo Center for Research and Development on Transition from Secondary to Higher Education, Division for Cross-Stage Education and Assessment, CoREF.<sup>\*2</sup> About 30 teachers attended this event.

The program started with a hands-on exercise, where teachers were assigned a task to “give an easy-to-understand explanation of dark matter to high-school fresh-year students.” The participants were divided into groups to discuss and present how to accomplish the task, based on the given material. Subsequently, Kavli IPMU Director Murayama gave a lecture explaining why dark matter is believed to exist. He also gave some examples of familiar phenomena, which are likely not to exceed the Japanese government course guidelines for high-schools, including quadratic curves and planetary orbits, and the relation between the flame reactions and absorption lines (see photo on page 3).

Finally, there was time for attendees to have a discussion with CoREF Professor Hajime Shirouzu and Kavli IPMU Director Murayama. They discussed how to introduce cutting-edge science in normal classes, amongst many things.

<sup>\*2</sup> Consortium for Renovating Education of the Future

## Kavli IPMU Seminars

1. “Coulomb branches of 4d  $N=2$  SUSY gauge theories for  $R^3 \times S^1$ ”  
Speaker: Hiraku Nakajima (Kyoto U)  
Date: May 01, 2017
2. “Existence of crepant resolutions and generalized McKay correspondence”  
Speaker: Yukari Ito (Nagoya U)  
Date: May 08, 2017
3. “Implications of locality and unitarity for massive S-matrix”  
Speaker: Yu-tin Huang (National Taiwan U)  
Date: May 09, 2017
4. “ADE String Chains and Mirror Symmetry”  
Speaker: Babak Haghighat (Tsinghua U)  
Date: May 16, 2017
5. “ $R_D, R_K$ : Flavor Anomalies in B Decays.”  
Speaker: Alakabha Datta (U Mississippi)  
Date: May 17, 2017
6. “Extent and spatial distribution on a kpc scale of star formation in cluster galaxies from  $z=0$  to  $z \sim 0.5$ ”  
Speaker: Benedetta Vulcani (INAF OaPD)  
Date: May 18, 2017
7. “Phase space slicing method in NNLO QCD and its application in collider physics”  
Speaker: Chong-Sheng Li (ITP, Peking U)  
Date: May 19, 2017
8. “Status of the Dark Energy Survey”  
Speaker: Gary Bernstein (U Penn)  
Date: May 22, 2017
9. “Weak gravitational Lensing by Large-Scale Structure”  
Speaker: Hendrik Hildebrandt (U Bonn)  
Date: May 23, 2017
10. “Probing fundamental physics with galaxies”  
Speaker: Neal Dalal (U Illinois)  
Date: May 24, 2017
11. “Recent wide-angle photometric redshift catalogues”  
Speaker: Maciej Bilicki (Leiden U)  
Date: May 25, 2017
12. “Classical Field Theory”  
Speaker: James Wallbridge (Kavli IPMU)  
Date: May 25, 2017
13. “Aspects of the chiral algebra in 4d  $N=2$  SCFT”  
Speaker: Jaewon Song (KIAS)  
Date: May 30, 2017
14. “‘Magnetic bubble chambers’ for sub-GeV dark matter direct detection”  
Speaker: Tom Melia (UC Berkeley)  
Date: May 31, 2017
15. “From Einstein to Gravitational Waves and Beyond”  
Speaker: Barry Barish (Caltech/LIGO)  
Date: May 31, 2017
16. “Higgs bundles, branes and applications”  
Speaker: Laura Schaposnik (U Illinois at Chicago)  
Date: Jun 06, 2017
17. “Peterson isomorphism in K-theory and Relativistic Toda lattice”  
Speaker: Takeshi Ikeda (Okayama U of Science)  
Date: Jun 06, 2017
18. “Gravitational Instabilities of the Cosmic Neutrino Background with Non-zero Lepton Number”  
Speaker: Neil Barrie (U Sydney)  
Date: Jun 07, 2017
19. “Cosmic rays from high-redshift starburst galaxies and their role in heating and ionizing the intergalactic and circum-galactic medium”  
Speaker: Ellis Owen (U College

- London)  
Date: Jun 08, 2017
20. “Cores in Dwarf Galaxies from Fermi Repulsion”  
Speaker: James Unwin (U Illinois)  
Date: Jun 09, 2017
21. “The Search for Inflationary B-modes: Latest Results from BICEP/Keck”  
Speaker: Clem Pryke (U Minnesota)  
Date: Jun 12, 2017
22. “The universal quantum invariant and colored ideal triangulations”  
Speaker: Sakie Suzuki (Kyoto U)  
Date: Jun 13, 2017
23. “From CREAM to ISS-CREAM Projects”  
Speaker: Hwanbae Park (Kyngpook National U )  
Date: Jun 14, 2017
24. “Universality in Biology?: Fluctuation-response relationship and Deep Linearity in Adaptation and Evolution”  
Speaker: Kunihiko Kaneko (Universal Biology Inst, U Tokyo)  
Date: Jun 14, 2017
25. “Perverse coherent sheaves on blow-ups at codimension two loci”  
Speaker: Naoki Koseki (Kavli IPMU)  
Date: Jun 15, 2017
26. “Secondary astrophysical production of anti-deuteron and anti-Helium3 cosmic ray”  
Speaker: Ryosuke Sato (Weizmann Inst)  
Date: Jun 16, 2017
27. “Derived categories and flips”  
Speaker: Matt Ballard (IAS / U South Carolina)  
Date: Jun 20, 2017
28. “New information from the small scale CMB”  
Speaker: Simone Ferraro (UC Berkeley)  
Date: Jun 21, 2017
29. “The Galaxy-Halo Connection with the Observation of Neutral Hydrogen”  
Speaker: Hong Guo (SHAO)  
Date: Jun 27, 2017
30. “Supernovae: Observational Wonders and Theoretical Nightmares”  
Speaker: Tomasz Plewa (Florida State U)  
Date: Jun 28, 2017
31. “The Curious Case of Lyman-alpha Emitting Galaxies”  
Speaker: Zheng Zheng (Utah U)  
Date: Jun 29, 2017
32. “Mutations of non-commutative crepant resolutions arising from dimer models”  
Speaker: Yusuke Nakajima (Kavli IPMU)  
Date: Jun 29, 2017
33. “R-matrices and cohomological Hall algebras”  
Speaker: Eric Vasserot (Jussieu)  
Date: Jul 04, 2017
34. “A New Population of (extragalactic) X-ray Transients”  
Speaker: Franz Bauer (Instituto de Astrofisica, Facultad de Fisica Pontificia Universidad Catolica de Chile)  
Date: Jul 05, 2017
35. “Planet Formation as an Astrophysical Problem”  
Speaker: Roman Rafikov (DAMTP, U Cambridge)  
Date: Jul 06, 2017
36. “From the FOURGE to the FIRE: Tracking Galaxy Evolution over 12 Billion Years”  
Speaker: Kim-Vy Tran (University of New South Wales)  
Date: Jul 06, 2017
37. “The Mass Within Galaxy Clusters: CMB Cluster Lensing and Splashback”  
Speaker: Eric Baxter (U Penn)  
Date: Jul 10, 2017

## Personnel Changes

### Changes of Deputy/Associate Directors

Kavli IPMU Administrative Director Tomiyoshi Haruyama was additionally appointed to Kavli IPMU Deputy Director on June 7, 2017.

Kavli IPMU Professor Nobuhiko Katayama stepped down as Kavli IPMU Associate Director on July 13, 2017. He will concentrate on his research.

### Promotion

Yukinobu Toda, who was Kavli IPMU Associate Professor, became Kavli IPMU Professor on July 16, 2017.



Yukinobu Toda

### 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.

Kavli IPMU Postdoctoral Fellow Edmond Cheung [October 1, 2014 — September 30, 2017] moved to Raise.me as a Lead Data Scientist.

Kavli IPMU Postdoctoral Fellow Dulip Piyaratne [October 16, 2014 — August 13, 2017] moved to the University of Arizona as a Postdoctoral Research Associate.

Kavli IPMU Postdoctoral Fellow Wiphu Rujopakarn [March 16, 2014 — August 7, 2015 and March 1, 2016 — July 10, 2017] moved to Chulalongkorn University in Thailand as a Lecturer of Department of Physics, Faculty of Science.