

News

2012 Lancelot Berkeley Prize to Eiichiro Komatsu

Eiichiro Komatsu (Director of the Department of Physical Cosmology, Max-Planck Institute for Astrophysics and Kavli IPMU Visiting Senior Scientist) won the 2012 Lancelot M. Berkeley - New York Community Trust Prize for Meritorious Work in Astronomy. The prize is given annually to highly meritorious work in advancing the science of astronomy during the previous year. Dr. Komatsu received the prize for his paper, "Seven-Year Wilkinson Microwave Anisotropy Probe (WMAP) Observations: Cosmological Interpretation." Komatsu has been a member of the WMAP team since 2001 and was the first author of the papers presenting the cosmological interpretation of their five- and seven-year data sets.



Eiichiro Komatsu

Masahiro Takada and International Colleagues Received 2012 PASJ Excellent Paper Award

Kavli IPMU Professor Masahiro Takada received the 2012 *PASJ* (*Publications of Astronomical Society of Japan*)



Masahiro Takada

Excellent Paper Award jointly with his collaborators for their paper entitled "LoCuSS: Subaru Weak Lensing Study of 30 Galaxy Clusters," which was published in *PASJ* in 2010. The *PASJ* Excellent Paper Award is given to ingenious and excellent papers that appeared in the *PASJ* within the past five years and made significant contributions to the field of astronomy. One of the coauthors Nobuhiro Okabe, now at the Academia Sinica Institute of Astronomy and Astrophysics, will join the Kavli IPMU in fall 2013.

Masayuki Tanaka Received ASJ 2012 Young Astronomer Award

Kavli IPMU Distinguished Postdoctoral Fellow Masayuki Tanaka received the ASJ 2012 Young Astronomer Award for his contribution to the investigation of "evolution of galaxy populations and AGN activities in distant clusters of galaxies." This award is presented by the Astronomical Society of Japan to up to three young astronomers who are under 36 years old and achieved excellent research results.



Masayuki Tanaka

KamLAND-Zen Achieved the Highest Sensitivity in Search for Neutrinoless Double Beta Decay

KamLAND-Zen is an experiment to search for neutrinoless double beta decay in Xenon 136. Neutrinoless double beta decay is one of the clues to solve the mystery: "Why is our universe made of matter?" or "Why almost no antimatter exists in our universe?"

The KamLAND-Zen detector is located 1000 m underground in the Kamioka mine in Gifu Prefecture. The international team is led by Kunio

Inoue (Director of the Research Center for Neutrino Science, Tohoku University and Principal Investigator at Kavli IPMU), and Kavli IPMU Assistant Professor Alexandre Kozlov is one of the main players. This team recently published the world best limit for the neutrinoless double beta decay half-life of 1.9×10^{25} years at 90% Confidence Level (CL) in *Physical Review Letters* **110** (2013) 062502.

The combined result from KamLAND-Zen and another ^{136}Xe neutrinoless double beta decay search experiment EXO-200 (lower limit for the ^{136}Xe neutrinoless double beta decay half-life of 3.4×10^{25} years at 90% CL) refutes the discovery of neutrinoless double beta decay in ^{76}Ge , previously claimed by a part of the Heidelberg-Moscow Collaboration, at more than 97.5% CL.

Kavli IPMU Participated in AAAS 2013 Held in Boston

The six WPI institutes including the Kavli IPMU jointly participated in the "Annual Meeting of the American Association for the Advancement of Science (AAAS) 2013" held on February 14 - 18 in Boston, USA, following the last year's joint participation in AAAS 2012 in Vancouver.

For 3 days during the Meeting, February 15 - 17, the six WPI institutes hosted the WPI booth as part of the Japan pavilion organized by the Japan Science and Technology Agency (JST). More than 1,000 people visited the Japan pavilion over the three days.

On February 15, the WPI program, RIKEN, and the University of Tsukuba jointly held a one-hour workshop on the theme "Japan: Your next carrier destination?" In the workshop, a MEXT officer Mitsuyuki Ueda (Director, WPI/Basic

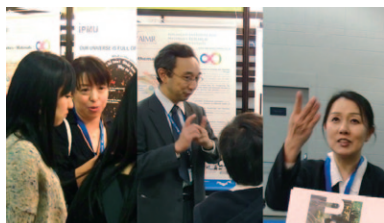
Research Promotion Division, Research Promotion Bureau) introduced the nine WPI centers including three centers newly selected in 2012. He explained internationally-opened environment of the WPI centers and exciting career opportunities they offer to foreign researchers.

In a scientific symposium entitled “Tiny But Mighty: Neutrinos and the New Frontiers of Science,” Kavli IPMU Professor Chang Kee Jung talked on “The Challenging Art of Creating and Catching Human-Made Neutrinos.” Also in another scientific symposium entitled “Neutrinos: Nature’s Smallest Surprises,” Kavli IPMU Professor Mark Vagins talked on “Astronomical Neutrinos.”

The next AAAS meeting will be held in Chicago in February 2014.



WPI booth staff members from the six WPI centers and two MEXT officers Mitsuyuki Ueda and Eiki Yanata.



Kavli IPMU staff members explaining the research activities and researchers’ life at the Kavli IPMU to visitors to the booth.

Kavli IPMU Joined Science & Technology Festa 2013

On March 16 and 17, 2013, the “Science and Technology Festa 2013” was held at the Kyoto Pulse Plaza. The six WPI centers jointly exhibited their research activities. IPMU ran an entire single booth. Science and Technology

Festa is an event held under the auspices of the Cabinet Office of the Japanese Government and other governmental and public organizations, aiming to enhance people’s interests, in particular those of young generations that bear the future, in science and technology. For that purpose, lectures are given and exhibitions are presented on cutting-edge researches and achievements. This year, about 6,000 people attended this event in two days.

On the first day, an opening ceremony was held in the Inamori Hall. It was attended by an audience of about 1,000 people. After the opening address by Minister of State for Science and Technology Policy Ichita Yamamoto, Kavli IPMU Director Hitoshi Murayama gave a lecture entitled “Why the Universe Is Extremely Well Devised?”

At the Kavli IPMU booth, a visual demonstration by graduate students in Astronomy, “Digital Space Theater,” and a 3D movie program, “Story of the Origins of the Universe” were very popular. In addition, Director Hitoshi Murayama conducted a talk and Q&A session twice on March 16, and Principal Investigator Kyoji Saito three times on March 17. At times, they attracted a capacity audience for the single booth of about 60 people. In addition, there was a kids’ corner where kids cheerfully played with a dissection puzzle, tangram, and subatomic particle plush toys, Particle Zoo.



Hitoshi Murayama talking with a kid.



Kyoji Saito explaining complex numbers to high-school students.

Public Lecture “Challenging the Mystery of the Universe—The Wonder That We Exist Here”

On March 24, 2013, Kavli IPMU public lecture entitled “Challenging the Mystery of the Universe—The Wonder That We Exist Here” was held at the Ito Hall on the Hongo Campus of the University of Tokyo. This lecture was sponsored by the FIRST (Funding Program for World-Leading Innovative R&D on Science and Technology) Outreach Program for the Murayama Project (Kavli IPMU Director Murayama is a core-researcher), and gathered an audience of 450 people, including 200 high school students.

The program consisted of two lectures entitled “From Stardust to the Earth” by Professor Eiichiro Kokubo of National Astronomical Observatory of Japan, and “Why Do We Exist in the Universe?” by Director Murayama. Following these lectures, Azusa Minamizaki, a Project Researcher belonging to the Public Relations Group, General Affairs and Planning Department of the University of Tokyo, facilitated a panel discussion entitled “The Wonder That We Exist Here.” Eleven high school students on the stage asked Director Murayama and Professor Kokubo actively about the Universe and the research of the Universe, such as “Are there Earth-like planets with water and life?” and “Is the Big-Bang Theory really true?”

This public lecture was broadcasted over the internet and many people

enjoyed it real time.



Eiichiro Kokubo giving a lecture.



Hitoshi Murayama giving a lecture.



Panel discussion: from right to left, Eiichiro Kokubo, Hitoshi Murayama, Azusa Minamizaki, and high school students.

Kavli IPMU Seminars

1. "BPS States in the Duality Web of the Omega Deformation"
Speaker: Susanne Reffert (CERN)
Date: Nov 27, 2012
2. "Density matrix of the universe and the CFT driven cosmology"
Speaker: Andrei Barvinsky (Lebedev Inst.)
Date: Nov 27, 2012
3. "Supersymmetry with light higgsinos"
Speaker: Felix Bruemmer (DESY)
Date: Nov 28, 2012
4. "Non-Gaussianity and the Adiabatic Limit"
Speaker: Joel Meyers (Austin)
Date: Nov 28, 2012
5. "Form factors of descendant fields and null-vectors for sine-Gordon model"
Speaker: Fedor Smirnov (LPTHE)
Date: Nov 28, 2012
6. "General Relativity without paradigm of space-time covariance, and resolution of the problem of time"
Speaker: Hoi-lai Yu (Academia Sinica)
Date: Nov 29, 2012
7. "Spherically symmetric analysis on open FLRW solution in non-linear massive gravity"
Speaker: Keisuke Izumi (LeCosPA)
Date: Dec 03, 2012
8. "Non-Abelian Strings in Supersymmetric Yang-Mills"
Speaker: Mikhail Shifman (Minnesota)
Date: Dec 03, 2012
9. "Squashed group manifolds in String Theory: Brane realization and classical integrability"
Speaker: Domenico Orlando (CERN)
Date: Dec 04, 2012
10. "The B-L Phase Transition as the Origin of the Hot Early Universe"
Speaker: Kai Schmitz (Kavli IPMU)
Date: Dec 05, 2012
11. "AGT conjecture"
Speaker: Hiraku Nakajima (RIMS)
Date: Dec 10, 2012
12. "The ABCDEFG of Instantons"
Speaker: Jaewon Song (UCSD)
Date: Dec 11, 2012
13. "Primordial Spikes from Wrapped Brane Inflation"
Speaker: Takeshi Kobayashi (CITA)
Date: Dec 11, 2012
14. "Searching for Cosmic Strings in New Observational Windows"
Speaker: Robert Brandenberger (McGill)
Date: Dec 12, 2012
15. "Gravitational Lensing and Topology"
Speaker: Marcus Werner (Kavli IPMU)
Date: Dec 12, 2012
16. "Tackling Dark Energy, Dark Matter, and Galaxy Formation with Weak Gravitational Lensing"
Speaker: Alexie Leauthaud (Kavli IPMU)
Date: Dec 13, 2012
17. "Spin structure on moduli space of sheaves on CY 3-folds"
Speaker: Zheng Hua (Kansas State)
Date: Dec 14, 2012
18. "Testing local isotropy with weak lensing"
Speaker: Jean-Philippe Uzan (IAP)
Date: Dec 18, 2012
19. "Lorentz invariant CPT violation and neutrino-antineutrino mass splitting in the Standard Model"
Speaker: Kazuo Fujikawa (Mathematical Physics Laboratory, RIKEN Nishina Center)
Date: Dec 19, 2012
20. "Cosmic Acceleration and Modified Gravity"
Speaker: Wayne Hu (KICP, Chicago)
Date: Dec 20, 2012
21. "'Unnatural' SUSY"
Speaker: Satoshi Shirai (UC Berkeley)
Date: Dec 26, 2012
22. "Bootstrap program for CFT in $d \geq 3$: Status and Open Problems"
Speaker: Slava Rychkov (ENS Paris & CERN)
Date: Jan 08, 2013
23. "Does anomalous violation of null energy condition invalidate holographic c-theorem?"
Speaker: Yu Nakayama (Caltech/Kavli IPMU)
Date: Jan 08, 2013
24. "Implication of the current Higgs data and a composite higgs"
Speaker: Jing Shu (Institute of Theoretical Physics, Chinese Academy of Sciences)
Date: Jan 09, 2013
25. "Triangulations, Hall algebras and

- membrane spaces”
Speaker: Mikhail Kapranov (Yale)
Date: Jan 17, 2013
26. “Character sheaves on unipotent groups”
Speaker: Tanmay Neelesh Deshpande (Kavli IPMU)
Date: Jan 17, 2013
27. “Effects of Strong Moduli Stabilization on Low Energy Phenomenology”
Speaker: Keith Olive (University of Minnesota)
Date: Jan 21, 2013
28. “Birational geometry of moduli of sheaves on K3s via Bridgeland stability”
Speaker: Arend Bayer (Edinburgh)
Date: Jan 21, 2013
29. “The Integrated Perturbation Theory for the Large-scale Structure of the Universe”
Speaker: Takahiko Matsubara (Nagoya Univ.)
Date: Jan 22, 2013
30. “Quo Vadis Higgs?”
Speaker: Christophe Grojean (CERN)
Date: Jan 23, 2013
31. “Present status of viable cosmological models in $f(R)$ gravity”
Speaker: Alexei A. Starobinsky (Landau Institute and RESCEU)
Date: Jan 23, 2013
32. “Comparing Gromov-Witten-like invariants”
Speaker: Cristina Manolache (Imperial)
Date: Jan 23, 2013
33. “Galaxy Assembly in the Thermal Era”
Speaker: Rik Williams (Carnegie Observatories)
Date: Jan 24, 2013
34. “Hurwitz spaces and divisors on moduli spaces of curves”
Speaker: Gerard van der Geer (U Amsterdam)
Date: Jan 24, 2013
35. “2D galaxy clustering in SDSS-III BOSS: growth of structure, geometry, and small-scale galaxy motions at $z=0.57$ ”
Speaker: Beth Reid (Berkeley)
Date: Jan 25, 2013
36. “Star formation activity in and around high- z clusters revealed with Subaru”
Speaker: Masao Hayashi (NAOJ)
Date: Jan 28, 2013
37. “The quark-antiquark potential in $N=4$ SYM from an open spin-chain”
Speaker: Nadav Drukker (King’s College London)
Date: Jan 29, 2013
38. “Recent results from the T2K long baseline neutrino experiment”
Speaker: Kendall Mahn (TRIUMF)
Date: Jan 30, 2013
39. “Conformal Theories with IR cutoff”
Speaker: Yoichi Iwasaki (U. Tsukuba)
Date: Jan 30, 2013
40. “Probing the Dawn of Galaxies at $z\sim 9-12$ ”
Speaker: Pascal Oesch (University of California, Santa Cruz)
Date: Jan 31, 2013
41. “From the initial conditions of the Universe to our own Milky Way”
Speaker: Annalisa Pillepich (University of California, Santa Cruz)
Date: Feb 04, 2013
42. “Neutrino Production and Interaction Modeling for Long Baseline Neutrino Experiments”
Speaker: Mark Hartz (York U.)
Date: Feb 04, 2013
43. “Donaldson-Thomas invariants of 2-dimensional torsion sheaves and modular forms”
Speaker: Artan Sheshmani (Max Planck Institute)
Date: Feb 04, 2013
44. “Measurement of weak lensing shear in CFHTLenS and future surveys”
Speaker: Lance Miller (Oxford)
Date: Feb 05, 2013
45. “Large N volume independence and bosonization”
Speaker: Aleksey Cherman (Minnesota)
Date: Feb 05, 2013
46. “Galaxy evolution in groups and clusters in a hierarchical Universe”
Speaker: Andrew Wetzel (Yale)
Date: Feb 06, 2013
47. “Test of Lorentz and CPT violation with Neutrino oscillation experiments”
Speaker: Teppei Katori (Massachusetts Institute of Technology)
Date: Feb 06, 2013
48. “Experimental test of gravitational inverse square law at short range”
Speaker: Jiro Murata (Rikkyo)
Date: Feb 06, 2013
49. “Building a cosmological distance scale based on type II n supernovae”
Speaker: Sergei Blinnikov (ITEP)
Date: Feb 07, 2013
50. “Categorical approach to discrete harmonic analysis”
Speaker: Alexey Bondal (Kavli IPMU)
Date: Feb 07, 2013
51. “Triangulated Categories of Matrix Factorizations for Elliptic Singularities”
Speaker: Hidemasa Oda (Kavli IPMU)
Date: Feb 12, 2013
52. “Analytical Approximation to the Neutrino Oscillation Probabilities at large θ_{13} ”
Speaker: Tatsu Takeuchi (Virginia Tech)
Date: Feb 13, 2013
53. “(Electro)elasticity from Gravity”
Speaker: Jay Armas (Univ. of Bern)
Date: Feb 15, 2013
54. “The Standard Cosmological Model”
Speaker: Douglas Scott (UBC)
Date: Feb 18, 2013
55. “Wild Ramification and the Cotangent Bundle”
Speaker: Takeshi Saito (U Tokyo)

- Date: Feb 20, 2013
56. "Towards a precision cosmology with CMB and galaxy survey data"
Speaker: Chiaki Hikage (Nagoya U)
Date: Feb 21, 2013
57. "The evolution of low mass, close binary systems leading to the formation of 'black widow' systems"
Speaker: Omar G. Benvenuto (U. La Plata)
Date: Feb 26, 2013
58. "How low can SUSY go? Monojets, matching and compressed spectra"
Speaker: Jamie Tattersall (U Bonn)
Date: Feb 27, 2013
59. "Modeling the nonlinear growth of large scale structure with perturbation theories and N-body simulations: implications to on-going and future surveys"
Speaker: Takahiro Nishimichi (Kavli IPMU)
Date: Feb 27, 2013
60. "Expansion opacity for type Ia supernovae: How to survive when you need to use more than 10 million spectral lines"
Speaker: Elena Sorokina (Sternberg)
Date: Feb 28, 2013
61. "Integrable systems and toric degenerations"
Speaker: Changzheng Li (Kavli IPMU)
Date: Feb 28, 2013
62. "The Lightest Higgs Boson Mass in the MSSM with Strongly Coupled Spectators"
Speaker: Jason Evans (U of Minnesota)
Date: Mar 01, 2013
63. "Mickelsson's twisted K-theory invariant and its generalization"
Speaker: Kiyonori Gomi (Shinshu U)
Date: Mar 05, 2013
64. "The coevolution between black hole and galaxy growth over the past 11 billion years"
Speaker: James Mullaney (Durham)
- Date: Mar 06, 2013
65. "The Life and Death of Galaxies at Cosmic High Noon"
Speaker: Marcin Sawicki (Saint Mary's University)
Date: Mar 07, 2013
66. "Dark energy and beyond"
Speaker: Mohammad Sami (Jamia Millia Islamia)
Date: Mar 07, 2013
67. "Low-Mass Higgs Bosons in the NMSSM and Their LHC Implications"
Speaker: Shufang Su (Arizona)
Date: Mar 08, 2013
68. "The Direct Search for Dark Matter"
Speaker: Rafael Lang (Purdue University)
Date: Mar 08, 2013
69. "The charge radius of the proton"
Speaker: Gil Paz (Wayne State Univ.)
Date: Mar 11, 2013
70. "Revisit to Non-decoupling MSSM"
Speaker: Liucheng Wang (Zhejiang Institute of Modern Physics)
Date: Mar 11, 2013
71. "Some Implications of Higgs Diphoton Excess"
Speaker: Ran Huo (U Chicago)
Date: Mar 12, 2013
72. "Axion-Higgs Unification"
Speaker: Michele Redi (CERN)
Date: Mar 13, 2013
73. "Top Quarks and Jet Substructure at the LHC"
Speaker: Michihisa Takeuchi (King's College London)
Date: Mar 14, 2013
74. "Cyclic Covers, Pryms and Moduli"
Speaker: Charles Martin Siegel (Kavli IPMU)
Date: Mar 14, 2013
75. "Geometrical CP violation and nonstandard Higgs decays"
Speaker: Gautam Bhattacharyya (Saha Institute of Nuclear Physics)
Date: Mar 15, 2013
76. "Toward an Extinction-Free Picture of Galaxy Evolution"
Speaker: Wiphu Rujopakarn (Arizona)
Date: Mar 19, 2013
77. "Singular points and confinement in SQCD"
Speaker: Simone Giacomelli (Scuola Normale Superiore & INFN Pisa)
Date: Mar 19, 2013
78. "Cosmology with Type Ia SN after the Nobel prize: level-up or game-over?"
Speaker: Ariel Goobar (Oskar Klein Centre, Stockholm University)
Date: Mar 27, 2013
79. "Universal R-operator for split real quantum groups"
Speaker: Ivan Chi-Ho Ip (Kavli IPMU)
Date: Mar 28, 2013

Personnel Changes

Promotion

Alexie Leauthaud, previously Kavli IPMU postdoctoral fellow, was appointed as a Kavli IPMU Assistant Professor on February 1, 2013.



Moving Out

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

Kavli IPMU distinguished postdoctoral fellow Masayuki Tanaka [January 1, 2010 – March 31, 2013] moved to Subaru Mitaka Office, National Astronomical Observatory of Japan as an Assistant Professor.

JSPS postdoctoral fellow Takahiro Nishimichi [April 1, 2010–March 31, 2013] moved to Paris Institute of Astrophysics (IAP) under the support of JSPS Postdoctoral Fellowship for Research Abroad Program.