

Third WPI Follow-Up Meeting

The Third Follow-Up Meeting of the WPI Program Committee was held on July 4, 2010 at the Hotel New Otani Tokyo. The Committee, which selected the WPI centers, meets every year to review and evaluate the progress and achievements of each center. The Committee interviews the center directors and the heads of the host institutions and receives a site visit report from the Program Officers assigned to each project. When necessary, the Committee makes requests for improvements to each WPI center.

At this meeting, the Committee evaluated the visibility of IPMU as a WPI center highly, as evidenced in the results of JSPS's questionnaire of researchers worldwide. The Committee also welcomed the University of Tokyo plan to create a new institute of international advanced studies, which would integrate IPMU as one of the University's permanent entities and give tenure to central members of the IPMU faculty. On the other hand, the Committee mentioned some points that need improvement, such as increasing the number of full-time principal investigators as well as female researchers.

The follow-up results have been made public at <http://www.jsps>.

go.jp/j-toplevel/data/08_followup/h21Followup_j.pdf.

IPMU Annual Report 2009 Published

The *IPMU Annual Report 2009* has been published, summarizing IPMU's research activities and mentioning some highlights, in particular, as well as progress in the WPI project implementation during fiscal 2009 (March 2009 – April 2010). The pdf version of this and previous reports can be downloaded from the IPMU web site, <http://www.ipmu.jp/ja/research-activities/annual-report>.

"Second IPMU Building" under Construction

IPMU accommodates visitors and graduate students in addition to its full-time researchers and administrative staff. The IPMU Research Building, which has a floor area of around 6,000 m², began being used at the beginning of this year, but it is not large enough to accommodate the additional visitors IPMU wishes to invite. IPMU consequently requested a budget to construct its second building, with a floor area of about 3,000 m², and this was included in the Government's stimulus package in fiscal 2009. As the Institute of Gerontology and the Information Technology Center also secured a budget to construct their own research buildings on the Kashiwa campus of the University of Tokyo, the University's Campus Planning Office took the initiative to efficiently integrate the demands for research space of the three institutions. As a consequence, construction of the General Research Laboratory Building (tentative name), boasting a total floor area of 12,000 m², got underway in April, 2010. The building will be completed at the end

of February 2011. The IPMU wing of this building will be located diagonally behind the IPMU Research Building.

IPMU is planning to use its new space not only as office space for visitors, but also as an Astronomical Information Center. It will function as an analysis center for the data to be obtained from the IPMU initiatives for astronomical observations, and at the same time it will showcase outcomes from the IPMU's astronomical research to the public. For this purpose, the center will be located at a corner of the ground floor, with a transparent glass wall. There will be a number of large screens for data projection. People will be able to view them from outside.



Fig. 1 An artist's view of the new building. The left wing will house the IPMU. The Astronomical Information Center is located at the corner on the ground floor. © Mitsuru Senda + Environment Design Institute.



Fig. 2 Construction area of the General Research Laboratory Building.

Ken'ichi Nomoto Awarded 2010 IAP Medal

Ken'ichi Nomoto, IPMU Principal Investigator, was awarded the IAP Medal on July 1, 2010 from the Institut d'Astrophysique de Paris (IAP), France. This medal is awarded annually to

coincide with IAP's annual colloquium, and is given to an astrophysicist who has made a significant contribution in related fields. The award was established in 2005, and the previous recipients are all prominent scientists. 2005: Sandra Faber (UC Santa Cruz) 2006: Andrei Linde (Stanford University) 2007: Roger Blandford (StanfordUniversity)

2008: Charles Steidel (Caltech) 2009: Wallace Sargent (Caltech)

This year's colloquium was held on the themes of "exploding stars," such as new stars, supernovae, and gamma-ray bursts. Nomoto's theoretical contribution for the supernovae research earned the recognition of the medal committee.



Professor Ken'ichi Nomoto was awarded this IAP Medal.

After All, Type Ia Supernovae OK for Cosmological Standard Candles

Type Ia supernovae form a homogeneous class of stellar explosions and are used as excellent "standard candles" to measure distances across the Universe. The measurements of the acceleration of the Universe using these standard candles revealed in 1998 - 1999 that the Universe largely comprises mysterious dark energy. However, it has long been known that type Ia supernovae, which otherwise look like twins, can show diverse spectral features, questioning their accuracy as standard candles. Consequently, solving this problem has been given the highest priority in

cosmological research using type Ia supernovae.

An international collaboration of researchers led by IPMU Assistant Professor Keiichi Maeda, including IPMU Professor Ken'ichi Nomoto and IPMU postdoc Masaomi Tanaka, has solved this problem. The research group argues that type Ia supernovae explode asymmetrically, causing apparent diversity as a consequence of the random directions from which an SN is observed. This result is good news for cosmology—it confirms that type Ia supernovae are excellent cosmological standard candles. This result has been published in *Nature*, (1 July 2010 issue).

Workshop : CLJ2010+0628: from Massive Galaxy Formation to Dark Energy

See pp. 22-23.

Workshop : IDEAS on Chemical Evolution

IDEAS (IPMU Day of Extragalactic Astrophysics Seminars) is a new initiative at IPMU to hold a series of one-day workshops on a given topic in astrophysics. The IDEAS on Chemical Evolution was held on July 13th, 2010. Three review talks were followed by five contributed talks. Topics covering theory and observations at different scales (from stars to clusters of galaxies) were actively discussed.

Future Conference: Focus Week on String Cosmology

A workshop entitled "Focus week on string cosmology" will be held at IPMU for five days from October 4 to 8, 2010. "String cosmology" is cosmology based on superstring theory, a strong candidate for the theory of everything. Various topics such as the beginning of the universe, the origin of cosmic inflation and observability in cosmic

microwave background will be discussed.

Future Conference: The Observational Pursuit of Dark Energy after Astro2010

We are holding a meeting at Caltech on October 7 to 8, 2010, through the sponsorship of DENET (International Research Network for Dark Energy) funded by JSPS (Japan Society of Promotion of Science), IPMU and Caltech. Our goal is to have a timely discussion on the optimum way forward in developing various dark energy probes in the light of the recommendations of the US National Academy of Sciences Decadal Survey "Astro2010", whose report was released on August 13th.

Future Conference: Evolution of Massive Galaxies and Their AGNs with the SDSS-III/BOSS Survey

IPMU is a member institute of SDSS-III/BOSS Collaboration, which is conducting a massive spectroscopic survey of distant galaxies. This workshop will be held at IPMU for four days from October 24 to 28, 2010. The workshop aims to bring together individuals from the BOSS community with a strong interest in the study of luminous galaxies and/or AGNs in order to foster collaborative efforts. The format of the meeting will involve a combination of science presentations and working group sessions, with ample time for discussion.

Future Conference: Mini Workshop on Neutrino

Neutrinos have been extensively studied so far. Nevertheless, the neutrino remains one of the least understood particles. It is very important to understand its properties,

partly because it may be related to the origin of the matter-antimatter asymmetry of the Universe. A mini workshop on neutrino will be held at IPMU for five days from November 8 to 12, 2010. The purpose of this meeting will be to review the current experimental and theoretical understanding of neutrinos. We plan to schedule a series of seminars on the neutrino experiments, such as Super-Kamiokande, T2K, neutrinoless double beta decay, MINOS and MiniBooNE, and the theoretical models of the neutrino mass.

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. "Fermi's Restless Universe"
Speaker: Roger Blandford (KIPAC (Stanford University))
Date: Jun 18, 2010



2. "Homological mirror symmetry for toric Fano stack and suspension for

- directed Fukaya categories"
Speaker: Masahiro Futaki (The University of Tokyo)
Date: Jun 21, 2010
3. "Holographic superconductors from M5-branes"
Speaker: Nakwoo Kim (Kyung Hee University)
Date: Jun 22, 2010
4. "Heavy element synthesis in neutrino-driven neutron-star winds of core collapse supernovae"
Speaker: Almudena Arcones (Basel University)
Date: Jun 22, 2010
5. "Donaldson-Thomas theory and cluster algebras"
Speaker: Kentaro Nagao (Nagoya University)
Date: Jun 28, 2010
6. "Higher Categories and TQFTs"
Speaker: Alexander Voronov (University of Minnesota)
Date: Jun 29, 2010
7. "Recursion Relations and String Theory Amplitudes"
Speaker: Brian Wecht (IAS)
Date: Jun 30, 2010
8. "Non-linear dynamics and primordial curvature perturbations from preheating"
Speaker: Andrei Frolov (Simon Fraser)
Date: Jul 06, 2010
9. "Infrared modified gravity with dynamical connection"
Speaker: Valery Rubakov (Moscow, INR)
Date: Jul 08, 2010
10. "Cosmology from gravitational-wave standard sirens"
Speaker: Daniel Holz (Los Alamos)
Date: Jul 09, 2010
11. "Differential equations aspects of quantum cohomology (Part 1), Some new solutions of the tt^* -equations (Part 2)"
Speaker: Martin Guest (Tokyo Metropolitan University)
Date: Jul 12, 2010
12. "B is for BIRD"
Speaker: Nobuhiko Katayama (KEK)
Date: Jul 13, 2010
13. "Introductions to Quantum Deformation Theory"
Speaker: Alexander Voronov (University of Minnesota)
Date: Jul 13, 2010
14. "Group and clusters of galaxies in deep X-ray surveys"
Speaker: Alexis Finoguenov (MPE)
Date: Jul 14, 2010
15. "Cosmology and Astrophysics with Galaxy Clusters: Recent Advances and Future Challenges"
Speaker: Daisuke Nagai (Yale University)
Date: Jul 15, 2010
16. "Quantum Deformation Theory"
Speaker: Alexander Voronov (University of Minnesota)
Date: Jul 20, 2010
17. "Host Galaxies of "Dark" Gamma-Ray Bursts"
Speaker: Yuu Niino (Kyoto University)
Date: Jul 21, 2010
18. "Galaxy Formation with Cosmological Hydrodynamic Simulations in the JWST Era"
Speaker: Kentaro Nagamine (University of Nevada Las Vegas)
Date: Jul 21, 2010
19. "Phenomenology of Pure General Gauge Mediation"
Speaker: Valya Khoze (IPPP Durham)
Date: Jul 22, 2010
20. "The Calabi-Yau/Landau-Ginzburg correspondence for B-branes"
Speaker: Ed Segal (Imperial College London)
Date: Jul 26, 2010
21. "Radiative Transfer Modeling of Lyman Alpha Emitters and New Effects in Galaxy Clustering"

- Speaker: Zheng Zheng (Yale University)
Date: Jul 27, 2010
22. “Quantum Deformation Theory”
Speaker: Alexander Voronov (University of Minnesota)
Date: Jul 27, 2010
23. “Gauge-Higgs Unification: Stable Higgs, Dark Matter, and Colliders”
Speaker: Yutaka Hosotani (Osaka University)
Date: Jul 29, 2010
24. “Methods in Supersymmetric Field Theories and Supergravity Theories”
Speaker: Zohar Komargodski (IAS)
Date: Aug 03, 2010
25. “Strong Coupling and Causality in High-Spin Massive Particles: the Charged Spin 3/2 Example”
Speaker: Massimo Porrati (New York University)
Date: Aug 04, 2010
26. “Quantum Deformation Theory”
Speaker: Alexander Voronov (University of Minnesota)
Date: Aug 05, 2010
27. “The Annihilator of the Derived Singularity Category”
Speaker: Ragnar-Olaf Buchweitz (University of Toronto)
Date: Aug 17, 2010
28. “Quantum Deformation Theory”
Speaker: Alexander Voronov (University of Minnesota)
Date: Aug 18, 2010
29. “Donaldson-Thomas invariants, wall-crossing and matrix models”
Speaker: Masahito Yamazaki (IPMU)
Date: Aug 23, 2010
30. “Forming Bulgeless Disk Galaxies”
Speaker: Chris Brook (Univ. of Central Lancashire)
Date: Aug 24, 2010
31. “Quantum Deformation Theory”
Speaker: Alexander Voronov (University of Minnesota)
Date: Aug 25, 2010
32. “2-dimensional lattice models and renormalization”
Speaker: Cornelius Schmidt-Colinet (IPMU)
Date: Aug 26, 2010
33. “Special Geometry (after Strominger)”
Speaker: Kyoji Saito (IPMU)
Date: Aug 27, 2010
34. “Toric degenerations of Grassmann manifolds and mirror symmetry”
Speaker: Makoto Miura (The University of Tokyo)
Date: Aug 30, 2010
35. “Semi-topological invariants of real algebraic varieties”
Speaker: Mircea Voineagu (IPMU)
Date: Aug 31, 2010
36. “The Yau-Zaslow conjecture and Noether-Lefschetz theory”
Speaker: Emanuel Scheidegger (Augsburg University)
Date: Sep 01, 2010
37. “Resonant Non-Gaussianity from Axion Monodromy Inflation”
Speaker: Raphael Flauger (Yale)
Date: Sep 02, 2010
38. “Negative Differential Regivity from Holography”
Speaker: Shin Nakamura (Kyoto University)
Date: Sep 02, 2010
39. “Wronskian solutions of T, Q and Y-systems for AdS/CFT”
Speaker: Zengo Tsuboi (Osaka City University)
Date: Sep 07, 2010
40. “Boosting BSM Higgs discovery with jet substructure”
Speaker: Adam Martin (FNAL)
Date: Sep 09, 2010
41. “Instanton counting in Omega background and beyond”
Speaker: Daniel Krefl (IPMU)
Date: Sep 13, 2010
42. “Borchers products in monstrous moonshine”
Speaker: Scott Carnahan (IPMU)

Date: Sep 14, 2010

43. “Motion of charged particles near weakly magnetized Schwarzschild black hole”
Speaker: Valeri Frolov (Alberta)
Date: Sep 16, 2010

Personnel Changes

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

Yogesh Kumar Srivastava [September 1, 2009 – July 15, 2010] moved to the National Institute of Science Education and Research in India as an Assistant Professor.

Tathagata Basak [October 1, 2009 – August 15, 2010] moved to the Department of Mathematics, Iowa State University, as an Assistant Professor.

Daniel Krefl [August 1, 2009 – September 30, 2010] moved to UC Berkeley as a Simons Postdoctoral Fellow.

Guillaume Lambard [April 3, 2009 – September 30, 2010] moved to IFIC (Instituto de Física Corpuscular) in Spain as a postdoctoral fellow.

Yen-Ting Lin [October 16, 2008 – September 30, 2010] moved to ASIAA in Taiwan as an Assistant Research Fellow.

Also, Masahito Yamazaki, who stayed at IPMU from April 1 to August 31, 2010 as a JSPS Postdoctoral Fellow, moved to Princeton University as a postdoctoral fellow.

In addition, Alex Bene, an IPMU postdoctoral fellow since September 1, 2009, resigned from IPMU on August 31, 2010.