

**First International Symposium on
Interdisciplinary Materials Science (ISIMS-2008)**

March 13-14, 2008

Tsukuba

Abstract Booklet

**Strategic Initiatives for
Center of Interdisciplinary Materials Science
University of Tsukuba**

First International Symposium on Interdisciplinary Materials Science

ISIMS-2008

Tsukuba Research Center for Interdisciplinary Materials Science (TIMS) was established in 2003 upon the achievements of Emeritus Professor Hideki Shirakawa, a Nobel laureate in chemistry, and has achieved substantial results in research and education in materials science and nanotechnology. In this fiscal year, we planned the next phase of TIMS. At the same time, two groups in Graduate School of Pure and Applied Sciences independently proposed plans of the center of innovative hybrid molecules (leader: Toshiharu Teranishi) and the center of interdisciplinary optical science (leader: Yutaka Moritomo). As these proposals are closely related, the university decided to support them as a unified program in the framework of Pre Strategic Initiatives.

The First International Symposium on Interdisciplinary Materials Science (ISIMS-2008) will be held as a part of this program, and will provide a forum to discuss the latest research progress in the related fields, i.e., innovative hybrid molecules, interdisciplinary optical science, nano-science, and biomaterial.

Organizer: Strategic Initiatives for Center of Interdisciplinary Materials Science

Date: March 13-14, 2008

Venue: EPOCHAL TSUKUBA (Tsukuba International Congress Center)
Conference Room 101 & 102

Organizing Committee

Yuiti Ootuka,	Kikuo Yamabe,
Tatsuya Nabeshima,	Yukio Nagasaki,
Takaki Kanbara,	Hidemi Shigekawa,
Yutaka Moritomo,	Keiichi Tomishige,
Toshiharu Teranishi	

Administrative Coordinator

Kiyoshi Akiba,	Emiko Omori
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Program

March 13 (Thursday)

9:20 Opening
 Youiti Ootuka (TIMS, University of Tsukuba)

Session1. Interdisciplinary Optical Science

chairman: Yutaka Moritomo

9:30-10:10 **Collective atomic motion in solids observed as wave-packet propagation**
 Tohru Suemoto (Institute of Solid-State Physics, University of Tokyo) 1

10:10-10:35 **Femtosecond microscopic study of dynamics of surface plasmon polariton**
 Atsushi Kubo (University of Tsukuba; PRESTO-JST)2

10:35-10:45 break

chairman: Muneaki Hase

10:45-11:10 **Adiabatic manipulation of Raman process and its application to novel coherent light source**
 Masayuki Katsuragawa (University of Electro-Communications; PREST-JST) 3

11:10-11:35 **Coherent dynamics of exciton qubits in strain-compensated quantum dots**
 Junko Ishi-Hayase (JST-PREST; National Institute of Information and Communications Technology (NICT); Department of Physics, Sophia University) ... 4

11:35-12:00 **Phonon-induced low energy dynamics of graphite**
 Jae Dong Lee (School of materials science, Japan Advanced Institute of Science and Technology)5

12:00-13:30 Lunch

Session 2. Innovative Hybrid Molecules

chairman: Takeshi Akasaka

13:30-14:20 **Supramolecular Photo- and Electro-active Nanostructures**
 Nazario Martin (Department of Organic Chemistry, University of Complutense) 6

chairman: Hiroki Oshio

14:20-14:55 **Spin-chiral-structural Correlation in Frustrated Molecular Based Magnets**

Hiroyuki Nojiri (Institute for Materials Research and CINTS, Tohoku University)7

14:55-15:05 break

chairman: Toshiharu Teranishi

15:05-15:40 **Main Group Approach to New pi-Electron Materials**

Shigehiro Yamaguchi (Department of Chemistry, Graduate School of Science,
Nagoya University; SORST, JST) 8

15:40-16:00 **Design and Synthesis of Helical Oligooxime-Zinc(II) Complexes for Ion
Recognition**

Shigehisa Akine (Tsukuba Research Institute for Interdisciplinary Materials Science,
Graduate School of Pure and Applied Sciences, University of Tsukuba) 9

16:00- 18:30 **Poster session** (Conference Room 102)

18:30- Reception (Restaurant ESPOIR)

March 14 (Friday)

Session 3. Nano Science/ Nano Technology

chairman: Hidemi Shigekawa

9:00-9:40 **Future of Nano Technology**

Young Kuk (Department of Physics and Astronomy, Seoul National University.) ... 10

9:40-10:00 **Characteristics of Nanoscale Devices**

Tomihiko Hashizume (Advanced Research Laboratory, Hitachi, Ltd.; Department of
Physics, Tokyo Institute of Technology; WPI Advanced Institute for Materials
Research, Tohoku University) 11

10:00-10:10 break

chairman: Young Kuk & Takaki Kanbara

10:10-10:30 **Functionalized metal complex with molecular recognition ability controlled by
external stimuli**

Junpei Kuwabara (Tsukuba Research Center for Interdisciplinary Materials Science,
University of Tsukuba) 12

10:30-10:50	Molecular wire for multi-channel transistor Yutaka Wakayama (Advanced Electronic Materials Center, National Institute for Materials Science)	13
10:50-11:10	Atomic Switch and Related Applications Tsuyoshi Hasegawa (WPI Center for Materials Nanoarchitectonics (MANA), National Institute for Materials Science)	14
11:10-11:30	Superconductivity of Nanometer-size superconductors visualized by STM Toyoaki Eguchi (Institute for Solid State Physics, University of Tokyo)	15
11:30-13:00	Lunch	
Session 4. Bio Materials		
<i>chairman: Yukio Nagasaki</i>		
13:00-13:40	Quantification of copy number variation by multiplex ligation-dependent sequence amplification (MLSA) and photodiode-based pyrosequencer Guohua Zhou (Medical School, Nanjing University)	16
13:40-14:00	Density Controlled PEG/Biomacromolecule Co-Immobilized Gold Surface as an Intelligent Sensor Platform Keitaro Yoshimoto (Center for Tsukuba Advanced Research Alliance (TARA), Graduate School of Pure and Applied Sciences, and Tsukuba Research Center for Interdisciplinary Materials Science (TIMS), University of Tsukuba)	18
14:00-14:10	break	
<i>chairman: Guohua Zhou & Keitaro Yoshimoto</i>		
14:10-14:30	Effective Protein Recognition on the Glycosylated Self- Assembled Monolayer Yukari Sato (National Institute of Advanced Industrial Science and Technology (AIST))	19
14:30-14:50	Novel Biocompatible Surface with Concentrated Polymer Brushes Chiaki Yoshikawa (International Center for Materials Nanoarchitectonics, National Institute for Materials Science)	20
14:50-15:10	Dynamic control of cellular microenvironment based on caged compounds Jun Nakanishi (WPI Center for Materials Nanoarchitectonics (MANA), National	

	Institute for Materials Science; PREST-JST)	21
15:10-15:30	Formation of elaborately-patterned co-culture system by photo-control of cell adhesion		
	Kimio Sumaru (Research Center of Advanced Bionics, National Institute of Advanced Industrial Science and Technology (AIST))	22
15:30	Closing		
	Toshiharu Teranishi (University of Tsukuba)		

List of Poster Presentations

- P-1 Activation of Alkynes by Indium Salts and Its Application to Catalytic Carbon-Carbon Bond Formation**
Katsukiyo Miura, Kiyomi Yamamoto, Sayaka Toyohara, Junji Ichikawa and Akira Hosomi
Department of Chemistry, Graduate School of Pure and Applied Sciences, University of Tsukuba
- P-2 Synthesis of Fluorine-Containing Five-Membered Heterocyclic Compounds via Nucleophilic 5-*endo-trig* Cyclizations of Metalloenolates and Metalloenamines**
Masahiro Ikeda¹, Kotaro Sakoda², and Junji Ichikawa¹
¹ Graduate School of Pure and Applied Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8573, Japan
² Graduate School of Science, University of Tokyo,
- P-3 Synthetic Study on 13-Oxyingenol**
Takayuki Ohyoshi, Toshihiro Haruna, Yuki Asuma, Kenta Aoki, Satomi Ohmura, Ichiro Hayakawa and Hideo Kigoshi
Department of Chemistry, Graduate School of Pure and Applied Sciences, and Center for Tsukuba Advanced Research Alliance, University of Tsukuba,
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Hidekazu, WATANABE; Ichiro, HAYAKAWA; Hideo, KIGOSHI.
Department of Chemistry, Graduate School of Pure and Applied Sciences, and Center for Tsukuba Advanced Research Alliance, University of Tsukuba,
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Akiyuki Ikeda, Ichiro Hayakawa, Hideo Kigoshi
Department of Chemistry, Graduate School of Pure and Applied Sciences, and Center for Tsukuba Advanced Research Alliance, University of Tsukuba,
- P-7 Synthesis of Cyclic Zinc(II) Dipyrin Trimer by Heteroleptic Coordination**
Satoko Ueda¹, Chusaku Ikeda¹, Tatsuya Nabeshima^{1,2}.
¹ Graduate School of Pure and Applied Sciences, University of Tsukuba,
² Tsukuba Research Institute for Interdisciplinary Materials Science, University of Tsukuba,
- P-8 Ion pair recognition by multidentate pyridine ligand bearing urea moieties**
Hiroshi Tamai¹ and Tatsuya Nabeshima^{1,2}
¹ Department of Chemistry, University of Tsukuba
² Tsukuba Research Center for Interdisciplinary Materials Science (TIMS), University of Tsukuba
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- Nabeshima^{1, 2}
1 Graduate School of Pure and Applied Sciences, University of Tsukuba,
2 Tsukuba Research Institute for Interdisciplinary Materials Science, University of Tsukuba,
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1 Graduate School of Pure and Applied Sciences, University of Tsukuba
2 Tsukuba Research Center for Interdisciplinary Materials Science (TIMS), University of Tsukuba
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Shiho Kijima¹, Yuki Imamura^{1,2} and Tatsuya Nabeshima^{1,2}
1 Graduate School of Pure and Applied Sciences, University of Tsukuba,
2 Tsukuba Research Institute for Interdisciplinary Materials Science, University of Tsukuba,
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1 Graduate School of pure and applied Sciences, University of Tsukuba
2 Tsukuba Research Center for Interdisciplinary Materials Science (TIMS), University of Tsukuba,
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Shuichi Sunaga,¹ Shigehisa Akine,^{1,2} and Tatsuya Nabeshima^{1,2}
1 Graduate School of Pure and Applied Sciences, University of Tsukuba
2 Tsukuba Research Center for Interdisciplinary Materials Science (TIMS), University of Tsukuba
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1 Graduate School of Pure and Applied Sciences, University of Tsukuba,
2 Tsukuba Research Center for Interdisciplinary Materials Science (TIMS), University of Tsukuba
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Masaki Sairenji,¹ Chusaku Ikeda,¹ and Tatsuya Nabeshima^{1,2}
1 Graduate School of Pure Applied Sciences, University of Tsukuba
2 Tsukuba Research Center for Interdisciplinary Materials Science (TIMS), University of Tsukuba
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1 Graduate School of Pure and Applied Sciences, University of Tsukuba
2 Tsukuba Research Center for Interdisciplinary Materials Science (TIMS), University of Tsukuba
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Naoya Sakamoto,¹ Chusaku Ikeda¹ and Tatsuya Nabeshima^{1,2}
¹Graduate School of Pure and Applied Sciences, University of Tsukuba,
² Tsukuba Research Center for Interdisciplinary Materials Science (TIMS),
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Graduate School of Pure and Applied Sciences, University of Tsukuba
Tsukuba Research Institute for Interdisciplinary Materials Science (TIMS),
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Yoko Morita,¹ Shigehisa Akine^{1,2} and Tatsuya Nabeshima^{1,2}
¹ Graduate School of Pure and Applied Sciences, University of Tsukuba
² Tsukuba Research Center for Interdisciplinary Materials Science (TIMS),
University of Tsukuba

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Takuro Makiguchi,¹ Shigehisa Akine,^{1, 2} Tatsuya Nabeshima^{1, 2}
¹Graduate School of Pure and Applied Sciences, University of Tsukuba,
²Tsukuba Research Center for Interdisciplinary Materials Science (TIMS),
University of Tsukuba

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Toshihiko Shimada¹, Chusaku Ikeda¹ and Tatsuya Nabeshima^{1, 2}
¹ Graduate School of Pure and Applied Sciences, University of Tsukuba,
² Tsukuba Research Institute for Interdisciplinary Materials Science, University of Tsukuba,

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Yuki Imamura and Tatsuya Nabeshima
Graduate School of Pure and Applied Sciences, University of Tsukuba
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Kiyofumi Irie,¹ Shin-ichi J. Takayama,¹ Hulin Tai,¹ Shin-ichi Mikami,¹ Shin Kawano,¹
Shigenori Nagatomo,¹ Takumi Kawahara,² Noriaki Funasaki,² Teruhiro Takabe,³
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¹Univ. of Tsukuba; ²Kyoto Pharm. Univ.; ³Meijo Univ.; ⁴NIST; ⁵PRESTO.;

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Shin-ichi Mikami¹, Kiyofumi Irie¹, Shin-ichi J. Takayama¹, Hulin Tai¹, Masato Kagel¹, Shin Kawano¹, Shigenori Nagatomo¹, and Yasuhiko Yamamoto¹
¹ Tsukuba Research Institute for Interdisciplinary Materials Science, University of Tsukuba,

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Takuya Teratani^{1,2}, Ken Okamoto^{1,2}, Take-aki Koizumi², Takaki Kanbara¹, and Takakazu Yamamoto²

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²Chemical Resources Laboratory, Tokyo Institute of Technology

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Ken Okamoto^{1,2}, Takakazu Yamamoto¹, and Takaki Kanbara²

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²Tsukuba Research Center for Interdisciplinary Materials Science, University of Tsukuba,

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Michio Yamada,¹ Chika Someya,¹ Takatsugu Wakahara,¹ Takahiro Tsuchiya,¹ Takeshi Akasaka,¹ Yutaka Maeda,² Kenji Yoza,³ Naomi Mizorogi,⁴ and Shigeru Nagase⁴

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Haruka Enoki¹, Midori O. Ishitsuka¹, Takahiro Tsuchiya¹, Takeshi Akasaka¹, Zdenek Slanina¹, Michael T. H. Liu², Naomi Mizorogi³, Shigeru Nagase³

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³Institute for Molecular Science,

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Hidefumi Nikawa¹, Yoichiro Matsunaga¹, Takeshi Akasaka¹, Tatsuhisa Kato², Yasuyuki Araki³, Osamu Ito³, Masafumi Ata⁴, and Klaus-Peter Dinse⁵

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³Institute of Multidisciplinary Research for Advanced Materials, Tohoku University,

⁴National Institute of Advanced Industrial Science and Technology (AIST),

⁵Physical Chemistry III, Darmstadt University of Technology,

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Koji Nakajima¹, Yuko Yamazaki¹, Takatsugu Wakahara¹, Takahiro Tsuchiya¹, Yutaka Maeda², Takeshi Akasaka^{1*}, Markus Waelchli³, Kenji Yoza⁴, Naomi Mizorogi⁵, and Shigeru Nagase⁵

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Makoto Hachiya¹, Yuko Iiduka¹, Takatsugu Wakahara¹, Takahiro Tsuchiya¹, Yutaka Maeda², Takeshi Akasaka¹, Naomi Mizorogi³, Shigeru Nagase³
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Yuya Yokosawa, Takahiro Tsuchiya, Takeshi Akasaka
Center for Tsukuba Advanced Research Alliance, University of Tsukuba

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⁴Department of Theoretical and Computational Molecular Science, Institute for Molecular Science

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1Center for Tsukuba Advanced Research Alliance, University of Tsukuba,
2Department of Chemistry, Tokyo Gakugei University,
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4Department of Theoretical and Computational Molecular Science, Institute for Molecular Science,

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⁴Department of Chemistry, Tokyo Gakugei University,
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Graduate School of Pure and Applied Sciences, University of Tsukuba,

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Takuya Shiga,¹ Hiroyuki Nojiri,² and Hiroki Oshio¹
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² Institute of Material Research, Tohoku University, Katahira 2-1-1, Aoba-ku, Sendai 980-8577, Japan

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Graduate School of Pure and Applied Sciences, University of Tsukuba,
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Takuya Sakuraga, Tomohisa Miyazawa, Kimio Kunimoria, Keiichi Tomishigea,*
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Graduate School of Pure and Applied Sciences, University of Tsukuba,
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Graduate School of Pure and Applied Sciences, University of Tsukuba,
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¹ Tsukuba Research Institute for Interdisciplinary Materials Science, University of Tsukuba,
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Mutsumasa Kyotani¹, Satoshi Matsushita², Takuro Nagai³, Yoshio Matsui³, Kazuo Akagi^{1, 2}
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- P-54 Acceleration of the Z to E photoisomerization of penta-2,4-dieniminium by hydrogen out-of-plane motion: Theoretical study on a model system of retinal protonated Schiff base**
Masato Sumita and Kazuya Saito
Department of Chemistry, Graduate School of Pure and Applied Sciences, University of Tsukuba.
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¹ Department of Chemistry, Graduate School of Pure and Applied Sciences, University of Tsukuba,
² Department of Chemistry, Graduate School of Science, Osaka University,
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Takahito Nakamura ¹, Motoi Oishi ^{1, 2, 3}, Yukio Nagasaki ^{1, 2, 3, 4, 5}

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 Institute of Materials Science

P-58 Preparation and Characterization of Tumor-Specific Imaging Probes Utilizing the pH-sensitive PEGylated Nanogels Containing 19F Compounds.

Shogo SUMITANI¹), Motoi OISHI¹), ²), ³) and Yukio NAGASAKI¹), ²), ³), ⁴), ⁵)

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 3) Center for Tsukuba Advanced Research Alliance (TARA)
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 5) Satellite Laboratory of International Center for Materials Nanoarchitectonics (MANA), NIMS,

P-59 Mechanism analysis of patterned PEG hydrogel surface on cellular adhesiveness changes

Masahiro Ichino¹, Keitaro Yoshimoto^{1, 2}, Yukio Nagasaki^{1, 2, 3, 4, 5}

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 3) Tsukuba Research Center for Interdisciplinary Materials Science (TIMS),
 University of Tsukuba
 4) Master's School of Medical Sciences, Graduate School of Comprehensive Human Sciences, University of Tsukuba
 5) Satellite Laboratory, International Center for Materials Nanoarchitectonics (MANA), National Institute of Materials Science (NIMS)

P-60 Self-Assembled Polyion Complex Nanosphere by PEG-siRNA Block Copolymer –Effect of siRNA Chain Length on Stabilization of Nanosphere–

Taiga Tatsumi^{1,2,3}, Motoi Oishi^{1,2,3,5}, Kazunori Kataoka^{6,7}, and Yukio Nagasaki^{1,2,3,4,5}

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 4) Master's School of Medical Science, Graduate School of Comprehensive Human Science, University of Tsukuba,
 5) Satellite Laboratory, International Center for Materials Nanoarchitectonics, National Institute of Materials Science,
 6) Department of Materials Engineering, Graduate School of Engineering, The University of Tokyo,
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P-61 Fluorescence-based labeling of nucleobases by a hydrogen-bond forming lanthanide chelate complex

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- P-62 Antigen binding ability of Fab'/mixed-poly(ethylene glycol) (PEG) tethered-chain gold surface -A PEG interphase maintains the antibody activity-**
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- P-64 Chemical reactions in solutions by atmospheric-pressure nonthermal plasmas**
Katsuhisa Kitano and Satoshi Hamaguchi
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Hidenori Goto^{1, 2}, Takashi Sato¹, Sho Tanaka¹, Akinobu Kanda^{1, 2}, Youiti Ootuka¹,
Shunsuke Odaka^{3, 4}, Hisao Miyazaki^{2, 3}, Kazuhito Tsukagoshi^{2, 3, 5}, and
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- P-66 Conduction-channel analysis of hydrogen molecule junctions by superconducting point-contact spectroscopy**
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- P-67 A micro SQUID using small tunnel junctions**
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- P-69 Plasmon-mediated multiple excitations observed in STM-induced light emission from rubrene/Au(111) thin films**
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- P-70 STM-induced light emission from an organic-LED structure**
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- P-71 Two-dimensional Electronic Structures Realized in Self-assembled Monolayers of Amino Acids on Cu(100) Surface**
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- P-72 Investigation of Biotin-Streptavidin Interactions by Dynamic Force Spectroscopy with Precise Force Control**
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- P-73 Influence of junction geometry on single molecular conductance investigated by STM point contact method**
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- P-74 Nanoscale imaging of carrier dynamics in semiconductor heterostructures by femtosecond time-resolved STM**
Yasuhiko Terada, Shoji Yoshida, Hiroyuki Kondo, Atsushi Okubo, Osamu Takeuchi, and Hidemi Shigekawa
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- P-75 Four-Probe Scanning Tunneling Microscope with True Atomic Resolution**
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- P-76 The effect of infiltration on atomic step flow**
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- P-77 Dielectric characteristics of SiO₂ film formed by radical oxygen**
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- P-78 Ultrafast dynamics of coherent optical phonons in Ge₂Sb₂Te₅ films**
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- P-79 Photoconductance imaging of a quantum point contact under local optical excitations**
Hironori Ito, Tetsuya Omi and Shintaro Nomura
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- P-80 Photo voltage response images of a superconductor-normal metal- superconductor junction**
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- P-81 A low-temperature field near-field scanning optical microscope for imaging electronic states in GaAs/AlGaAs heterostructures**
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- P-82 Transient band bending in InP/InAs/InP core-multishell nanowires**
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- P-83 Narrowing of exciton linewidth of a quantum dot with increasing temperature**
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- P-84 Spin orientation of excitons, trions and tetraons in charge tunable InP quantum dots**
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- P-85 Single NN pair luminescence and single photon generation in nitrogen δ -doped GaP**
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- P-86 Femtosecond observation of coherent plasmon-phonon coupled modes in InAs: application to estimation of carrier mobility**

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- P-87 Time-resolved spectroscopy of Fe-Co nano particle**
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- P-88 Arbitrary optical waveform generation with ultra-high repetition rate using line-by-line control of spectral phase of broad Raman sidebands**
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- P-89 Dynamics of the three-leg spin tube system**
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- P-90 Specific heat measurements of the geometrically frustrated system $Cd_{1-x}Zn_xV_2O_4$**
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- P-91 NMR study of the geometrically frustrated systems Li_xVO_2 and $Li_yZn_{1-y}V_2O_4$**
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