

International Symposium on  
**Carrier Interactions in  
Mesoscopic Systems 2001**  
(CIM 2001)

February 13-14, 2001  
NTT Atsugi R&D Center

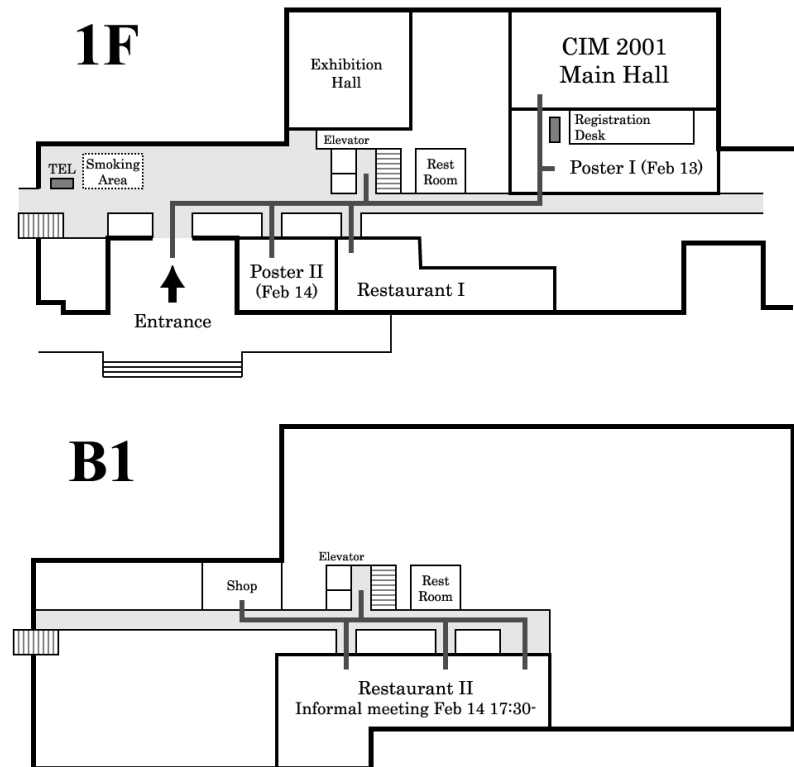
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K. Muraki (NTT), Secretary

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NEDO  
CREST (FEMD)-JST  
NTT Basic Research Laboratories

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Registration & Welcome Reception  
Feb 12 (Mon) 18:00-21:00  
Atsugi Royal Park Hotel  
2F, Room 'Akatsuki'

Banquet  
Feb 13 (Tue) 19:00 start  
Atsugi Royal Park Hotel  
3F, Room 'Sagami-nishi'

Informal Meeting  
Feb 14 (Wed) 17:30-  
NTT R&D Center  
B1, Restaurant II

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## Oral Session (Feb 13, Tue)

10:00-10:25	Opening Address
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10:00-10:15  
 Y. Hirayama (NTT), CIM2001 Chair  
 Representatives from NEDO and CREST

10:15-10:25  
 S. Ishihara, Director of NTT Basic Research Laboratories

10:30-11:15	Opening Session
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Electron and spin interactions in low dimensional systems  
 K. von Klitzing (plenary)  
 Max-Planck-Institut für Festkörperforschung, Stuttgart, Germany

11:15-11:35 Coffee Break (20 min)
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11:35-13:05	Session A: Quantum Hall Systems
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11:35-12:05  
 A-1 Interlayer coherence in bilayer quantum Hall systems  
 Z. F. Ezawa (invited)  
 Department of Physics, Tohoku University, Japan

12:05-12:35  
 A-2 Quantum Hall ferromagnets: the big picture  
 A. H. MacDonald (invited)  
 Department of Physics, University of Texas at Austin, USA

12:35-13:05  
 A-3 Quantum Hall ferromagnet: integer quantum Hall effect due to Coulomb interactions  
 K. Muraki  
 NTT Basic Research Laboratories, Japan

13:05-14:00 Lunch (55 min)
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14:00-15:30	Session B: Electron-Hole Systems
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14:00-14:30  
 B-1 The controlling exciton Bose condensate and phonon laser  
 Y. Lozovik (invited)  
 Institute of Spectroscopy, Russian Academy of Science, Russia

14:30-15:00  
 B-2 InAs/GaSb based interacting electron-hole system in high magnetic field  
 K. Takashina (invited)  
 Department of Physics, Clarendon Laboratory, University of Oxford, UK

15:00-15:30  
 B-3 Magnetic electron-hole plasmas in carbon nanotubes  
 G. E. W. Bauer  
 Department of Applied Physics and DIMES, Delft University of Technology, the Netherlands

15:30-15:50 Coffee Break (20 min)
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15:50-16:50	Session C: Carrier Interactions in Magnetic Media
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15:50-16:20  
 C-1 Ferromagnetic transition mechanisms in III-V diluted magnetic semiconductors  
 K. Hirakawa  
 Institute of Industrial Science, University of Tokyo, Japan  
 CREST, Japan Science and Technology Corporation, Japan

16:20-16:50  
 C-2 Nuclear spin polarization/relaxation via interactions with two-dimensional electron systems  
 Y. Hirayama  
 NTT Basic Research Laboratories, Japan

16:50-18:20	Poster Session I (Main Hall Lobby)
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18:20 Shuttle Bus leaves for Atsugi Royal Park Hotel

19:00-21:00	Banquet (Atsugi Royal Park Hotel)
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## Oral Session (Feb 14, Wed)

9:30-11:00	<b>Session D: Physics and Fabrication/Probing Techniques in Nanostructures</b>
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9:30-10:00

D-1 Magnetically modulated two dimensional electron systems, micro-Hall-magnetometry and composite fermions  
D. Weiss (invited)  
Universitaet Regensburg, Experimentelle und Angewandte Physik, Germany

10:00-10:30

D-2 Fabrication and properties of uncoupled and coupled quantum wire and dot structures on high-index GaAs substrates  
K. H. Ploog  
Paul Drude Institute for Solid State Electronics, Germany

10:30-11:00

D-3 Advancement of scanning probe microscopy for functional study of quantum nanostructures  
H. Yokoyama  
Electrotechnical Laboratory, JST-CREST, Japan

11:00-11:20	Coffee Break (20 min)
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11:20-12:20	<b>Session E: Spin States in Quantum Dots</b>
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11:20-11:50

E-1 Control and applications of two-electron states in quantum dot structures  
S. Tarucha  
Department of Physics, University of Tokyo, Japan

11:50-12:20

E-2 Spin effects and exchange engineering in coupled quantum dots  
J. P. Leburton  
Department of Electrical and Computer Engineering and Beckman Institute, University of Illinois at Urbana-Champaign, USA

12:20-13:20	Lunch (60 min)
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13:20-14:20	<b>Session F: Kondo Effect in Quantum Dots</b>
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13:20-13:50

F-1 Kondo effect in quantum dots: recent developments  
Y. V. Nazarov (invited)  
Department of Applied Physics and DIMES, Delft University of Technology, the Netherlands

13:50-14:20

F-2 The Kondo effect in lateral and vertical quantum dots  
W. G. van der Wiel  
Department of Applied Physics, DIMES, and ERATO Mesoscopic Correlation Project, Delft University of Technology, the Netherlands

14:20-15:50	<b>Poster Session II (Presentation Room)</b>
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15:50-17:20	<b>Session G: Qubit Manipulation</b>
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15:50-16:20

G-1 Amplifying quantum signals with the single-electron transistor  
M. Devoret (invited)  
Quantronics group, CEA-Saclay, France

16:20-16:50

G-2 Collective/individual manipulation and entanglement for qubit information control  
N. Imoto  
The Graduate University for Advanced Studies, Japan

16:50-17:20

G-3 Measurements on persistent-current qubits  
J. E. Mooij  
Delft University of Technology, the Netherlands

17:20-17:30	<b>Closing Address</b>
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Y. Hirayama, CIM 2001 Chair

17:30-	<b>Informal Meeting with Food &amp; Drink (B1 Floor, Restaurant II)</b>
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## Poster Session I (Feb 13, Tue)

- TP-01 Electron removal spectrum and elementary excitations in fractional quantum Hall systems  
S. Suzuki, Y. Kato and Y. Kuramoto  
Department of Physics, Tohoku University, Japan
- TP-02 Properties of compressible strips at fractional quantum Hall plateaux  
K. Oto, T. Matsubayashi, K. Arai, S. Takaoka and K. Murase  
Graduate School of Science, Osaka University, Japan
- TP-03 Various  $\nu = 2/3$  quantum Hall states in bilayer system  
N. Kumada, H. Azuhata, S. Nagahama, D. Terasawa, Y. Shimoda, A. Sawada, Z. F. Ezawa, K. Muraki, T. Saku and Y. Hirayama  
Department of Physics, Tohoku University, Japan
- TP-04 Investigation of Rashba spin-splitting energies in InGaAs/InAlAs heterostructures using anti-weak-localization analyses  
T. Koga, J. Nitta, T. Akazaki and H. Takayanagi  
NTT Basic Research Laboratories, Japan
- TP-05 Quantum transport in narrow wire FETs made at spin-splitting  
 $\text{In}_{0.75}\text{Ga}_{0.25}\text{As}/\text{In}_{0.75}\text{Al}_{0.25}\text{As}$  heterointerfaces  
S. Yamada, Y. Sato and S. Gozu  
School of Materials Science, JAIST, Japan
- TP-06 Spin-orbit interaction in an InAlAs/InAs heterostructure  
K. Yoh, S. Abe, T. Doi, Y. Katano, H. Ohno, K. Sueoka and K. Mukasa  
Research Center for Interface Quantum Electronics, Hokkaido University, Japan
- TP-07 Quantum point contact with a widely tunable range for the electron density  
K. Hashimoto, S. Miyashita, T. Saku and Y. Hirayama  
NTT Basic Research Laboratories, CREST-JST, Japan
- TP-08 Electron coupling in weakly and strongly coupled quantum point contacts  
K. J. Friedland, T. Saku, Y. Hirayama and K. H. Ploog  
Paul Drude Institute for Solid State Electronics, Germany
- TP-09 Quantum transport and gate-controlled mode hybridization in GaAs-based Schottky in-plane gate coupled quantum wire transistors  
S. Kasai, M. Iwaya, M. Yumoto and H. Hasegawa  
Research Center for Interface Quantum Electronics and Graduate School of Electronics and Information Engineering, Hokkaido University, Japan
- TP-10 Magnetic minibands and conductance oscillations in a quantum wire with short period potential modulation  
T. Asayama, Y. Tokura, S. Miyashita, M. Stopa and S. Tarucha  
Department of Physics, University of Tokyo, Japan
- TP-11 Hund's rule in a spherical artificial atom  
Y. Asari, H. Tamura and K. Takeda  
Department of Material Science, School of Science and Engineering, Waseda University, Japan
- TP-12 Three-dimensional analysis of the electronic structure of cylindrical vertical quantum dots  
P. Matagne, J. P. Leburton, D. G. Austing and S. Tarucha  
Beckman Institute for Advanced Science and Technology, University of Illinois at Urbana-Champaign, USA
- TP-13 Magnetic field induced transitions in the few-electron ground states of artificial molecules  
S. Amaha, D. G. Austing, Y. Tokura, K. Muraki, K. Ono and S. Tarucha  
Department of Physics, University of Tokyo, Japan
- TP-14 Mean field theory for integer-spin Kondo effect in quantum dots  
M. Eto and Y. V. Nazarov  
Department of Applied Physics / DIMES, Delft University of Technology, the Netherlands
- TP-15 Magnetoconductance of coupled quantum dots in the Kondo region  
T. Aono and M. Eto  
The Institute of Physical and Chemical Research (RIKEN), Japan
- TP-16 Suppression of the Kondo effect in a quantum dot by microwave radiation  
J. M. Elzerman, W. G. van der Wiel, S. De Franceschi, D. Goldhaber-Gordon and L. P. Kouwenhoven  
Department of Applied Physics / DIMES, Delft University of Technology, the Netherlands
- TP-17 Aharonov-Bohm oscillations induced by a coil current  
K. Tsubaki  
NTT Basic Research Laboratories, Japan
- TP-18 Electro-magnetic Aharonov-Bohm effect in a 2-D electron gas ring  
W. G. van der Wiel, E. W. G. M. Huizeling, J. M. Elzerman, S. De Franceschi, T. Fujisawa, S. Tarucha and L. P. Kouwenhoven  
Department of Applied Physics / DIMES, Delft University of Technology, the Netherlands
- TP-19 Nonlinear response and dephasing in mesoscopic rings and dots under an external ac pumping  
V. I. Yudson  
Center for Frontier Science, Chiba University, Japan  
Institute of Spectroscopy, Russian Academy of Sciences, Russia
- TP-20 Charge fluctuations on a ultrasmall superconductor  
Y. Utsumi, H. Imamura, M. Hayashi and H. Ebisawa  
Graduate School of Information Sciences, Tohoku University, Japan
- TP-21 N-qubit system in capacitively coupled semiconductor quantum dots  
T. Tanamoto  
Corporate R & D Center, Toshiba Corporation, Japan
- TP-22 Entanglement of quantum dots in the spin van der Waals model  
A. Miranowicz, S. K. Ozdemir, M. Koashi, N. Imoto and Y. Hirayama  
CREST-JST, School of Advanced Sciences, Graduate University for Advanced Studies (SOKEN), Japan  
Nonlinear Optics Division, Institute of Physics, Adam Mickiewicz University, Poland
- TP-23 Electro-mechanical properties of freestanding InAs membranes fabricated from InAs/GaAs (111)A heterostructures  
H. Yamaguchi, R. Dreyfus, S. Miyashita and Y. Hirayama  
NTT Basic Research Laboratories, Japan

## Poster Session II (Feb 14, Wed)

- WP-01 High mobility electron gas wafer-fused on LiNbO<sub>3</sub>  
K. J. Friedland, A. Riedel, H. Kostial, R. Hey and K. H. Ploog  
Paul Drude Institute for Solid State Electronics, Germany
- WP-02 Transport properties in InAs/AlSb/GaSb heterostructures  
K. Suzuki, S. Miyashita and Y. Hirayama  
NTT Basic Research Laboratories, Japan
- WP-03 Electronic structures of a single-layer and a double-layer two dimensional electron systems in tilted magnetic fields investigated by cyclotron resonance spectroscopy  
H. Aikawa, S. Takaoka, K. Oto, K. Murase, S. Shimomura, S. Hiyamizu, T. Saku and Y. Hirayama  
Graduate School of Science, Osaka University, Japan
- WP-04 Edge states and bulk conduction properties of Si-MOSFET in the quantum Hall regime  
K. Arai, T. Matsubayashi, K. Oto, S. Takaoka and K. Murase  
Department of Physics, Graduate School of Science, Osaka University, Japan
- WP-05 Surface-acoustic-wave attenuation in asymmetric two-layer systems in the quantum Hall regime  
Y. Takagaki, E. Wiebicke, K. J. Friedland and K. H. Ploog  
Paul Drude Institute for Solid State Electronics, Germany
- WP-06 Model for spin-transport in resonant ferromagnet/2-dimensional electron gas/ferromagnet structures  
Th. Schaeppers, J. Nitta, H. B. Heersche, T. Koga and H. Takayanagi  
NTT Basic Research Laboratories, Japan
- WP-07 Fabrication and characterization of Fe/InAs hybrid structure  
K. Yoh, H. Ohno, Y. Katano, A. Subagyo, T. Doi, K. Sueoka and K. Mukasa  
Research Center for Interface Quantum Electronics, Hokkaido University, Japan
- WP-08 The electron-electron interactions in the spin transport dynamics of a two-dimensional electron gas  
Y. Takahashi, K. Shizume and N. Masuhara  
Department of Electrical Engineering, Yamagata University, Japan
- WP-09 Electronic pressure on ferromagnetic domain wall  
Y. Tokura and G. Tatara  
NTT Basic Research Laboratories, Japan
- WP-10 Transport characteristics of electrons in weak short period two-dimensional potential arrays  
A. Kawaharazuka, T. Saku, Y. Tokura, Y. Horikoshi and Y. Hirayama  
NTT Basic Research Laboratories, Japan  
School of Science and Engineering, Waseda University, Japan
- WP-11 Magnetic field effects on the flat-band ferromagnetism on a kagome dot array  
T. Kimura, H. Tamura, K. Shiraishi and H. Takayanagi  
NTT Basic Research Laboratories, Japan
- WP-12 Quasi-periodic spin polarization in realistic quantum dots  
M. Stopa  
Tarucha Mesoscopic Correlation Project, ERATO-JST, Japan
- WP-13 Spectroscopy of electronic states in self-assembled InAs quantum dots formed on GaAs pyramids  
H. An, J. Motohisa and T. Fukui  
Research Center for Interface Quantum Electronics, Hokkaido University, Japan
- WP-14 Influence of different starting materials on transport through self assembled dots  
D. G. Austing, R. Hill, A. Patane, M. Henini, P. Main, L. Eaves and S. Tarucha  
NTT Basic Research Laboratories, Japan
- WP-15 Strong quantum confinement characterization of vertically stacked InAs self-assembled quantum dots in Al<sub>0.5</sub>Ga<sub>0.5</sub>As barrier  
S. Li, K. Koike and M. Yano  
New Materials Research Center, Osaka Institute of Technology, Japan
- WP-16 Crossover between singlet - and triplet-state in a quantum dot with Kondo coupling  
W. Izumida  
Tarucha Mesoscopic Correlation Project, ERATO-JST, Japan
- WP-17 The Kondo effect in a quantum dot with only one electron  
Y. Kitamura, S. Sasaki, W. Izumida, K. Ono and S. Tarucha  
Department of Physics, University of Tokyo, Japan
- WP-18 Transient current spectroscopy of lateral and vertical quantum dots  
T. Fujisawa, Y. Tokura, Y. Hirayama, D. G. Austing and S. Tarucha  
NTT Basic Research Laboratories, Japan
- WP-19 THz emission from Bloch oscillations in wide miniband superlattices  
Y. Shimada, S. Madhavi and K. Hirakawa  
Institute of Industrial Science, University of Tokyo, Japan
- WP-20 Bounds on bipartite entanglement shared among many qubits  
M. Koashi, V. Buzek and N. Imoto  
CREST-JST, School of Advanced Sciences, The Graduate University for Advanced Studies (SOKEN), Japan
- WP-21 Optical state truncation: a proposal for experimental realization  
S. K. Ozdemir, A. Miranowicz, M. Koashi and N. Imoto  
CREST-JST, School of Advanced Sciences, The Graduate University for advanced Studies (SOKEN), Japan
- WP-22 Luminescence spectroscopy of modulation-doped AlGaAs/GaAs quantum structures using low-temperature scanning near-field optical microscope  
T. Tokizaki, H. Kawashima, T. Shigefuji, T. Inoue and H. Yokoyama  
Electrotechnical Laboratory, CREST-JST, Japan
- WP-23 Imaging of zero-dimensional states in InAs nanostructures using low-temperature scanning tunneling microscopy  
K. Kanisawa, M. J. Butcher, Y. Tokura, H. Yamaguchi and Y. Hirayama  
NTT Basic Research Laboratories, Japan