

6th RIEC International Workshop on Spintronics

PROGRAM

February 5th (Friday)

Registration 8:30-8:50

Opening 8:50-9:00

- FR-1** 9:00-9:35 **Tomasz Dietl**
*(Institute of Physics, Polish Academy of Sciences,
Institute of Theoretical Physics, University of Warsaw)*
Ferromagnetism of Dilute and Condensed Magnetic Semiconductors
- FR-3** 9:35-10:10 **Dieter Weiss**
(Institute for Experimental and Applied Physics, University of Regensburg)
Phase Coherent Phenomena in (Ga,Mn)As
- 10:10-10:40 **Coffee Break**
- FR-4** 10:40-11:15 **Tomas Jungwirth**
(Institute of Physics Academy of Sciences of the Czech Republic and University of Nottingham)
Spin-orbit Coupling Induced Magneto-transport Anisotropy Phenomena in GaMnAs and Beyond
- FR-5** 11:15-11:40 **Fumihiko Matsukura, Yu Nishitani¹, Masaki Endo¹, Daichi Chiba^{1,2}, Maciej Sawicki^{3,1}, Anna Korbecka⁴, Jacek A. Majewski⁴, Agnieszka Werpachowska³, Tomasz Dietl^{3,4,1}, and Hideo Ohno¹**
(¹Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University, ²Institute for Chemical Research, Kyoto University, ³Institute of Physics, Polish Academy of Sciences, ⁴Institute of Theoretical Physics, University of Warsaw)
Electric-field Effect on Thin (Ga,Mn)As Layers
- 11:40-14:00 **Lunch Break**

- FR-6** 14:00-14:35 **Alexandr Chernyshov¹, Mason Overby¹, Xinyu Liu²,
Jacek K. Furdyna², Yuli Lyanda-Geller¹, and Leonid P. Rokhinson**
(¹Department of Physics and Birck Nanotechnology Center, Purdue University,
²Department of Physics, University of Notre Dame)
Reversible Control of Magnetization via Spin-orbit Magnetic Field
- FR-7** 14:35-15:00 **Junsaku Nitta¹, Yoji Kunihashi¹, and Makoto Kohda^{1,2}**
(¹Department of Materials Science, Tohoku University, ²PRESTO-JST)
**Competition between Rashba and Dresselhaus Spin-orbit
Interactions in InGaAs Wires**
- FR-8** 15:00-15:35 **Roland Winkler**
(Materials Science Division, Argonne National Laboratory,
Northern Illinois University)
Spin Precession, Densities and Currents in Semiconductors
- FR-9** 15:35-16:00 **Yasutomo J. Uemura¹, S. R. Dunsiger^{1,2}, J. P. Carlo¹, T. Goko^{1,3},
G. Nieuwenhuys⁴, T. Prokscha⁴, A. Suter⁴, E. Morenzoni⁴, D. Chiba^{5,6},
Y. Nishitani⁶, T. Tanikawa^{5,6}, F. Matsukura^{6,5}, H. Ohno^{6,5}, J. Ohe^{7,8},
and S. Maekawa^{7,8}**
(¹Department of Physics, Columbia University, ²Physik Dept., Technische Universitat
Munchen, ³TRIUMF, ⁴Paul Scherrer Institut, Lab. for Muon Spin Spect. ⁵ERATO
Semiconductor Spintronics Project, Japan Science and Technology Agency (JST),
⁶Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical
Communication, Tohoku University, ⁷Institute for Materials Research, Tohoku University,
⁸CREST, JST)
**Spatially Homogeneous Ferromagnetism of (Ga,Mn)As Detected by
Muon Spin Relaxation**

Poster Session

16:00-18:00 (Room A401)

- P-1** **Lin Chen¹, X. Chen², L. H. Chen², and Jianhua Zhao¹**
(¹State Key Laboratory for Superlattices and Microstructures, Institute of Semiconductors, Chinese Academy of Sciences, ²Nano-Optoelectronics Laboratory, Institute of Semiconductors, Chinese Academy of Sciences)
Manipulation of Magnetic Properties of (Ga,Mn)As Films by Nano-scale Patterning
- P-2** **Yonggang Zhu, Xinhui Zhang, Lin Chen, and Jianhua Zhao**
(State Key Laboratory for Superlattices and Microstructures, Institute of Semiconductors, Chinese Academy of Sciences)
Ultrafast Dynamics of Four-state Magnetization Reversal in (Ga,Mn)As
- P-3** **L. Chen, S. Yan, P. F. Xu, J. Lu, W. Z. Wang, J. J. Deng, X. Qian, Y. Ji, and Jianhua Zhao**
(State Key Laboratory for Superlattices and Microstructures, Institute of Semiconductors, Chinese Academy of Sciences)
Magnetic and Magneto-transport Properties of Heavily Mn-doped (Ga,Mn)As Films with High Ferromagnetic Transition Temperature
- P-4** **Makoto Kohda^{1,2} and Junsaku Nitta¹**
(¹Department of Materials Science, Tohoku University, ²PRESTO-JST)
Enhancement of Spin Orbit Interaction in Quaternary InGaAsP/InGaAs heterostructures
- P-5** **Toshihiro Kubo¹, Yasuhiro Tokura^{1,2}, and Seigo Tarucha^{1,3}**
(¹Quantum Spin Information Project, ICORP-JST, ²NTT Basic Research Laboratories, NTT Corporation, ³Department of Applied Physics, University of Tokyo)
Electron Transport through an Aharonov-Bohm-Casher Interferometer Containing a Laterally Coupled Double Quantum Dot
- P-6** **Yoji Kunihashi¹, Makoto Kohda^{1,2}, and Junsaku Nitta¹**
(¹Department of Materials Science, Tohoku University, ²PRESTO-JST)
Anisotropic Spin Splitting in InGaAs Wire Structures
- P-7** **Shunichiro Matsuzaka, Yuzo Ohno, and Hideo Ohno**
(Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University)
Carrier Concentration Dependence of Spin Hall Effect in n-GaAs
- P-8** **Masaaki Ono, Genki Sato, Jun Ishihara, Shunichiro Matsuzaka, Yuzo Ohno, and Hideo Ohno**
(Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University)
Strain Dependence of Nuclear Spin Relaxation Time in a GaAs Quantum Well
- P-9** **X. M. Dou, X. Y. Chang, Baoquan Sun, Y. H. Xiong, Z. C. Niu, H. Q. Ni, and D. S. Jiang**
(State Key Laboratory for Superlattices and Microstructures, Institute of Semiconductors, Chinese Academy of Sciences)
Electron Spin Relaxation by Nuclei and Holes in Single InAs Quantum dots

- P-10** **Soichiro Teraoka¹, Shinichi Amaha¹, Tsuyoshi Hatano¹,
Toshihiro Kubo¹, Yasuhiro Tokura², Yuzo Ohno³, Hideo Ohno³,
and Seigo Tarucha⁴**
(¹Quantum Spin Information Project, ICORP-JST, ²NTT Basic Research Laboratories,
NTT Corporation, ³Laboratory for Nanoelectronics and Spintronics, Research Institute
of Electrical Communication, Tohoku University, ⁴Department of Applied Physics,
University of Tokyo)
**Hole Spin Resonance and Spin-Orbit interaction in
p-GaAs/AlGaAs(311)A Heterostructure**
- P-11** **O. Entin-Wohlman^{1,2}, A. Aharony¹, Yoshihiro Tokura³,
and Y. Avishai¹**
(¹Department of Physics and Ilse Kats Center for Meso- and Nano-Scale Science and
Technology, Ben Gurion University, ²Weizmann Institute of Science, ³NTT Basic
Research Labs, NTT Corporation)
**Spin-polarized Electric Currents through the Constriction with
Spin-orbit Interaction**
- P-12** **Hidekazu Saito, Jean C. Le Breton, Vadym Zaytes, Y. Mineno,
Shinji Yuasa, and Koji Ando**
(Nanoelectronics Research Institute, National Institute of Advanced Industrial Science
and Technology)
Spin Injection into GaAs from a Fe/GaO_x Tunnel Injector
- P-13** **Kazuma Izumiya, Yoshio Miura, Kazutaka Abe,
and Masafumi Shirai**
(Research Institute of Electrical Communication, Tohoku University)
**A First-principles Study on Electronic Structures of Fe₃O₄/GaAs
Interface**
- P-14** **Pengfa Xu, K. K. Meng, S. L. Wang, L. Chen, J. Lu,
and Jianhua Zhao**
(State Key Laboratory for Superlattices and Microstructures, Institute of
Semiconductors, Chinese Academy of Sciences)
**Co doping Enhanced Magnetocaloric Effect in Mn_{1-x}Co_xAs Films
Epitaxied on GaAs (001) Substrate**
- P-15** **Gyung-Min Choi, Il-Jae Shin Byoung-Chul Min, and Kyung-Ho Shin**
(Center for Spintronics Research, Korea Institute of Science and Technology (KIST))
**Synthetic Antiferromagnetic Pinned Layer in Perpendicular
Magnetic Tunnel Junctions**
- P-16** **Huadong Gan¹, Shoji Ikeda¹, Jun Hayakawa²,
Hiroyuki Yamamoto^{1,2}, Katsuya Miura^{1,2}, Haruhiro Hasegawa²,
Fumihiko Matsukura¹, and Hideo Ohno¹**
(¹Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical
Communication, Tohoku University, ²Advanced Research Laboratory, Hitachi, Ltd.)
**Tunneling Spectroscopy of CoFeB/MgO/CoFeB Pseudo Spin-Valve
MTJs with Ultrahigh TMR Ratio**
- P-17** **Huadong Gan¹, Shoji Ikeda¹, Wataru Shiga¹, Jun Hayakawa²,
Katsuya Miura^{2,1}, Hiroyuki Yamamoto², Fumihiko Matsukura¹,
Tadakatsu Ohkubo³, Kazuhiro Hono³, and Hideo Ohno¹**
(¹Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical
Communication, Tohoku University, ²Advanced Research Laboratory, Hitachi, Ltd.,
³National Institute for Materials Science)
**Effect of Free Layer Structures on Tunnel Magnetoresistance for
Double MgO Barrier Magnetic Tunnel Junctions**

- P-18** **Yoshio Miura, Kazutaka Abe, and Masafumi Shirai**
(Research Institute of Electrical Communication, Tohoku University)
Electronic and Transport Properties of Magnetic Tunnel Junctions with Half-metallic Co₂YZ (Y = Mn or Cr; Z=Si, Al or Ga)
- P-19** **Kotaro Mizunuma¹, Shoji Ikeda¹, Hiroyuki Yamamoto^{2,1}, Huadong Gan¹, Katsuya Miura^{2,1}, Jun Hayakawa², Kenchi Ito², Fumihiro Matsukura¹, and Hideo Ohno¹**
(¹Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University, ²Advanced Research Laboratory, Hitachi, Ltd., ³National Institute for Materials Science)
Effect of CoFeB Insertion and Pd Layer Thicknesses on TMR Properties in Perpendicular MTJs with MgO Barrier and CoFe/Pd Multilayers
- P-20** **Il-jae Shin^{1,2}, Byoung-Chul Min¹, Jin-Pyo Hong², and Kyung-Ho Shin¹**
(¹Center for Spintronics Research, Korea Institute of Science and Technology, ²Novel Functional Materials and Devices Lab., Department of Physics, Hanyang University)
Effect of Ru Diffusion in Exchange-biased MgO Magnetic Tunnel Junctions Prepared by *In-situ* Annealing
- P-21** **Mitsuru Suzuki, Kazutaka Abe, Yoshio Miura, and Masafumi Shirai**
(Research Institute of Electrical Communication, Tohoku University)
An *ab initio* Study on the Tunneling Magnetoresistance in FePt/Fe_n/MgO/Fe_n/FePt (n = 0-4) Magnetic Tunnel Junctions
- P-22** **Lihui Bai¹, Makoto Kohda^{1,2}, and Junsaku Nitta¹**
(¹Department of Materials Science, Tohoku University, ²PRESTO-JST)
Electrical Detection of Spin Waves in Permalloy Strips
- P-23** **Masahito Tsujikawa¹, Tatsuki Oda², Yoshio Miura³, and Masafumi Shirai³**
(¹Graduate School of Natural Science and Technology, Kanazawa University, ²Institute of Science and Engineering, Kanazawa University, ³Research Institute of Electrical Communication, Tohoku University)
Electric Field Effects on Magnetic Anisotropy of MgO/Pt/Fe/Pt (001)
- P-24** **Shun Kanai, Masaki Endo, Shoji Ikeda, Fumihiro Matsukura, and Hideo Ohno**
(Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University)
Thickness Dependence of Magnetic Anisotropy in CoFeB under Electric Fields
- P-25** **Toshiro Ohnuma**
(Human Electromagnetics Charge Spin (HECS) Laboratory)
On Charge Spin
- P-26** **Soogil Lee, Jungho Ko, and Jongill Hong**
(Materials Science and Engineering, Yonsei University)
Effect of a Junction Area on Anisotropy Dispersion of the Exchange-biased Pinned Layer for MgO-based MTJs

Banquet 18:30-20:30 (Trattoria e Bar "Caccinu")

February 6th (Saturday)

- SA-1** 9:00-9:35 **Albert Fert¹, O. Boulle¹, V. Cros¹, A. Dussaux¹, B. Georges¹, J. Grollier¹, H. Jaffrés¹, A. Ruotolo¹, A. Fukushima², M. Konoto², K. Yakushiji², S. Yuasa², K. Ando², J. Barnas³, and G. Faini⁴**
(¹Unité Mixte de Physique CNRS/Thales, Palaiseau, and Université Paris-Sud, ²National Institute of Advanced Science and Technology (AIST), ³Poznan University, ⁴LPN/CNRS)
Generation of Microwave Oscillations by Spin Transfer, Synchronization of Spin Transfer Oscillators
- SA-2** 9:35-10:10 **L. E. Nistor¹, B. Rodmacq¹, C. Ducruet², C. Portemont², I. L. Prejbeanu², M. Chshiev¹, and Bernard Dieny¹**
(¹SPINTEC (UMR 8191 CEA-CNRS-UJF), CEA/INAC, ²CROCUS Technology, 4 Place Robert Schuman)
Direct Correlation between Magnetic Anisotropy and Tunnel Magnetoresistance in Magnetic Tunnel Junctions with MgO Barrier
- 10:10-10:25 **Coffee Break**
- SA-3** 10:25-10:50 **T. Koyama¹, D. Chiba¹, G. Yamada¹, K. Ueda¹, H. Tanigawa², S. Fukami², T. Suzuki², N. Ohshima², N. Ishiwata², Y. Nakatani³, and Teruo Ono¹**
(¹Institute for Chemical Research, Kyoto University, ²Device Platforms Research Laboratories, NEC Corporation, ³University of Electro-communications)
Current-induced Domain Wall Motion against Magnetic Field
- SA-4** 10:50-11:15 **Kenchi Ito¹, Jun Hayakawa¹, Katsuya Miura^{1,2}, Michihiko Yamanouchi¹, Haruhiro Hasegawa¹, Shoji Ikeda², Ryutaro Sasaki², Hiromasa Tskahashi¹, Hideyuki Matsuoka¹, and Hideo Ohno²**
(¹Advanced Research Laboratory, Hitachi, Ltd., ²Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University)
Spin Transfer Torque Switching in Magnetic Tunnel Junctions with CoFeB-based Synthetic Ferri-magnetic Free Layers
- SA-5** 11:15-11:40 **Shinji Yuasa¹, Rie Matsumoto^{1,2}, Akio Fukushima¹, Taro Nagahama¹, Hitoshi Kubota¹, Kay Yakushiji¹, Koji Ando¹, and Yoshishige Suzuki^{1,2}**
(¹National Institute of Advanced Industrial Science and Technology (AIST), ²Graduate School of Engineering Science, Osaka University)
Quantitative Analysis of Coherent and Incoherent Tunneling Currents in MgO-based Epitaxial Magnetic Tunnel Junctions
- SA-6** 11:40-12:15 **Se-Chung Oh¹, Seung-Young Park², Aurélien Manchon³, Mairbek Chshiev³, Jae-Ho Han⁴, Hyun-Woo Lee⁴, Jang-Eun Lee¹, Kyung-Tae Nam¹, Younghun Jo², Yo-Chan Kong⁵, Bernard Dieny³ and Kyung-Jin Lee⁵**
(¹Semiconductor R&D Center, Samsung Electron. Co, ²Nano Mater. Research Team, Korea Basic Sci. Inst., ³SPINTEC, UMR 8191 CEA/CNRS/UJF, CEA/Grenoble, ⁴Dept. of Phys., POSTECH, Pohang, ⁵Dept. of Mater. Sci. & Eng., Korea Univ.)
Bias-voltage Dependence of Perpendicular Spin-transfer Torque in Asymmetric MgO-based Magnetic Tunnel Junctions
- 12:15-14:00 **Lunch Break**

- SA-7** 14:00-14:25 **K. Sato, T. Fukushima, M. Toyoda H. Kizaki,
and Hiroshi Katayama- Yoshida**
(Graduate School of Engineering Science, Osaka University)
**First Principles Theory and Computational Materials Design for
Semiconductor Nano-Spintronics:
Design vs. Experimental Realization**
- SA-8** 14:25-14:50 **Kohei M. Itoh**
(Dept. Applied Physics, Keio University)
Silicon Spintronics for Quantum Information Processing
- SA-9** 14:50-15:25 **Igor Zutic, Rafal Oszwaldowski, Christian Gothgen, Jeongsu Lee,
and William Falls**
(Department of Physics, University at Buffalo)
Semiconductor Spin-Lasers
- 15:25-15:45 **Coffee Break**
- SA-10** 15:45-16:10 **Y. Suzuki^{1,2}, Y. Shiota¹, T. Nozaki^{1,3}, M. Shiraishi¹ and T. Shinjo¹**
(¹Osaka University, ²CREST-JST, ³PREST-JST)
**Voltage Control of Magnetic Anisotropy in Au/FeCo(001) Ultrathin
Layer/MgO Junctions**
- SA-11** 16:10-16:35 **Masaki Endo, Shun Kanai, Shoji Ikeda, Fumihiro Matsukura,
and Hideo Ohno**
(Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical
Communication, Tohoku University)
**Change of Magnetic Properties in Co₄₀Fe₄₀B₂₀ Induced by Electric
Field**
- SA-12** 16:35-17:00 **Tatsuki Oda**
(Institute of Science and Engineering, Kanazawa University)
**Magnetic Anisotropy and Its Electric Field Effect in the
Nano-structures of Fe-Pt System**
- Closing** 17:00-17:10