Hiro Munekata
Adjunct Professor, Virginia Tech
and
Professor Emeritus, Institute of Science Tokyo (IST)*
(* Before Oct. 2024, Tokyo Institute of Technology ≡ T^2)
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PROFESSIONAL BACKGROUND:

1979	B.S.	Chemical Engineering, Tokyo Institute of Technology
1981	Master of Engineering	Information Processing, Tokyo Institute of Technology
1984	Doctor of Engineering	Information Processing, Tokyo Institute of Technology

APPOINTMENTS:

1984 – 1985	Visiting Scientist, IBM T.J. Watson Research Center
1985 – 1993	Research Staff Member, IBM T.J. Watson Research Center
1994 – 1998	Associate Professor, Tokyo Institute of Technology
1998 – 2022	Professor, Tokyo Institute of Technology
2022	Mandatory Retirement, Professor Emeritus, Tokyo Institute of Technology*
2022 – present	Adjunct Professor, Virginia Tech
	* After Oct. 2024, Institute of Science Tokyo

TEACHING EXPERIENCES:

Fundamental Semiconductor Physics (Undergraduate course, Japanese)

Fundamental Electromagnetism (Undergraduate course, Japanese)

Optical Properties of Semiconductors (Graduate course, English)

English academic presentation and writing for Ph.D. students (Graduate course, English)

SYNERGISTIC ACTIVITIES:

· Principal coordinator of Scientific Research in Priority Areas “Semiconductor Nano-Spintronics” of The Ministry of Education, Culture, Sports, Science and Technology, Japan (2002 - 2006).

· Chair, Fourth International Conference on Physics and Applications of Spin-related Phenomena in Semiconductors (PASPS-4), Sendai, Japan, Aug., 2006.

· Chair, Fourteenth International Conference on Narrow Gap Semiconductors (NGS-14), Sendai, Japan, July, 2009.

· Divisional Associate Editor, Physical Review Letters (2008 - 2014).

· Member of the Editorial Board of Applied Physics Letters (2015 - 2019).

· A program chair of the Magnetic and Optic Research International Symposium 2013 (Omiya, Dec. 2013).

· A program chair of the Spintronics Session in the International Symposium of Solid State Devices and Materials 2013 (Sept., 2013, Fukuoka) and 2014 (Sept., 2014, Tsukuba).

[1] SELECTED PUBLICATIONS (Ph.D. student: 1980 – 1983):

(1) H. Munekata, S. Murasato, and H. Kukimoto: White Photoluminescence of Amorphous Silicon-Carbon Alloy Prepared by Glow Discharge Decomposition of Tetramethylsilane; Appl. Phys. Lett. **37**, 536-537 (1980).

(2) H. Munekata, A. Shiozaki, and H. Kukimoto: Compositional-Dependent Stokes Shift of Photoluminescence in Amorphous Si_xC_{1-x}; J. Luminescence **24/25**, 43-46 (1981)

(3) H. Munekata and H. Kukimoto: Electroluminescence in Hydrogenated Amorphous Silicon-Carbon Alloy; Appl. Phys. Lett. **42**, 432-434 (1983).

(4) H. Munekata and H. Kukimoto: Optical Properties of a-Si:H Ultrathin Layers; Jpn. J. Appl. Phys. **22**, L544-L546 (1983).

(5) H. Munekata, M. Mizuta, and H. Kukimoto: Optical Properties of a-Si:H/a-$Si_{0.2}C_{0.8}$:H Quantum Well Structures; J. Non-Cryst. Solid **59/60**, 1167-1170 (1983).

[2] SELECTED PUBLICATIONS (Research Staff Member at IBM: 1984 - 1993):

(1) J. Luo, H. Munekata, F.F. Fang, and P.J. Stiles: Observation of the zero field spin splitting of ground electron subband in GaSb-InAs-GaSb quantum wells; Phys. Rev. B **38**, 10142 (1988).

(2) H. Munekata, H. Ohno, S. von Molnár, A. Segmüller, L.L. Chang, and L. Esaki: Diluted magnetic III-V semiconductors; Phys. Rev. Lett. **63**, 1849 (1989).

(3) H. Ohno, H. Munekata, T. Penney, S, von Molnar, and L.L. Chang: Magnetotransport properties of p-type (In,Mn)As diluted magnetic III-V semiconductors; Phys. Rev. Lett. **68**, 2664 (1992).

(4) H. Munekata, A. Zaslavsky, P. Fumagalli, and R.J. Gambino: Preparation of (In,Mn)As/(Ga,Al)Sb magnetic semiconductor heterostructures and their ferromagnetic characteristics; Appl. Phys. Lett. **63**, 2929 (1993).

[3] SELECTED PUBLICATIONS (Tokyo Tech: 1994 – 2018):

(1) S. Koshihara, A. Oiwa, M. Hirasawa, S. Katsumoto, Y. Iye, C. Urano, H. Takagi, and H. Munekata: Ferromagnetic Order Induced by Photogenerated Carriers in Magnetic III-V Semiconductor Heterostructures of (In,Mn)As/GaSb; Phys. Rev. Lett. **78**, 4617 (1997).

(2) S.Haneda, M. Yamaura, Y. Takatani, K. Hara, S. Harigae and H. Munekata: Preparation and characterization of Fe-based III-V Diluted Magnetic Semiconductor (Ga,Fe)As; Jpn. J. Appl. Phys. **39**, L9-L12 (2000).

(3) T. Slupinski, H. Munekata, and A. Oiwa: Ferromagnetic semiconductor (In,Ga,Mn)As with Curie temperature above 100K,; Appl. Phys. Lett. **80**, 1592 (2002).

(4) A. Oiwa, Y. Mitsumori, R. Moriya, T. Slupinski, and H. Munekata: Effect of optical spin injection on ferrmagnetically coupled Mn spins in the III-V magnetic alloy semiconductor (Ga,Mn)As; Phys. Rev. Lett. **88**, 137202 (2002)

(5) R. Moriya and H. Munekata: Relation among concentrations of incorporated Mn atoms, ionized Mn acceptors, and holes in *p*-(Ga,Mn)As epilayers; J. Appl. Phys. **93**, 4603 - 4609 (2003).

(6) G. A. Khodaparast, D. C. Larrabee, J. Kono, D. S. King, J.Kato, T. Slupinski, A. Oiwa, H. Munekata, G.

D. Sanders, and C. J. Stanton: Terahertz dynamics of photogenerated carriers in ferromagnetic InGaMnAs; J. Appl. Phys. **93**, 8286 (2003).

(7) J. Wang, C. Sun, J. Kono, A. Oiwa, H. Munekata, L. Cywinski, and L. J. Sham: Ultrafast Quenching of Ferromagnetism in InMnAs Induced by Instense Laser Irradiation; Phys. Rev. Lett. **95**, 167401 1-4 (2005).

(8) T. Kondo, J. Hayafuji, and H. Munekata: Investigation of spin voltaic effect in a p-n heterojunction; Jpn. J. Appl. Phys. **45**, (Express Lett.) L663-L665 (2006).

(9) T. Schallenberg and H. Munekata: Preparation of ferromagnetic (In,Mn)As with a high Curie temperature of 90 K; Appl. Phys. Lett. **89**, 042507 1-3 (2006).

(10) Y. Hashimoto, S. Kobayashi, and H. Munekata: Photo-induced precession of magnetization in ferromagnetic (Ga,Mn)As; Phys. Rev. Lett. **100**, 067202 1-4 (2008), and Y. Hashimoto and H. Munekata: Coherent manipulation of magnetization precession in ferromagnetic semiconductor (Ga,Mn)As with successive optical pumping; Appl. Phys. Lett. **93**, 202506 1-3 (2008).

(11) T. Matsuda and H. Munekata: Mechanism of photoexcited precession of magnetization in (Ga,Mn)As on the basis of time-resolved spectroscopy; Phys. Rev. B **93**, 075202 1-8 (2016).

(12) N. Nishizawa, K. Nishibayashi, and H. Munekata: Pure circular polarization electroluminescence at room temperature with spin-polarized light-emitting diodes; Proceedings of National Academy of Science of United States of America (PNAS) **114**, 1783-1788 (2017).

(13) R. C. Roca, N. Nishizawa, K. Nishibayashi, and H. Munekata: A lateral-type spin-photodiode based on Fe/x-AlO_x/p-InGaAs junctions with a refracting-facet side window; J. Appl. Phys. **123**, 213903 1-10 (2018).

(14) B. Al-Qadi, Y. Sakatoku, N. Nishizawa, H. Munekata: Imaging in-plane 90° magnetization switching in a (Ga,Mn)As epitaxial layer; J. Appl. Phys. **124**, 063901 1-8 (2018).

(15) N. Nishizawa, M. Aoyama, R. C. Roca, K. Nishibayashi, and H. Munekata: Arbitrary helicity control of circularly polarized light from lateral-type spin-polarized light-emitting diodes at room temperature; Appl. Phys. Express **11**, 053003 1-5 (2018).

[4] SELECTED PUBLICATIONS (Tokyo Tech. and VT: 2020 – present):

(1) H. Munekata, S. Ogawa, K. Michihiro, K. Nishibayashi, N. Nishizawa: Imparting memory functionality to planar waveguide structures with photo-magnetic materials; Jpn. J. Appl. Phys. **59**, SEEA05 1-8 (2020).

(2) B. A. Magill, S. Thapa, J. Holleman, S. McGill, H. Munekata, C. J. Stanton, and G. A. Khodaparast: Magnetic field enhanced detection of coherent phonons in a GaMnAs/GaAs film; Phys. Rev. B **102**, 045306 (2020).

(3) N. Nishizawa and H. Munekata; Lateral-Type Spin-Photonics Devices: Development and Applications: Micromachines **12**, 644 (2021).

(4) N. W. G. Smith, Y. Pleimling, B. A. Magill, R. R. H. H. Mudiyanselage, A. Shenenberger, S. Ogawa, N. Nishizawa, H. Munekata, and G. A. Khodaparast: Probe and control of photo-excited magnetization precession in Co/Pd multilayer films at low laser fluence regime; J. Appl. Phys. **132**, 243902 (2022).