

# PROGRAM

Aug. 31/Room A

## Hyperthermia • Medical applications

9:00 ~ 10:30

Chair: S. Ota (Shizuoka Univ.)

- 31aA-1 Consideration of analysis area of current source estimation by spatial filter in MCG  
°M. Iwai<sup>1</sup>, K. Kobayashi<sup>1</sup>, W. Sun<sup>2</sup> (<sup>1</sup>Iwate Univ., <sup>2</sup>Kinki Univ.)
- 31aA-2 Detection of Magnetic Resonance Signal without Prepolarization Technique in Ultra-low Magnetic Field  
°D. Oyama<sup>1</sup>, S. Shibata<sup>2</sup> (<sup>1</sup>Kanazawa Inst. Tech., <sup>2</sup>RICOH)
- 31aA-3 Differential effects of 60 Hz magnetic fields on anticancer drug potency in human uterine sarcoma cell lines with and without multidrug resistance  
°R. Shibaki<sup>1</sup>, M. Kakikawa<sup>1</sup>, S. Yamada<sup>2</sup> (<sup>1</sup>Kanazawa Univ., <sup>2</sup>Komatsu Univ.)
- 31aA-4 Preparation of spherical (La, Sr)MnO<sub>3</sub> heating mediator for magnetic hyperthermia by electrostatic adsorption  
°K. Yamada<sup>1</sup>, S. Seino<sup>1</sup>, S. Fujieda<sup>1</sup>, A. Yokoi<sup>2</sup>, K. W. Tan<sup>2</sup>, H. Muto<sup>2</sup>, T. Nakagawa<sup>1</sup> (<sup>1</sup>Osaka Univ., <sup>2</sup>Toyohashi Univ. Tech.)
- 31aA-5 Evaluation of magnetic heating efficiency of silica-coated magnetic nanoparticles  
°Y. Kimura, J. Sakurai, S. Hata, C. Oka (Nagoya Univ.)
- 31aA-6 Development of PID-based Automatic Temperature Control System for Magnetic Hyperthermia  
°A. Shikano, L. Tonthat, A. Kuwahata, S. Yabukami (Tohoku Univ.)

## Nanoparticles (High frequency properties)

10:45 ~ 12:15

Chair: L. TON THAT (Tohoku Univ.)

- 31aA-7 Magnetic anisotropy of magnetically fractionated Ferucarbotran  
°M. Ishikawa<sup>1</sup>, S. Ota<sup>2</sup>, S. Trisnanto<sup>1</sup>, T. Yamada<sup>1</sup>, T. Yoshida<sup>3</sup>, Y. Takemura<sup>1</sup>  
(<sup>1</sup>Yokohama National Univ., <sup>2</sup>Shizuoka Univ., <sup>3</sup>Kyushu Univ.)
- 31aA-8 FORC measurement of superparamagnetic nanoparticles with oriented easy axis  
°E. Sasaoka<sup>1</sup>, C. Yang<sup>1,2</sup>, S. B. Trisnanto<sup>1</sup>, I. Kobayashi<sup>1</sup>, T. Yamada<sup>1</sup>, Z. Song<sup>2</sup>, S. Ota<sup>3</sup>, Y. Takemura<sup>1</sup>  
(<sup>1</sup>Yokohama National Univ., <sup>2</sup>Nanjing Vocational Univ. of Industry Technology, <sup>3</sup>Shizuoka Univ.)
- 31aA-9 AC magnetic susceptibility of magnetic nanoparticles whose orientation is controlled by DC magnetic field  
°S. Noguchi<sup>1</sup>, S. B. Trisnanto<sup>1</sup>, T. Yamada<sup>1</sup>, S. Ota<sup>2</sup>, Y. Takemura<sup>1</sup> (<sup>1</sup>Yokohama National Univ., <sup>2</sup>Shizuoka Univ.)
- 31aA-10 Experimental and simulation studies of dynamic MH loop with DC magnetic field of magnetic nanoparticles  
°E. Kita<sup>1</sup>, R. Onodera<sup>2</sup>, M. Kishimoto<sup>1</sup>, H. Yanagihara<sup>1</sup> (<sup>1</sup>Univ. of Tsukuba, <sup>2</sup>NIT, Ibaraki Coll.)
- 31aA-11 Physical rotation of iron oxide magnetic nanoparticles under alternating magnetic field  
°M. Suwa, S. Kawahigashi, S. Tsukahara (Osaka Univ.)
- 31aA-12 Complex magnetization dynamics of Neel and Brownian relaxations in magnetic nanoparticles  
°S. Ota<sup>1</sup>, R. Miyazawa<sup>1</sup>, D. Nagata<sup>2</sup>, M. Futagawa<sup>1</sup>, Y. Takemura<sup>2</sup> (<sup>1</sup>Shizuoka Univ., <sup>2</sup>Yokohama National Univ.)

## Symposium "Recent progress of relationship between magnetism and light"

Chief Organizer: K. Tanabe (Toyota Tech. Inst.), T. Ishibashi (Nagaoka Univ. Tech.)

13:00 ~ 14:30

Chair: K. Tanabe (Toyota Tech. Inst.)

- 31pA-1 Large magneto-optical effects in a non-collinear antiferromagnet and its application for antiferromagnetic spintronics  
°T. Higo (Univ. of Tokyo)
- 31pA-2 Theoretical proposal for control of spin textures and vortices with topological light waves  
°M. Sato (Ibaraki Univ.)
- 31pA-3 Metamaterials and metasurfaces with broken symmetries  
°S. Tomita (Tohoku Univ.)

14:45 ~ 16:45

Chair: T. Ishibashi (Nagaoka Univ. Tech.)

- 31pA-4 Focused-millimeter-wave-assisted magnetic recording based on epsilon iron oxide  
°S. Ohkoshi (Univ. of Tokyo)
- 31pA-5 Development of magnetic holographic memory using artificial magnetic lattice media  
°Y. Nakamura<sup>1</sup>, P. Lim<sup>1</sup>, M. Inoue<sup>1,2</sup> (<sup>1</sup>Toyohashi Univ. Tech., <sup>2</sup>National Inst. Tech.)
- 31pA-6 Near-Infrared Magneto-Refractive Effect for Magnetic Multilayer; GMR film and Ferro./Antiferro. stacked film with Surface Plasmon Resonance  
°S. Saito<sup>1</sup>, H. Uchida<sup>2</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>Toyohashi Univ. Tech.)
- 31pA-7 Faraday effect of nanogranular films  
°N. Kobayashi, K. Ikeda, K. Arai (DENJIKEN)

### Aug. 31/Room B

#### Magnetic properties

9:00 ~ 10:45

Chair: H. Nakayama (AIST)

- 31aB-1 Levitation mechanism of bending electromagnetic suspension for flexible steel plate (Fundamental consideration on vibration characteristics using FDM)  
°R. Miyazaki<sup>1</sup>, K. Funada<sup>1</sup>, K. Ogawa<sup>1</sup>, A. Endo<sup>2</sup>, T. Narita<sup>1</sup>, H. Kato<sup>1</sup> (<sup>1</sup>Tokai Univ., <sup>2</sup>FIT)
- 31aB-2 The effect of atomic disorder in nitrogen-doped FeNi alloys with high magnetic anisotropy  
°Z. Qiao<sup>1,2</sup>, M. Tsujikawa<sup>2,3</sup>, M. Shirai<sup>2,3</sup> (<sup>1</sup>Grad. Sch. of Eng., Tohoku Univ., <sup>2</sup>RIEC, Tohoku Univ., <sup>3</sup>CSRN, Tohoku Univ.)
- 31aB-3 Modification of magnetic anisotropy of La<sub>1-x</sub>Sr<sub>x</sub>MnO<sub>3</sub> thin film/BaTiO<sub>3</sub>(100)  
°S. Ishikawa, S. Komori, K. Imura, T. Taniyama (Nagoya Univ.)
- 31aB-4 Magneto-electric effect of ferroelectric and ferromagnetic oxide laminated films prepared by metal organic decomposition  
°T. Ichinomiya, K. Kamishima, K. Kakizaki (Saitama Univ.)
- 31aB-5 Development of BiFeO<sub>3</sub> based multiferroic thin film materials with large saturation magnetization and perpendicular magnetic anisotropy -Effect of substitution element against Bi on magnetic properties-  
°S. Yoshimura, T. Ozeki, R. Suzuki, K. Takeda, D. Yamamoto, G. Egawa (Akita Univ.)
- 31aB-6 Development of BiFeO<sub>3</sub> based multiferroic thin film materials with large saturation magnetization and perpendicular magnetic anisotropy -Effect of substitution element against Fe on magnetic properties-  
°T. Ozeki, D. Yamamoto, G. Egawa, S. Yoshimura (Akita Univ.)
- 31aB-7 Element-specific magnetic states and magnetic compensation in Mn<sub>2</sub>(Co<sub>1-x</sub>V<sub>x</sub>)Al studied by XMCD  
°J. Okabayashi<sup>1</sup>, T. Tsuchiya<sup>2</sup>, S. Mizukami<sup>2</sup> (<sup>1</sup>Univ. of Tokyo, <sup>2</sup>Tohoku Univ.)

#### Skyrmion and Topological materials

11:00 ~ 12:15

Chair: M. Shirai (Tohoku Univ.)

- 31aB-8 Multiple-valued Memory Utilized Chiral Magnetic Skyrmion  
°J. Watanabe, Y. Nakatani (UEC)
- 31aB-9 Control of magnetic skyrmionium on TbFeCo films  
°S. Kato<sup>1</sup>, K. Ohara<sup>1</sup>, X. Zhang<sup>1</sup>, J. Xia<sup>2</sup>, X. Liu<sup>1</sup> (<sup>1</sup>Shinshu Univ., <sup>2</sup>CUHK)
- 31aB-10 Anomalous Hall effect of noncollinear antiferromagnetic antiperovskite nitrides  
°K. Sonoda, H. Kato, K. Matsuura, B. Qiang, T. Hajiri, K. Ueda, H. Asano (Nagoya Univ.)
- 31aB-11 The Effect of Confinement and Protection of Skyrmions  
°K. Ohara<sup>1</sup>, X. Zhang<sup>1</sup>, Y. Chen<sup>1</sup>, J. Xia<sup>2</sup>, Y. Zhou<sup>2</sup>, X. Liu<sup>1</sup> (<sup>1</sup>Shinshu Univ., <sup>2</sup>CUHK)
- 31aB-12 Configurable pixelated skyrmions on nanoscale grids  
°X. Zhang<sup>1</sup>, J. Xia<sup>1</sup>, K. Shirai<sup>1</sup>, H. Fujiwara<sup>1</sup>, O. A. Tretiakov<sup>2</sup>, M. Ezawa<sup>3</sup>, Y. Zhou<sup>4</sup>, X. Liu<sup>1</sup>  
(<sup>1</sup>Shinshu Univ., <sup>2</sup>UNSW Sydney, <sup>3</sup>Univ. of Tokyo, <sup>4</sup>CUHKSZ)

#### Symposium "New trends in magnetic field application"

Chief Organizer: M. Yamato (Tokyo Metropolitan Univ.)

13:00 ~ 15:00

Chair: N. Hirota (NIMS)

- 31pB-1 Recent progress in magneto-Archimedes levitation  
°Y. Ikezoe (Nippon Inst. Tech.)
- 31pB-2 Electromagnetophoretic microfluidic technique for the separation of micro particles  
°Y. Iiguni (Nagoya Inst. Tech.)

31pB-3 Development of in situ solid-state NMR system for magnetically oriented microcrystal suspensions  
°R. Kusumi (Kyoto Univ.)

31pB-4 Magnetic field effect on the preparation process of carbon materials  
°A. Hamasaki (Shinshu Univ.)

15:15 ~ 16:45

Chair: A. Sugiyama (Yoshino Denka)

31pB-5 Delay of magnetic field-induced martensitic transformation in some ferrous alloys  
Y. Song<sup>1</sup>, °T. Terai<sup>2</sup>, T. Fukuda<sup>2</sup>, Y. Narumi<sup>2</sup>, M. Hagiwara<sup>2</sup>, K. Sato<sup>2</sup>, M. Sugiyama<sup>2</sup>, T. Kakeshita<sup>3</sup>  
(<sup>1</sup>Tohoku Univ., <sup>2</sup>Osaka Univ., <sup>3</sup>Fukui Univ. Tech.)

31pB-6 Dynamic hysteresis measurement of a magnetic nano particle suspension under a DC bias magnetic field  
°R. Onodera<sup>1</sup>, E. Kita<sup>1,2</sup>, H. Yanagihara<sup>2</sup> (<sup>1</sup>NIT, Ibaraki Coll., <sup>2</sup>Univ. of Tsukuba)

31pB-7 In-field annealing for precipitation of magnetic alloys  
°Y. Mitsui<sup>1</sup>, M. Onoue<sup>1</sup>, S. Kuzuhara<sup>2</sup>, W. Ito<sup>2</sup>, K. Koyama<sup>1</sup> (<sup>1</sup>Kagoshima Univ., <sup>2</sup>NIT, Sendai Coll.)

### Aug. 31/Room C

#### Magnetic recording media

13:00 ~ 14:45

Chair: T. Tanaka (Kyushu Univ.)

31pC-1 Analysis of film thickness dependence of degree of order and perpendicular magnetic anisotropy energy for FePt granular film with structural inhomogeneity  
°T. Saito<sup>1</sup>, K. Tham<sup>2</sup>, R. Kushibiki<sup>2</sup>, T. Ogawa<sup>1</sup>, S. Saito<sup>1</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>TANAKA)

31pC-2 Evaluation of magnetocrystalline anisotropy energy of FePt grains in FePt granular film including FePt grains with *c*-axes parallel to the film plane  
°T. Saito<sup>1</sup>, K. Tham<sup>2</sup>, R. Kushibiki<sup>2</sup>, T. Ogawa<sup>1</sup>, S. Saito<sup>1</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>TANAKA)

31pC-3 Effect of FePt-C nucleation layer on *c*-axes orientation and perpendicular magnetic anisotropy energy for FePt-C / FePt-oxide stacked granular media  
°K. Tham<sup>1</sup>, T. Saito<sup>2</sup>, R. Kushibiki<sup>1</sup>, S. Saito<sup>2</sup> (<sup>1</sup>TANAKA, <sup>2</sup>Tohoku Univ.)

31pC-4 Evaluation of crystalline texture for thin film magnetic recording media utilizing two-dimensional X-ray Detector  
°D. Miyazaki<sup>1</sup>, T. Ogawa<sup>1</sup>, I. Tagawa<sup>2</sup>, S. Saito<sup>1</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>Tohoku Inst. Tech.)

31pC-5 Magnetic properties of nanoparticles produced by RTA from an ultra - thin Fe film sandwiched between SiO<sub>x</sub> and SiN  
°K. Komatsuda, H. Yoshikawa, A. Tsukamoto (Nihon Univ.)

31pC-6 Thermal activation on microwave assisted magnetization switching in Co/Pt nanodot arrays  
°S. Mizutani, N. Kikuchi, M. Hatayama, T. Shimatsu, S. Okamoto (Tohoku Univ.)

31pC-7 Effect of Dot Volume on Recording Performance in 3D HAMR Bit Patterned Media  
°H. Yamane, S. J. Greaves, Y. Tanaka (Tohoku Univ.)

#### Simulation of magnetization dynamics

15:00 ~ 16:45

Chair: C. Mitsumata (NIMS)

31pC-8 Minus Spin-Polarization Tri-Layer STO for MAMR  
°I. Tagawa (Tohoku Inst. Tech.)

31pC-9 Micromagnetic analysis of Dual FGL STO  
°R. Itagaki<sup>1</sup>, Y. Kanai<sup>1</sup>, S. Greaves<sup>2</sup> (<sup>1</sup>Niigata Inst. Tech., <sup>2</sup>Tohoku Univ.)

31pC-10 Dependence of MAS and signal recording characteristics on layer anisotropy structure for multilayer media  
°K. Kurihara<sup>1</sup>, X. Ya<sup>1</sup>, K. Kawakami<sup>1</sup>, Y. Kanai<sup>2</sup>, T. Tanaka<sup>1</sup> (<sup>1</sup>Kyushu Univ., <sup>2</sup>Niigata Inst. Tech.)

31pC-11 Microwave-assisted magnetization reversal analysis based on static energy approximation method  
°K. Kawakami, K. Kurihara, X. Ya, T. Tanaka (Kyushu Univ.)

31pC-12 Simulation of the switching rate of STT-MRAM  
°K. Kawakami, Y. Nakatani (UEC)

31pC-13 A Study of Low Current Recording for Parallel Magnetic Nanowire Memory using Recording Metal Wires  
°K. Ogura, N. Nakatani, M. Takahashi, N. Ishii, Y. Miyamoto (NHK STRL)

31pC-14 Master structure dependence of magnetic printing performance by utilizing double magnet mater media  
°T. Komine (Ibaraki Univ.)

**Aug. 31/Room D**

**Power magentics (Inductor) 9:15 ~ 10:00 Chair: A. Endo (Fukuoka Inst. Tech.)**

- 31aD-1 Orthogonal-core-type Variable Inductor consisted of Cut-core and Laminated-core  
°T. Sato<sup>1</sup>, K. Nakamura<sup>1</sup>, T. Ohinata<sup>2</sup>, K. Arimatsu<sup>2</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>Tohoku Electric Power)
- 31aD-2 Fabrication of magnetic ultrafine particle embedded porous alumina for power inductor and their properties  
°T. Hamada<sup>1</sup>, Y. Endo<sup>2</sup>, K. Yabumoto<sup>1</sup>, M. Ishitobi<sup>1</sup>, A. Tayaoka<sup>3</sup>, N. Fujita<sup>1</sup>  
(<sup>1</sup>NIT, Nara Coll., <sup>2</sup>Tohoku Univ., <sup>3</sup>NIT, Kitakyusyu Coll.)
- 31aD-3 Air-core Inductor with High Energy Density and Low Loss  
°I. Masuda<sup>1</sup>, E. Asahina<sup>1</sup>, K. Maeda<sup>2</sup>, M. Ishitobi<sup>1</sup> (<sup>1</sup>NIT, Nara Coll., <sup>2</sup>DAIHEN)

**Power magentics (Magnetic actuator) 10:30 ~ 12:00 Chair: K. Nakamura(Tohoku Univ.)**

- 31aD-4 A study on ANC system for ultra-compact EV by using giant magnetostrictive actuator(Fundamental consideration on output characteristics of road noise range)  
°T. Kato<sup>1</sup>, T. Kitamura<sup>1</sup>, F. Maehara<sup>1</sup>, H. Nakayama<sup>1</sup>, A. Endo<sup>2</sup>, H. Kato<sup>1</sup>, T. Narita<sup>1</sup> (<sup>1</sup>Tokai Univ., <sup>2</sup>FIT)
- 31aD-5 A Study on Linear actuator installed on cylinder head  
°Y. Majima<sup>1</sup>, J. Kuroda<sup>1</sup>, R. Suzuki<sup>1</sup>, A. Endo<sup>2</sup>, T. Narita<sup>1</sup>, H. Kato<sup>1</sup> (<sup>1</sup>Tokai Univ., <sup>2</sup>FIT)
- 31aD-6 Development of electromagnetic guideway for seamless ultra-thin steel plate (Basic consideration of damping effect on electromagnet installation position)  
°R. Nakasuga<sup>1</sup>, K. Ogawa<sup>1</sup>, A. Endo<sup>2</sup>, T. Narita<sup>1</sup>, H. Kato<sup>1</sup> (<sup>1</sup>Tokai Univ., <sup>2</sup>FIT)
- 31aD-7 Electromagnetic levitation and transportation system for bent thin steel plate (Fundamental consideration on acted position of electromagnetic force)  
°A. Shiina<sup>1</sup>, S. Kayama<sup>1</sup>, B. Muhammad Nur Hakimi<sup>1</sup>, K. Ogawa<sup>1</sup>, A. Endo<sup>2</sup>, T. Narita<sup>1</sup>, H. Kato<sup>1</sup> (<sup>1</sup>Tokai Univ., <sup>2</sup>FIT)
- 31aD-8 Development of electromagnetic levitation system for thin steel plate with electromagnets and permanent magnets(Fundamental consideration on acted position of tension)  
°S. Kayama<sup>1</sup>, B. Muhammad Nur Hakimi<sup>1</sup>, A. Shiina<sup>1</sup>, K. Ogawa<sup>1</sup>, A. Endo<sup>2</sup>, T. Narita<sup>1</sup>, H. Kato<sup>1</sup> (<sup>1</sup>Tokai Univ., <sup>2</sup>FIT)
- 31aD-9 Electromagnetic levitation system for flexible steel plate using magnetic field from horizontal direction (fundamental consideration on vibration characteristic in levitating)  
°A. Endo<sup>1</sup>, S. Kayama<sup>2</sup>, A. Shiina<sup>2</sup>, B. Muhammad Nur Hakimi<sup>2</sup>, K. Ogawa<sup>2</sup>, T. Narita<sup>2</sup>, H. Kato<sup>2</sup> (<sup>1</sup>FIT, <sup>2</sup>Tokai Univ.)

**Power magentics (Motor I ) 13:00 ~ 14:15 Chair: K. Tajima (Akita Univ.)**

- 31pD-1 Examination of Restarting Torque of Induction/Synchronous Magnetic Gears  
°Y. Mizuana<sup>1</sup>, K. Nakamura<sup>1</sup>, Y. Suzuki<sup>2</sup>, Y. Tachiya<sup>2</sup>, K. Kuritani<sup>2</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>Prospine)
- 31pD-2 Cogging Torque Reduction of Integer Gear Ratio Magnetic Gear by Applying Unbalanced Pole-Pieces  
°B. Dai<sup>1</sup>, K. Nakamura<sup>1</sup>, Y. Suzuki<sup>2</sup>, Y. Tachiya<sup>2</sup>, K. Kuritani<sup>2</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>Prospine)
- 31pD-3 A Consideration of Power Factor and Efficiency if IPM-type Magnetic Geared Motor  
°K. Ito, K. Nakamura (Tohoku Univ.)
- 31pD-4 Basic Characteristics of Transverse-Flux-type Switched Reluctance Motor with Permanent Magnets applying Reverse Bias Magnetic Field  
°A. Nagai, K. Mitsuya, K. Nakamura (Tohoku Univ.)
- 31pD-5 Characteristics Investigation of SMC-based SR Motor Manufactured by using Wire Electric Discharge Machining  
°K. Mitsuya, K. Nakamura (Tohoku Univ.)

**Power magentics (Motor II ) 14:30 ~ 15:30 Chair: M. Sonehara (Shinshu Univ.)**

- 31pD-6 Prototype Evaluation of Inset PM Motor made of NANOMET Laminated Core  
°Y. Yu<sup>1</sup>, S. Hiramoto<sup>2</sup>, K. Nakamura<sup>1</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>Tohoku Magnet Institute Co., Ltd.)
- 31pD-7 Outer-Rotor-type High-Speed PM motor with Segmented-shaped Rotor  
°S. Sakurai, Y. Uchiyama, K. Nakamura (Tohoku Univ.)
- 31pD-8 Experimental Study of Losses of Axial-Flux-type Switched Reluctance Motor for Compact EV  
°K. Sato, K. Nakamura (Tohoku Univ.)

**Sep. 1/Room A****Nanoparticles (Imaging) 9:00 ~ 10:30** Chair: M. Suwa (Osaka Univ.)

- 01aA-1 Magnetic particle imaging using magnetoresistive sensor  
°S. Trisnanto<sup>1</sup>, T. Kasajima<sup>2</sup>, T. Akushichi<sup>2</sup>, Y. Takemura<sup>1</sup> (<sup>1</sup>Yokohama National Univ., <sup>2</sup>TDK)
- 01aA-2 Design of gradient magnetic field coil using superconducting tape for human body size MPI  
°M. Yoshimoto<sup>1</sup>, H. Morioka<sup>1</sup>, T. Sasayama<sup>1</sup>, Y. Takemura<sup>2</sup>, T. Yoshida<sup>1</sup> (<sup>1</sup>Kyushu Univ., <sup>2</sup>Yokohama National Univ.)
- 01aA-3 Imaging technique of magnetic nanoparticles using pulse magnetic field  
°S. Tanaka<sup>1</sup>, H. Hirano<sup>1</sup>, M. Futagawa<sup>1</sup>, Y. Takemura<sup>2</sup>, S. Ota<sup>1</sup> (<sup>1</sup>Shizuoka Univ., <sup>2</sup>Yokohama National Univ.)
- 01aA-4 Comparison of the application results of various spatial filters in magnetic nanoparticle tomography  
°N. Okamura, K. Higashino, T. Sasayama, T. Yoshida (Kyushu Univ.)
- 01aA-5 Surface design of iron-oxide nanoparticles for intracerebral magnetic particle imaging  
°S. Seino<sup>1</sup>, H. Ikehata<sup>1</sup>, M. Tanabe<sup>1</sup>, T. Umeda<sup>2</sup>, T. Tomiyama<sup>2</sup>, A. Tanaka<sup>3</sup>, T. Sakane<sup>3</sup>, K. Yamauchi<sup>4</sup>, K. Nomura<sup>4</sup>,  
S. Tonooka<sup>4</sup>, A. Izawa<sup>5</sup>, S. Fujieda<sup>1</sup>, T. Nakagawa<sup>1</sup>  
(<sup>1</sup>Osaka Univ., <sup>2</sup>Osaka City Univ., <sup>3</sup>Kobe Pharm. Univ., <sup>4</sup>MITSUBISHI, <sup>5</sup>Nihon Medi-Physics)
- 01aA-6 Evaluation of magnetic particle magnetization characteristics for high sensitivity Magnetic Particle Imaging  
°K. Nomura<sup>1</sup>, K. Yamauchi<sup>1</sup>, M. Washino<sup>1</sup>, T. Matsuda<sup>1</sup>, Y. Okada<sup>1</sup>, Y. Susumu<sup>1</sup>, S. Seino<sup>2</sup>, T. Nakagawa<sup>2</sup>, T. Kiwa<sup>3</sup>,  
S. Tonooka<sup>1</sup> (<sup>1</sup>MITSUBISHI, <sup>2</sup>Osaka Univ., <sup>3</sup>Okayama Univ.)

**Nanoparticles (Bio-sensing) 10:45 ~ 12:00** Chair: D. Oyama (Kanazawa Inst. Tech.)

- 01aA-7 Basic study of the effect of magnetic dipole interaction on magnetization properties of magnetic nanoparticles  
°K. Ikeda, T. Sasayama, T. Yoshida (Kyushu Univ.)
- 01aA-8 Discrimination of solid and liquid phase states of magnetic nanoparticles using harmonic spectra.  
°J. Goto, S. Yamamura, K. Enpuku, T. Yoshida (Kyushu Univ.)
- 01aA-9 Development of magnetic immunoassay for detection of liquid tumor cells  
°M. Tsubota, K. Yamashita, K. Kishimoto, H. Kuroda, J. Wang, K. Sakai, T. Kiwa (Okayama Univ.)
- 01aA-10 Measurement of multiple bacteria species using magnetic nanoparticles by switching magnetic field  
°S. Takahashi<sup>1</sup>, H. Onodera<sup>2</sup>, T. Murayama<sup>2</sup>, L. Tonthat<sup>1</sup>, K. Okita<sup>2</sup>, A. Kuwahata<sup>1</sup>, S. Yabukami<sup>1,2</sup>, W. Ohtsubo<sup>1</sup>, K. Yokota<sup>1</sup>,  
<sup>2</sup>M. Huruya<sup>1</sup>, H. Kanetaka<sup>1</sup>, Y. Miura<sup>3</sup>, H. Takahashi<sup>3</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>Tohoku Gakuin Univ., <sup>3</sup>JNS)
- 01aA-11 Evaluation of antigen-antibody reaction of magnetic nanoparticles with directly adsorbed antibodies  
°T. Yoneyama<sup>1</sup>, T. Murayama<sup>2</sup>, L. Tonthat<sup>1</sup>, A. Kuwahata<sup>1</sup>, S. Yabukami<sup>1</sup>, Y. Sato<sup>3</sup>, Y. Teramura<sup>4</sup>, W. Ohtsubo<sup>1</sup>, T. Ogawa<sup>1</sup>  
(<sup>1</sup>Tohoku Univ., <sup>2</sup>Tohoku Gakuin Univ., <sup>3</sup>Univ. of Tokyo, <sup>4</sup>AIST)

**Symposium "Medical applied research of Biomagnetics"** Chief Organizer: K. Kobayashi (Iwate Univ.)**13:00 ~ 15:30** Chair: K. Kobayashi (Iwate Univ.)

- 01pA-1 History and progress of biomagnetic measurement  
°Y. Uchikawa (Tokyo Denki Univ.)
- 01pA-2 Magnetocardiography predictors of premature ventricular contractions origin in LVOT vs. RVOT  
°W. Sun<sup>1</sup>, M. Iwai<sup>2</sup>, K. Kobayashi<sup>2</sup> (<sup>1</sup>Kindai Univ., <sup>2</sup>Iwate Univ.)
- 01pA-3 Novel functional imaging methods by Magnetospinography and Magnetoneurography  
°T. Watanabe<sup>1</sup>, S. Kawabata<sup>2</sup>, Y. Adachi<sup>3</sup>, J. Hashimoto<sup>2</sup>, K. Sekihara<sup>2</sup>, M. Akaza<sup>2</sup>, Y. Miyano<sup>1</sup>, Y. Okada<sup>1</sup>, A. Okawa<sup>2</sup>  
(<sup>1</sup>Ricoh, <sup>2</sup>Tokyo Med. Dent. Univ., <sup>3</sup>Kanazawa Inst. Tech.)
- 01pA-4 Usefulness and prospects of magnetic materials and magnetic probes in surgery of breast cancer  
°K. Taruno<sup>1</sup>, M. Sekino<sup>2</sup>, A. Kuwahata<sup>2,3</sup>, S. Nakamura<sup>1</sup>, K. Enokido<sup>1</sup>, T. Kurita<sup>4</sup>, H. Takei<sup>4</sup>, M. Kusakabe<sup>2,5</sup>  
(<sup>1</sup>Showa Univ., <sup>2</sup>Univ. of Tokyo, <sup>3</sup>Tohoku Univ., <sup>4</sup>Nippon Med. Sch. HP, <sup>5</sup>Matrix Cell Research Inst.)
- 01pA-5 Hyperthermia using functional magnetic nanoparticles  
°A. Ito (Nagoya Univ.)

Sep. 1/Room B

Topological insulator, Mn compounds and anomalous Nernst effect

9:00 ~ 10:30

Chair: K. Yamada (Gifu Univ.)

- 01aB-1 Voltage-control of magnetic properties in topological-insulator/magnetic-insulator bilayers  
°T. Chiba<sup>1</sup>, A. O. Leon<sup>2</sup>, T. Komine<sup>3</sup> (<sup>1</sup>NIT, Fukushima Coll., <sup>2</sup>Metropolitan Tech. Univ., <sup>3</sup>Ibaraki Univ.)
- 01aB-2 Current-driven magnetic domain motion in magnetic nanowire with topological insulator BiSb  
°N. Nakatani<sup>1</sup>, M. Takahashi<sup>1</sup>, K. Ogura<sup>1</sup>, N. Ishii<sup>1</sup>, N. H. Pham<sup>2,3</sup>, Y. Miyamoto<sup>1,3</sup> (<sup>1</sup>NHK, <sup>2</sup>Tokyo Inst. Tech., <sup>3</sup>JST-CREST)
- 01aB-3 Laser pulse induced spin precessional dynamics and spin mixing conductance in Co<sub>2</sub>MnSi/Pt  
°Y. Sasaki<sup>1</sup>, Y. Takahashi<sup>1</sup>, S. Kasai<sup>1,2</sup> (<sup>1</sup>NIMS, <sup>2</sup>JST-PREST)
- 01aB-4 Magnetization switching driven by spin-orbit torque from a Co<sub>2</sub>MnGa magnetic Weyl semimetal thin film  
°K. Tang<sup>1,2</sup>, Z. Wen<sup>1</sup>, Y. Lau<sup>3</sup>, H. Sukegawa<sup>1</sup>, T. Seki<sup>3</sup>, S. Mitani<sup>1,2</sup> (<sup>1</sup>NIMS, <sup>2</sup>Univ. of Tsukuba, <sup>3</sup>Tohoku Univ.)
- 01aB-5 Anomalous Nernst effect dependence on composition in Fe<sub>100-x</sub>Rh<sub>x</sub> alloys  
°T. Yamauchi, Y. Hamada, Y. Kurokawa, H. Yuasa (Kyushu Univ.)
- 01aB-6 Enhancement of transverse Seebeck coefficient using semiconductor/ferromagnetic metal multilayer  
°R. Kitaura<sup>1</sup>, T. Ishibe<sup>1</sup>, H. Sharma<sup>2</sup>, M. Mizuguchi<sup>2,3</sup>, Y. Nakamura<sup>1</sup> (<sup>1</sup>Osaka Univ., <sup>2</sup>Tohoku Univ., <sup>3</sup>Nagoya Univ.)

Tunnel magnetoresistance

10:45 ~ 12:00

Chair: H. Tanigawa (Sony semiconductor)

- 01aB-7 Theoretical study for unconventional (111)-oriented magnetic tunnel junctions  
°K. Masuda<sup>1</sup>, H. Itoh<sup>2</sup>, Y. Sonobe<sup>1</sup>, H. Sukegawa<sup>1</sup>, S. Mitani<sup>1</sup>, Y. Miura<sup>1</sup> (<sup>1</sup>NIMS, <sup>2</sup>Kansai Univ.)
- 01aB-8 Fe/MgO/Fe(001): Observation of tunnel magnetoresistance exceeding 400% at room temperature and 900% at low temperature  
T. Scheike, Q. Xiang, Z. Wen, °H. Sukegawa, T. Ohkubo, K. Hono, S. Mitani (NIMS)
- 01aB-9 Improved bias-voltage dependence of magnetoresistance by tri-layered tunnel barrier of MgO and MgAl<sub>2</sub>O<sub>4</sub>  
°K. Nawa<sup>1,2</sup>, K. Masuda<sup>2</sup>, Y. Miura<sup>2</sup> (<sup>1</sup>Mie Univ., <sup>2</sup>NIMS)
- 01aB-10 Dielectric breakdown characteristics of lattice-matched MgAl<sub>2</sub>O<sub>4</sub>-based magnetic tunnel junctions  
°H. Sukegawa<sup>1</sup>, Z. Wen<sup>1</sup>, S. Kasai<sup>1</sup>, A. Kumar<sup>1</sup>, T. Ohkubo<sup>1</sup>, K. Hono<sup>1</sup>, S. Mitani<sup>1</sup>, S. Ichikawa<sup>2</sup>, K. Nakada<sup>2</sup> (<sup>1</sup>NIMS, <sup>2</sup>TDK)
- 01aB-11 Fabrication of tunnel magnetoresistance devices with even-function type resistance-field response  
°T. Nakatani, P. D. Kulkarni, H. Iwasaki, Y. Sakuraba (NIMS)

Spin transfer torque

13:00 ~ 14:00

Chair: Y. Kurokawa (Kyushu Univ.)

- 01pB-1 Effect of high  $T_C$  interface layer on the thermally assisted STT switching of high  $T_C$  / low  $T_C$  hybrid memory layer  
°W. Zhao<sup>1</sup>, T. Kato<sup>1</sup>, D. Oshima<sup>1</sup>, S. Iwata<sup>2</sup> (<sup>1</sup>Nagoya Univ., <sup>2</sup>NISRI)
- 01pB-2 Computer simulation of AFC structure effect for small MTJ II  
°H. Kimura, Y. Nakatani (UEC)
- 01pB-3 Zero field oscillation in spin torque oscillator  
°S. Tsunegi<sup>1,2</sup>, K. Yakushiji<sup>1</sup>, A. Fukushima<sup>1</sup>, S. Yuasa<sup>1</sup>, H. Kubota<sup>1</sup> (<sup>1</sup>AIST, <sup>2</sup>JST-PREST)
- 01pB-4 Analysis of a spin-torque oscillator using injection locking to a microwave magnetic field  
°H. Suto<sup>1</sup>, N. Asam<sup>1</sup>, S. Tamaru<sup>2</sup>, H. Sepehri-Amin<sup>1</sup>, A. Bolyachkin<sup>1</sup>, W. Zhou<sup>1</sup>, T. Nakatani<sup>1</sup>, H. Kubota<sup>2</sup>, Y. Sakuraba<sup>1</sup> (<sup>1</sup>NIMS, <sup>2</sup>AIST)

Spin orbit torque

14:15 ~ 15:15

Chair: M. Tanaka (Nagoya Inst. Tech.)

- 01pB-5 Investigation of current-induced magnetization switching in CoFeB/Tb-Fe wire for both high magnetoresistance and low operating current density  
°M. Fujimoto, U. Kamihoki, Y. Kurokawa, H. Yuasa (Kyushu Univ.)
- 01pB-6 Spin-orbit torque in a Ni-Fe single layer  
°T. Seki, Y. Lau, S. Iihama, K. Takanashi (Tohoku Univ.)



- 01pB-7 Antisymmetric interlayer exchange interaction in Pt/Co/Ir/Co/Pt with in-plane spatial inversion breaking  
 °H. Masuda<sup>1</sup>, T. Seki<sup>1,2,3</sup>, Y. Yamane<sup>4,5</sup>, R. Modak<sup>2</sup>, K. Uchida<sup>1,2,3</sup>, Jun'ichi Ieda<sup>6</sup>,  
 Y. Lau<sup>1,3</sup>, S. Fukami<sup>3,5,7,8</sup>, K. Takanashi<sup>1,3,8</sup>  
 (<sup>1</sup>IMR, Tohoku Univ., <sup>2</sup>NIMS, <sup>3</sup>CSRN, Tohoku Univ., <sup>4</sup>FRIS, Tohoku Univ., <sup>5</sup>RIEC, Tohoku Univ.,  
<sup>6</sup>ASRC, JAEA, <sup>7</sup>WPI-AIMR, Tohoku Univ., <sup>8</sup>CSIS, Tohoku Univ.)
- 01pB-8 Change of spin-orbit torques with uniaxial in-plane magnetic anisotropy in Py/Pt bilayers on a single-crystal Y-cut 128°  
 LiNbO<sub>3</sub> substrate.  
 °M. Ito<sup>1</sup>, A. Yamaguchi<sup>2</sup>, D. Oshima<sup>3</sup>, T. Kato<sup>3</sup>, M. Shima<sup>1</sup>, K. Yamada<sup>1</sup> (<sup>1</sup>Gifu Univ., <sup>2</sup>Univ. Hyogo, <sup>3</sup>Nagoya Univ.)

### Sep. 1/Room C

**Noise suppression and shield** **9:15 ~ 10:30** Chair: M. Sato (Shinshu Univ.)

- 01aC-1 Modification of transformer coupled permeameter for wider bandwidth  
 °S. Tamaru (AIST)
- 01aC-2 Physical mechanism of bimodal complex permeability spectrum of a noise-suppression sheet  
 °T. Igarashi<sup>1</sup>, S. Tamaru<sup>2</sup>, N. Kikuchi<sup>3</sup>, S. Yoshida<sup>3</sup>, S. Okamoto<sup>3</sup> (<sup>1</sup>TOKIN, <sup>2</sup>AIST, <sup>3</sup>Tohoku Univ.)
- 01aC-3 Size dependence of complex permeability spectrum of Fe single flakes  
 °T. Onuma<sup>1</sup>, T. Igarashi<sup>2</sup>, S. Tamaru<sup>3</sup>, N. Kikuchi<sup>1</sup>, S. Yoshida<sup>1</sup>, S. Okamoto<sup>1</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>TOKIN, <sup>3</sup>AIST)
- 01aC-4 FMR frequency shift of a magnetic sheet caused by RF current crowding in transmission line  
 °M. Yamaguchi, Y. Miyazawa (Tohoku Univ.)
- 01aC-5 New EMI Shielding Layer with Magnetic Multilayer for sub-100MHz Frequency Range  
 °A. Kikitsu<sup>1</sup>, Y. Kurosaki<sup>1</sup>, S. Shirotori<sup>1</sup>, A. Fujita<sup>2</sup>, H. Nishigaki<sup>2</sup>, S. Matsunaka<sup>2</sup> (<sup>1</sup>Toshiba, <sup>2</sup>Shibaura Mechatronics)

**High frequency and striction measurement** **10:45 ~ 11:45** Chair: S. Tamaru (AIST)

- 01aC-6 Evaluation of high frequency vibration characteristics of inverse magnetostrictive effect type strain sensor  
 °R. Takano<sup>1</sup>, K. Ishiyama<sup>1</sup>, T. Hoshi<sup>2</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>Pixie Dust Technologies)
- 01aC-7 Evaluation of Measurement System for Magnetostriction of Magnetics Alloy Ribbons  
 °O. Mori<sup>1</sup>, S. Sato<sup>1</sup>, R. Utsumi<sup>1</sup>, Y. Endo<sup>2</sup> (<sup>1</sup>Toei Scientific Industrial, <sup>2</sup>Tohoku Univ.)
- 01aC-8 Study of measurement error of ferromagnetic resonance frequency using Microstrip Line-Type Probe  
 °K. Takagi<sup>1</sup>, T. Ishihara<sup>1</sup>, K. Okita<sup>1</sup>, C. Iwasaki<sup>1</sup>, S. Yabukami<sup>1</sup>, M. Yamaguchi<sup>1</sup>, K. Chatani<sup>2</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>TOKIN)
- 01aC-9 Circuit parameter estimation of MSL with magnetic film using magnetic circuit analysis  
 °T. Mikami, S. Muroga, M. Tanaka (Akita Univ.)

**Magnetic sensor** **13:00 ~ 14:30** Chair: K. Ishiyama (Tohoku Univ.)

- 01pC-1 Impedance change ratio of miniaturized single layer thin film MI element  
 °M. Tanii, H. Kikuchi (Iwate Univ.)
- 01pC-2 Vehicle Traffic Measurement and Vehicle Type Estimation Algorithm Using Highly Stable MI Sensor  
 °R. Yao, T. Uchiyama (Nagoya Univ.)
- 01pC-3 Analysis of coplanar line type thin film magnetic field sensor by electromagnetic field simulation  
 °T. Ishihara<sup>1</sup>, H. Uetake<sup>2</sup>, C. Iwasaki<sup>1</sup>, S. Yabukami<sup>1</sup>, M. Yamaguchi<sup>1</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>DENJIKEN)
- 01pC-4 Effects of fall time of excitation pulse current on output voltage for magnetic sensor with amorphous wire  
 °T. Kaneko, F. Akagi (Kogakuin Univ.)
- 01pC-5 Output pulse voltage of Wiegand wire excited by AC magnetic field at high frequency  
 °F. Eto, T. Yamada, Y. Takemura (Yokohama National Univ.)
- 01pC-6 Receiving coils with cores using Wiegand wire and high permeability material  
 °S. Kawazoe, Y. Kawade, T. Yamada, Y. Takemura (Yokohama National Univ.)

### Sep. 1/Room D

**NdFeB** **9:15 ~ 10:30** Chair: T. Nishiuchi (Hitachi Metals)

- 01aD-1 Effect of deposition temperature on anisotropy of Nd-Fe-B magnet films made by modified two-step process  
 °H. Nakajima<sup>1</sup>, K. Furusawa<sup>1</sup>, T. Uchida<sup>1</sup>, K. Koike<sup>1</sup>, H. Kato<sup>1</sup>, N. Inaba<sup>1</sup>, M. Itakura<sup>2</sup>, Y. Saito<sup>3</sup>, S. Okubo<sup>3</sup>, H. Ota<sup>3</sup>  
 (<sup>1</sup>Yamagata Univ., <sup>2</sup>Kyushu Univ., <sup>3</sup>Kobe Univ.)

- 01aD-2 Change in magnetic domain structure of Nd-Fe-B sintered magnets due to combined effect of heating and compressive stress  
<sup>o</sup>K. Tamura<sup>1</sup>, N. Eguchi<sup>1</sup>, Y. Morimoto<sup>1</sup>, M. Takezawa<sup>1</sup>, N. Matsumoto<sup>2</sup> (<sup>1</sup>Kyushu Inst. Tech., <sup>2</sup>MITSUBISHI)
- 01aD-3 Core-shell grain structure and coercivity in Nd-La-Ce-Fe-B magnet powders prepared by d-HDDR process  
<sup>o</sup>R. Shimbo, M. Yamazaki, C. Mishima (Aichi Steel)
- 01aD-4 Effect of Dy substitution on the coercivity in Nd-Fe-B magnets ---atomistic model analysis---  
<sup>o</sup>M. Nishino<sup>1</sup>, H. Hayasaka<sup>1</sup>, S. Miyashita<sup>2</sup> (<sup>1</sup>NIMS, <sup>2</sup>Univ. of Tokyo)
- 01aD-5 Study on angular dependent coercivity in Nd-Fe-B magnets by an atomistic model approach  
<sup>o</sup>H. Hayasaka<sup>1</sup>, M. Nishino<sup>1</sup>, S. Miyashita<sup>1,2</sup> (<sup>1</sup>NIMS, <sup>2</sup>ISSP)

#### Ferrite • Rare-earth free

10:45 ~ 12:00

Chair: T. Horikawa (Aichi Steel)

- 01aD-6 Study on the turn angle of helical magnetism in hexagonal ferrite Ba(Fe<sub>1-x</sub>Sc<sub>x</sub>)<sub>12</sub>O<sub>19</sub>  
<sup>o</sup>K. Maruyama<sup>1</sup>, S. Tanaka<sup>1</sup>, S. Utsumi<sup>1</sup>, R. Kiyanagi<sup>2</sup>, A. Nakao<sup>3</sup>, K. Moriyama<sup>3</sup>, Y. Ishikawa<sup>3</sup>  
 (<sup>1</sup>Tokyo Univ. Sci., Suwa, <sup>2</sup>JAEA, <sup>3</sup>CROSS)
- 01aD-7 Verification of Co site preference of La-Co-substituted M-type ferrite by first-principles calculation  
<sup>o</sup>R. Kobayashi<sup>1</sup>, T. Waki<sup>1</sup>, H. Ohta<sup>2</sup>, H. Ikeno<sup>3</sup>, Y. Tabata<sup>1</sup>, H. Nakamura<sup>1</sup>  
 (<sup>1</sup>Kyoto Univ., <sup>2</sup>Doshisha Univ., <sup>3</sup>Osaka Pref. Univ.)
- 01aD-8 Local structure analysis of Cu<sub>x</sub>Co<sub>1-x</sub>Fe<sub>2</sub>O<sub>4</sub> by XAFS measurement  
<sup>o</sup>T. Nakagawa, M. Hisamatsu, S. Fujieda, S. Seino, T. A. Yamamoto (Osaka Univ.)
- 01aD-9 Crystal distortion due to Jahn-Teller effect and change in magnetic properties of Mn<sub>x</sub>CoFe<sub>2-x</sub>O<sub>4</sub>  
<sup>o</sup>H. Kashiwagi, S. Fujieda, S. Seino, T. Nakagawa (Osaka Univ.)
- 01aD-10 Novel hard magnetic compound with Zr<sub>11.5</sub>Fe<sub>53</sub>Si<sub>35.5</sub> composition.  
<sup>o</sup>H. Yamamoto, K. Ueda, I. Kitagawa (Hitachi)

#### Sep. 1/Fellow lecture Room

##### Fellow lecture

15:30 ~ 17:00

Chair: T. Kondo (KIOXIA)

- 01FL-1 Advance and Future of Magnetics & Optics Research  
<sup>o</sup>N. Ota (Univ. of Tsukuba)
- 01FL-2 Perpendicular Magnetic Anisotropy of Multilayers and Ordered Alloy Films and Their Application to Recording Media  
<sup>o</sup>S. Iwata (NISRI)
- 01FL-3 A Tricolor Flag of Research: Freedom, Forgiveness, and Insight  
<sup>o</sup>H. Munekata (Tokyo Inst. Tech.)

#### Sep. 2/Room A

##### Magnetic imaging

9:45 ~ 10:45

Chair: T. Ishibashi (Nagaoka Univ. Tech.)

- 02aA-1 DC magnetic field imaging of permanent magnets using an alternating magnetic force microscopy  
<sup>o</sup>K. Miura, H. Tanaka, T. Matsumura, H. Saito (Akita Univ.)
- 02aA-2 Evaluation of magnetic field response of Co-GdOx superparamagnetic tip in microwave frequency region by alternating magnetic force microscopy  
<sup>o</sup>S. Sato, T. Matsumura, H. Saito (Akita Univ.)
- 02aA-3 Simulation study of analysis of magnetic easy axis direction of single domain particles for magnetic imaging by alternating magnetic force microscopy  
<sup>o</sup>K. Murakami, A. Takada, T. Matsumura, H. Saito (Akita Univ.)
- 02aA-4 Theory of DC magnetic field imaging by using an alternating magnetic force microscopy  
<sup>o</sup>H. Saito, K. Miura, H. Tanaka, T. Matsumura (Akita Univ.)

##### Magneto-optical effect

11:00 ~ 12:00

Chair: S. Saito (Tohoku Univ.)

- 02aA-5 Three-dimensional distribution measurement of magnetic field vector by magneto-optical imaging  
<sup>o</sup>H. Sakaguchi<sup>1</sup>, S. Wada<sup>2</sup>, T. Matsumura<sup>2</sup>, H. Saito<sup>2</sup>, T. Ishibashi<sup>1</sup> (<sup>1</sup>Nagaoka Univ. Tech., <sup>2</sup>Akita Univ.)
- 02aA-6 Evaluation method of soft magnetic materials by difference image of magnetic domain structure.  
<sup>o</sup>R. Araki, T. Kohashi (Hitachi)



- 02aA-7 Clarification of reconstructed image in magneto-optical 3D holographic display using microlens array  
 °Y. Ito<sup>1</sup>, S. Yamagishi<sup>1</sup>, Y. Yamamoto<sup>1</sup>, H. Horimai<sup>2</sup>, T. Goto<sup>1</sup>, Y. Nakamura<sup>1</sup>, P. B. Lim<sup>1</sup>, M. Inoue<sup>3</sup>, H. Uchida<sup>1</sup>  
 (<sup>1</sup>Toyohashi Univ. Tech., <sup>2</sup>Holymine, <sup>3</sup>NIT)
- 02aA-8 Development of Magnetic-Domain Imaging Techniques in Polycrystalline Materials by Scanning Transmission Electron Microscopy  
 °Y. O. Murakami<sup>1</sup>, T. Seki<sup>1</sup>, A. Kinoshita<sup>2</sup>, T. Shoji<sup>2</sup>, Y. Ikuhara<sup>1,3</sup>, N. Shibata<sup>1,3</sup> (<sup>1</sup>Univ. of Tokyo, <sup>2</sup>TOYOTA Motor, <sup>3</sup>JFCC)

### Symposium "Prospects for ultra-sensitive magnetic sensor devices with sub-pico-tesla detectivity"

Chief Organizer: Y. Ando (Tohoku Univ.)

13:00 ~ 14:30

Chair: H. Iwasaki (NIMS)

- 02pA-1 Development of highly sensitive TMR based sensor  
 °M. Oogane<sup>1</sup>, K. Fujiwara<sup>2</sup>, S. Kumagai<sup>2</sup>, H. Matsuzaki<sup>2</sup>, Y. Ando<sup>1</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>Spin Sensing Factory Corp.)
- 02pA-2 High sensitive magnetic sensor using symmetric response GMR  
 °Y. Higashi, A. Kikitsu, Y. Kurosaki, S. Shirotori (Toshiba)
- 02pA-3 New model of FM-OFG magnetometer with 1-pT noise floor  
 °I. Sasada (Kyushu Univ.)

14:45 ~ 16:45

Chair: T. Nakatani (NIMS)

- 02pA-4 Development of highly sensitive magnetoimpedance sensor system towards for sub-pico-tesla resolution  
 °T. Uchiyama, J. Ma (Nagoya Univ.)
- 02pA-5 High-frequency drive type thin film sensor using coplanar line type structure and for biomedical application  
 °S. Yabukami (Tohoku Univ.)
- 02pA-6 Diamond quantum sensor towards robust biosensing  
 °Y. Masuyama (QST)
- 02pA-7 Approaches to noise reduction of optically pumped magnetometers  
 °Y. Ito, T. Kobayashi (Kyoto Univ.)

### Sep. 2/Room B

#### Thin film and layered materials

13:00 ~ 14:45

Chair: M. Kotsugi (Tokyo Univ. Sci.)

- 02pB-1 Temperature Dependence of Specific Heat of  $\text{EuSn}_2\text{As}_2$ , a 2D Antiferromagnetic Compound  
 °W. Lee, R. Sakagami, K. Hirata, M. Matoba, Y. Kamihara (Keio Univ.)
- 02pB-2 Structure and magnetic properties of metal-ordered NiAs-type pnictides  
 °T. Murakami<sup>1</sup>, S. Saito<sup>1</sup>, H. Kageyama<sup>2</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>Kyoto Univ.)
- 02pB-3 Detection of the Morin transition in impurity doped hematite films using spin Hall magnetoresistance  
 °M. Tanaka, K. Yokoyama, K. Ishii, K. Fujii, A. Furuta, K. Mibu (Nagoya Inst. Tech.)
- 02pB-4 Fabrication of CoCrPt-based magnetic/electric force microscope tip and observation of domain structure of ferromagnetic/ferroelectric thin films using the tip  
 °G. Egawa, R. Hosoya, N. Oshita, S. Yoshimura (Akita Univ.)
- 02pB-5 Magnetic properties and crystal structures of organic-inorganic layered cinnamoyl cobalt hydroxides  
 °K. Saito<sup>1</sup>, K. Ichimura<sup>1</sup>, A. Yasuta<sup>1</sup>, T. Kida<sup>2</sup>, M. Hagiwara<sup>2</sup>, Z. Honda<sup>1</sup> (<sup>1</sup>Saitama Univ., <sup>2</sup>Osaka Univ.)
- 02pB-6 Magnetic Characteristics of Iron-based Superconductor  $\text{SmFeAsO}_{0.77}\text{H}_{0.14}$   
 °T. Kawamatsu, R. Hotchi, M. Matoba, Y. Kamihara (Keio Univ.)
- 02pB-7 Synthesis of polycrystalline  $\text{EuSn}_2\text{P}_2$   
 °Z. Liu, R. Sakagami, Y. Kamihara (Keio Univ.)

#### Magnetic domain observation and magneto-optics

15:00 ~ 16:45

Chair: J. Okabayashi (Univ. of Tokyo)

- 02pB-8 Analysis of magnetic and mechanical mechanisms of ferromagnetic shape memory alloys based on extended free energy model  
 °S. Sato<sup>1</sup>, Ryohei Sen'i<sup>1</sup>, A. L. Foggiatto<sup>1</sup>, K. Masuzawa<sup>1</sup>, C. Mitsumata<sup>2</sup>, M. Kotsugi<sup>1</sup> (<sup>1</sup>Tokyo Univ. Sci., <sup>2</sup>NIMS)

- 02pB-9 Analysis of the coercivity mechanism of YIG based on the extended Landau free energy model  
 °K. Masuzawa<sup>1</sup>, S. Kunii<sup>1</sup>, S. Sato<sup>1</sup>, A. L. Foggiatto<sup>1</sup>, C. Mitsumata<sup>2</sup>, M. Kotsugi<sup>1</sup> (<sup>1</sup>Tokyo Univ. Sci., <sup>2</sup>NIMS)
- 02pB-10 Classification of magnetization reversal process and extraction of hidden parameter using persistent homology  
 °S. Kunii<sup>1</sup>, F. L. Alexandre<sup>1</sup>, C. Mitsumata<sup>2</sup>, M. Kotsugi<sup>1</sup> (<sup>1</sup>Tokyo Univ. Sci., <sup>2</sup>NIMS)
- 02pB-11 Characterization of cobalt ferrite thin films by magneto-optical spectroscopy  
 °S. Wang<sup>1</sup>, M. Nishikawa<sup>1</sup>, H. Yanagihara<sup>2</sup>, T. Ishibashi<sup>1</sup> (<sup>1</sup>Nagaoka Univ. Tech., <sup>2</sup>Univ. of Tsukuba)
- 02pB-12 Magneto-optical effect in nanogranular films with epsilon near zero matrix  
 <authors>°K. Ikeda<sup>1</sup>, T. Liu<sup>2</sup>, Y. Ota<sup>3</sup>, S. Iwamoto<sup>2,4</sup>, N. Kobayashi<sup>1</sup>  
 (<sup>1</sup>DENJIKEN, <sup>2</sup>RCAST, Univ. of Tokyo, <sup>3</sup>Keio Univ., <sup>4</sup>IIS. Univ. of Tokyo)
- 02pB-13 Polar Kerr activities on surface plasmon system consisting of CoPt perpendicular magnetic films  
 °H. Yamane<sup>1</sup>, S. Yanase<sup>1</sup>, M. Kobayashi<sup>2</sup>, Y. Yasukawa<sup>2</sup> (<sup>1</sup>AIT, <sup>2</sup>Chiba Inst. Tech.)
- 02pB-14 The dynamic magnetization of Bi:YIG thin film by measurement of Faraday effect  
 °S. Yoshida, T. Takase, K. Yamaguchi (Fukushima Univ.)

## Sep. 2/Room C

### Magnetostriction and vibration power generation 9:15 ~ 10:30 Chair: K. Fujisaki (Toyota Tech. Inst.)

- 02aC-1 Study of vibration power generation using ferromagnetic superelastic alloy  
 °K. Ozawa, S. Hashi, K. Ishiyama (Tohoku Univ.)
- 02aC-2 Magnetic flux density change of grain-oriented electromagnetic steel on vibration power generation device  
 °S. Fujieda<sup>1</sup>, T. Okada<sup>1</sup>, S. Hashi<sup>2</sup>, K. Ishiyama<sup>3</sup>, S. Suzuki<sup>3</sup>, S. Seino<sup>1</sup>, T. Nakagawa<sup>1</sup>, T. A. Yamamoto<sup>1</sup>  
 (<sup>1</sup>Osaka Univ., <sup>2</sup>Tohoku Gakuin Univ., <sup>3</sup>Tohoku Univ.)
- 02aC-3 Design of nanocrystalline soft magnetic material with large magnetostriction  
 °K. Sano<sup>1</sup>, T. Tomita<sup>2</sup>, C. Oka<sup>1</sup>, J. Sakurai<sup>1</sup>, T. Yamazaki<sup>1</sup>, S. Hata<sup>1</sup> (<sup>1</sup>Nagoya Univ., <sup>2</sup>TMI)
- 02aC-4 Effects of local magnetostriction in nanocrystalline soft magnetic materials  
 °H. Tsukahara<sup>1,2</sup>, H. Imamura<sup>2</sup>, C. Mitsumata<sup>3</sup>, K. Suzuki<sup>4</sup>, K. Ono<sup>1,5</sup> (<sup>1</sup>KEK, <sup>2</sup>AIST, <sup>3</sup>NIMS, <sup>4</sup>Monash Univ., <sup>5</sup>Osaka Univ.)
- 02aC-5 Structural, Magnetic, and Magnetostrictive Properties of Fe-Co Alloy Films Prepared by Electroplating  
 °Y. Nakamura<sup>1</sup>, S. Aketa<sup>1</sup>, H. Kondo<sup>1</sup>, M. Ohtake<sup>1</sup>, T. Kawai<sup>1</sup>, M. Futamoto<sup>1</sup>, F. Kirino<sup>2</sup>, N. Inaba<sup>3</sup>  
 (<sup>1</sup>Yokohama National Univ., <sup>2</sup>Tokyo Univ. of Arts, <sup>3</sup>Yamagata Univ.)

### Processing for soft magnet materials 10:45 ~ 12:00 Chair: T. Sato (Shinshu Univ.)

- 02aC-6 Influence of Annealing Temperature on Structure and Magnetic Properties of Pure Fe Ribbons  
 Y. Endo<sup>1</sup>, °X. Ma<sup>1</sup>, R. Umetsu<sup>1</sup>, T. Miyazaki<sup>1</sup>, S. Mikami<sup>2</sup>, T. Hiraki<sup>2</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>TOHO ZINC)
- 02aC-7 Magnetic characteristics of pure iron thin film manufactured by planer flow casting and cold rolling process  
 °J. Tanase<sup>1</sup>, T. Uemura<sup>1,2</sup>, E. Tsuchida<sup>2</sup>, T. Takeuchi<sup>1</sup>, K. Fujisaki<sup>1</sup> (<sup>1</sup>Toyota Tech. Inst., <sup>2</sup>Maruyoshi Kogyo)
- 02aC-8 Magnetic Properties and Reliability of Fe-Based Nano-crystalline Materials by Heat Treatment in Magnetic Field  
 °H. Sakuma<sup>1</sup>, S. Yazawa<sup>1</sup>, H. Watanabe<sup>2</sup>, K. Niizuma<sup>1</sup> (<sup>1</sup>Nihon Univ., <sup>2</sup>TOSEI INDUSTRIAL)
- 02aC-9 Synthesis of interstitial co-addition  $\alpha''$ -Fe<sub>16</sub>(N, C)<sub>2</sub> particles - Proposal of the synthesis method for new Fe-based interstitial compound by gas-solid reactions  
 °M. Tobise<sup>1</sup>, Y. Nomura<sup>2</sup>, M. Kodama<sup>2</sup>, S. Saito<sup>1</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>TAIYO NIPPON SANSO)
- 02aC-10 Synthesis of Fe-Mn alloy nanoparticles using metal carbonyl mixed precursor and its magnetic properties  
 T. Ogawa, °T. Yoshida, S. Saito (Tohoku Univ.)

### Film and composite soft magnet materials 13:00 ~ 14:00 Chair: S. Fujieda (Osaka Univ.)

- 02pC-1 Temperature dependence of the FMR spectra of Ferromagnetic Zinc Ferrite  
 °N. Adachi, K. Naniwa, Y. Nakata, K. Sinkai (Nagoya Inst. Tech.)
- 02pC-2 Structural and Magnetic Properties of Fe-B-N Alloy Films Formed on MgO(001) Single-Crystal Substrates  
 °Y. Maeda<sup>1</sup>, K. Imamura<sup>1</sup>, M. Ohtake<sup>1</sup>, T. Kawai<sup>1</sup>, M. Futamoto<sup>1</sup>, F. Kirino<sup>2</sup>, N. Inaba<sup>3</sup>  
 (<sup>1</sup>Yokohama National Univ., <sup>2</sup>Tokyo Univ. of Arts, <sup>3</sup>Yamagata Univ.)
- 02pC-3 Fabrication and evaluation of Fe based nanocrystalline sphere powder composite core  
 °S. Kimura, N. Kawada, M. Sonehara, T. Sato (Shinshu Univ.)

- 02pC-4 CoZrO nanogranular films for high frequency operation prepared by facing targets sputtering  
 °K. Kawahara<sup>1</sup>, T. Kaneko<sup>1</sup>, T. Yasuda<sup>2</sup>, J. Tanase<sup>2</sup>, Y. Takamura<sup>1</sup>, K. Fujisaki<sup>2</sup>, S. Nakagawa<sup>1</sup>  
 (<sup>1</sup>Tokyo Inst. Tech., <sup>2</sup>Toyota Tech. Inst.)

## Sep. 2/Room D

### High anisotropy films 9:00 ~ 10:30 Chair: Y. Shiratsuchi (Osaka Univ.)

- 02aD-1 Fabrication of variant-free (110)-oriented L1<sub>0</sub>-FeNi films by a denitriding method  
 °T. Ichimura<sup>1</sup>, K. Ito<sup>1</sup>, T. Nishio<sup>2</sup>, H. Kura<sup>2</sup>, H. Yanagihara<sup>3</sup>, K. Takanashi<sup>1</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>DENSO, <sup>3</sup>Univ. of Tsukuba)
- 02aD-2 First-principles calculations of magnetic anisotropy constant in Fe<sub>2</sub>Ni<sub>2</sub>C and Fe<sub>2</sub>Ni<sub>2</sub>N  
 °Y. Kota<sup>1</sup>, A. Sakuma<sup>2</sup> (<sup>1</sup>NIT, Fukushima Coll., <sup>2</sup>Tohoku Univ.)
- 02aD-3 High Through-put Exploration and Fabrication of Large Magnetic Anisotropy Materials Using Machine Learning  
 °D. Furuya<sup>1</sup>, T. Nakao<sup>1</sup>, H. Saito<sup>1</sup>, K. Uda<sup>1</sup>, Y. Miura<sup>2</sup>, M. Kotsugi<sup>1</sup> (<sup>1</sup>Tokyo Univ. Sci., <sup>2</sup>NIMS)
- 02aD-4 Ordering of CoPt in CoPt multilayer thin films on Al<sub>2</sub>O<sub>3</sub>(0001) single-crystal substrates  
 °R. Toyama<sup>1</sup>, S. Kawachi<sup>2,3,4</sup>, J. Yamaura<sup>2,3</sup>, Y. Murakami<sup>3</sup>, H. Hosono<sup>2</sup>, Y. Majima<sup>1,2</sup>  
 (<sup>1</sup>MSL, Tokyo Tech, <sup>2</sup>MCES, Tokyo Tech, <sup>3</sup>IMSS, KEK, <sup>4</sup>Graduate School of Science, Univ. of Hyogo)
- 02aD-5 Influence of Film Thickness on the Structural and Magnetic Properties of Epitaxial Mn-Al Alloy Thin Films  
 °S. Noro<sup>1</sup>, K. Nakano<sup>1</sup>, M. Ohtake<sup>1</sup>, M. Futamoto<sup>1</sup>, T. Kawai<sup>1</sup>, F. Kirino<sup>2</sup>, N. Inaba<sup>3</sup>  
 (<sup>1</sup>Yokohama National Univ., <sup>2</sup>Tokyo Univ. of Arts, <sup>3</sup>Yamagata Univ.)
- 02aD-6 Effect of surface free energy on the growth mode of FePt epitaxial thin films  
 °I. Suzuki, H. Sepehri-Amin, Y. K. Takahashi, K. Hono (NIMS)

### Surface and Interface 10:45 ~ 12:00 Chair: I. Suzuki (NIMS)

- 02aD-7 Biquadratic magnetic coupling dependence on material of spacer and temperature  
 °C. Liu, N. Hashimoto, S. Horiike, Y. Kurokawa, H. Yuasa (Kyushu Univ.)
- 02aD-8 Influence of antiferromagnetic ordering on exchange bias and superparamagnetic blocking temperature in ferromagnetic/antiferromagnetic thin film  
 °Y. Shiratsuchi, Y. Tao, K. Toyoki, R. Nakatani (Osaka Univ.)
- 02aD-9 The effects of optical interference layer thickness on photo-excited ultrafast magnetization response  
 °T. Takahashi, D. Tajima, H. Yoshikawa, A. Tsukamoto (Nihon Univ.)
- 02aD-10 Electrical conductivity measurements of NiFe-Cu nanocubes with ferromagnetic probes  
 °H. Sakuma<sup>1</sup>, R. Takeuchi<sup>1</sup>, H. Sakakura<sup>2</sup>, M. Takeda<sup>2</sup>, S. B. Trisnanto<sup>2</sup>, S. Ota<sup>3</sup>, Y. Takemura<sup>2</sup>  
 (<sup>1</sup>Utsunomiya Univ., <sup>2</sup>Yokohama National Univ., <sup>3</sup>Shizuoka Univ.)
- 02aD-11 STM and UPS study of Organic Molecule - Magnetic Metal Hetero Structures  
 °T. K. Yamada (Chiba Univ.)

### Granular and Nanoparticles 13:00 ~ 14:15 Chair: Y. Endo (Tohoku Univ.)

- 02pD-1 Faraday effect of (Fe-Pt, Co-Pt)-fluoride nanogranular films  
 °N. Kobayashi, T. Iwasa, K. Ikeda, K. Arai (DENJIKEN)
- 02pD-2 Shape effect of granule of lateral nanogranular films on ferromagnetic and superparamagnetic properties  
 °H. Aoki<sup>1</sup>, K. Uchikoshi<sup>1</sup>, S. Ohnuma<sup>1,2</sup>, N. Kobayashi<sup>2</sup>, H. Masumoto<sup>1</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>DENJIKEN)
- 02pD-3 Development of strain sensor with granular film 2  
 °S. Ueno<sup>1</sup>, K. Temma<sup>1</sup>, T. Uwabe<sup>1</sup>, Y. Fujiwara<sup>1</sup>, D. Oshima<sup>2</sup>, T. Kato<sup>2</sup>, M. Jimbo<sup>3</sup> (<sup>1</sup>Mie Univ., <sup>2</sup>Nagoya Univ., <sup>3</sup>Daido Univ.)
- 02pD-4 Mössbauer study and magnetic relaxation of frozen magnetic fluid  
 °E. Kita<sup>1,2</sup>, R. Onodera<sup>2</sup>, M. Kishimoto<sup>1</sup>, H. Yanagihara<sup>1</sup> (<sup>1</sup>Univ. of Tsukuba, <sup>2</sup>NIT, Ibaraki Coll.)
- 02pD-5 Analysis of magnetic vortex formation of cubic Fe<sub>3</sub>O<sub>4</sub> submicron particles by FORCs method  
 °E. Nomura<sup>1</sup>, S. Kobayashi<sup>1</sup>, C. Noda<sup>1</sup>, J. Manjanna<sup>2</sup> (<sup>1</sup>Iwate Univ., <sup>2</sup>Rani Channamma Univ.)

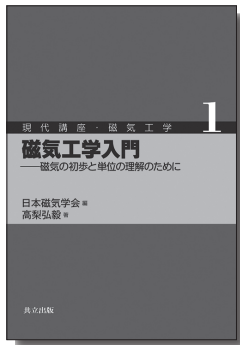
### Alloy 14:30 ~ 15:45 Chair: H. Aoki (Tohoku Univ.)

- 02pD-6 The evaluation of crystal structure and Néel temperature of C11<sub>b</sub> Cr<sub>2</sub>Al thin films  
 °K. Toyoki, S. Hamaguchi, Y. Shiratsuchi, R. Nakatani (Osaka Univ.)

- 02pD-7 Epitaxial Growth of Fe-N Thin Films on MgO and SrTiO<sub>3</sub> Single-Crystal Substrates of (001) Orientation  
°K. Imamura<sup>1</sup>, Y. Maeda<sup>1</sup>, M. Ohtake<sup>1</sup>, M. Futamoto<sup>1</sup>, T. Kawai<sup>1</sup>, F. Kirino<sup>2</sup>, N. Inaba<sup>3</sup>  
(<sup>1</sup>Yokohama National Univ., <sup>2</sup>Tokyo Univ. of Arts, <sup>3</sup>Yamagata Univ.)
- 02pD-8 Structural and Magnetic Properties of Co-Ni Alloy Films Prepared by Electroplating  
°S. Aketa<sup>1</sup>, Y. Nakamura<sup>1</sup>, H. Kondo<sup>1</sup>, M. Ohtake<sup>1</sup>, T. Kawai<sup>1</sup>, M. Futamoto<sup>1</sup>, F. Kirino<sup>2</sup>, N. Inaba<sup>3</sup>  
(<sup>1</sup>Yokohama National Univ., <sup>2</sup>Tokyo Univ. of Arts, <sup>3</sup>Yamagata Univ.)
- 02pD-9 Dependence of structure and static and dynamic magnetic properties of Fe-Ga-C thin films on C composition  
°S. Muramatsu, T. Miyazaki, Y. Endo (Tohoku Univ.)
- 02pD-10 Study on Static and Dynamic Magnetic Properties of Co-Fe-B Thin Film with Various Co Compositions  
H. Tanaka<sup>1</sup>, T. Miyazaki<sup>1</sup>, S. Hashi<sup>2</sup>, °Y. Endo<sup>1</sup> (<sup>1</sup>Tohoku Univ., <sup>2</sup>Tohoku Gakuin Univ.)

## [日本磁気学会 編]

### 現代講座・磁気工学



【各巻：A5判・上製本】

学部上級生から修士・若手技術者を主対象に、新機軸の研究対象と基礎的要素を結びつける重要な基礎理論を丁寧に解説。教科書や解説書など幅広く活用できる。

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第223回	2019年5月21日	磁性分野におけるマテリアルズインフォマティクスの現状
第224回	2019年7月29日	磁気キャパシタンス効果の新展開
第225回	2019年11月15日	超伝導応用最前線
第226回	2020年1月17日	スピン × センサ × IoT
第227回	2020年9月28日	X線とレーザーの融合による磁性ダイナミクス
第228回	2020年10月26日	磁気計測を利用した非破壊検査技術とインフラ診断応用
第229回	2020年11月11日	テラヘルツ領域におけるスピントロニクス研究の現状と展望
第230回	2020年12月22日	高度スマートグリッドシステム実現のための磁気センサ技術
第231回	2021年3月30日	磁気が拓くイノベーション
第232回	2021年5月12日	磁場の時空間制御と弱磁性物質への応用

日本磁気学会 学術講演会概要集

第43回	2019年9月25日～27日 京都大学
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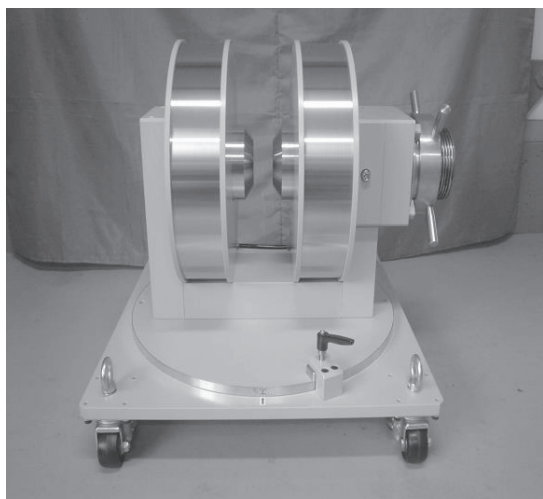
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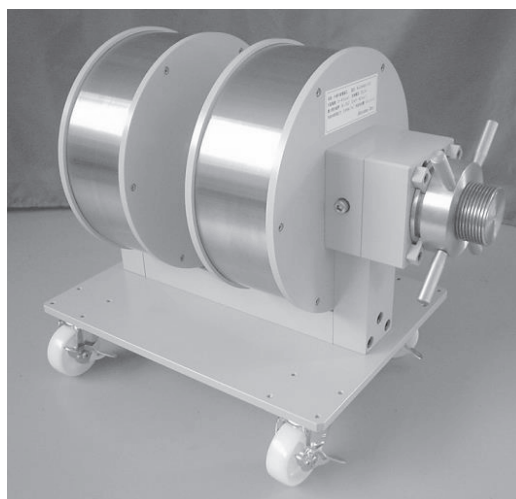
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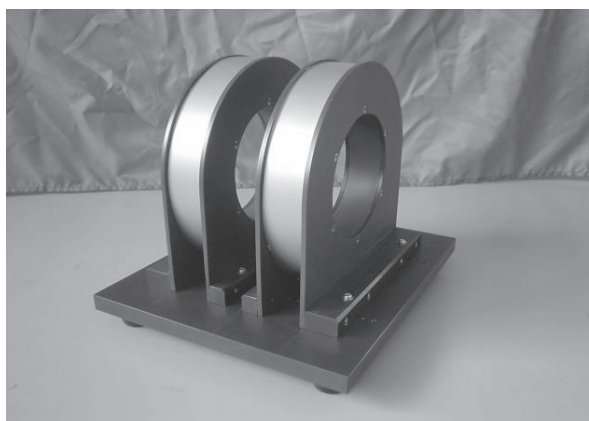
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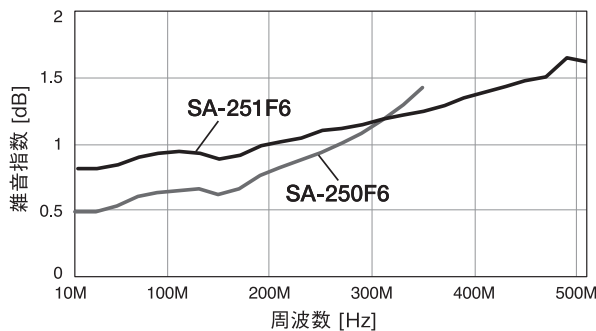
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## 電流アンプ

利得

**100G (V/A)**

周波数帯域

**DC ~ 2kHz**

### ■最高100G (V/A) 高利得と広帯域を両立

10M/100M/1G/10G/100G (V/A) の5種類の利得をラインナップ

### ■センサ・接続ケーブルの容量に対して安定

### ■低雑音 ■ローパスフィルタ出力装備

## 2機種新登場


 SA-251F6  
500 MHz

 SA-250F6  
250 MHz

### Application

- NMR 用電磁波センサ
- 量子コンピュータにおける超電導デバイス
- SQUID センサ

## 新登場


 SA-608F2  
100 G V/A

### Application

- フォトダイオード、磁気ピックアップの出力増幅
- 電子顕微鏡／走査型電子顕微鏡の検出器として

株式会社 エヌエフ回路設計ブロック

 本社/横浜市港北区綱島東6-3-20 〒223-8508  
 営業 TEL 045-545-8111 FAX 045-545-8191

## テクニカルセミナー Online

微小信号測定ノウハウや測定器の使いこなしなど、さまざまなテーマをオンラインでわかりやすく解説。

 ▶ 詳細は [www.nfcorp.co.jp](http://www.nfcorp.co.jp)

# 世界初! 高温超電導型VSM

新製品

TOEI

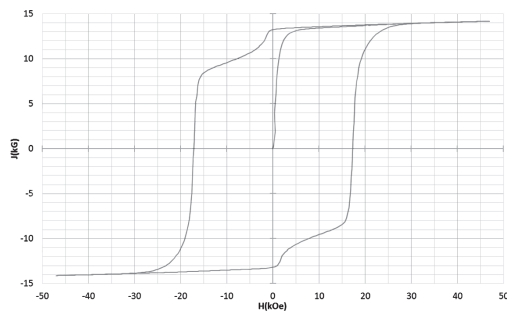
世界初\*、高温超電導マグネットをVSMに採用することで  
測定速度 当社従来機 1/20 を実現。

0.5mm cube 磁石のBr, HcJ 高精度測定が可能と  
なりました。

\*2014年7月 東英工業調べ

## 測定結果例

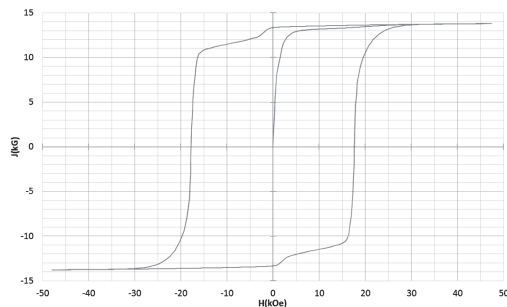
高温超電導VSMによるNdFeB(sint.) 0.5mm cube BHカーブ



磁化測定レンジ: 0.2emu

Br = 13.2kG      HcJ = 17.2kOe

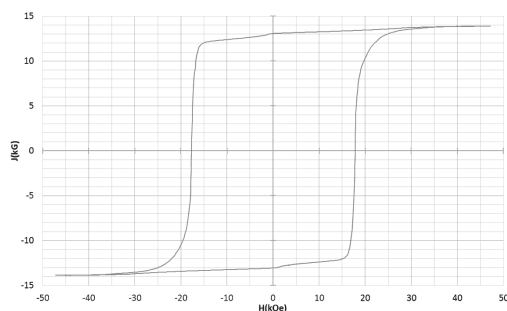
高温超電導VSMによるNdFeB(sint.) 1mm cube BHカーブ



磁化測定レンジ: 2emu

Br = 13.3kG      HcJ = 17.7kOe

高温超電導VSMによるNdFeB(sint.) 4mm cube BHカーブ



磁化測定レンジ: 100emu

Br = 13.1kG      HcJ = 17.8kOe



## 高速測定を実現

高温超電導マグネット採用により、高速測定を  
実現しました。Hmax = 5Tesla, Full Loop 測定が  
2分で可能です。

(当社従来機: Full Loop 測定 40分)

## 小試料のBr, HcJ 高精度測定

0.5mm cube 磁石のBr, HcJ 高精度測定ができ、  
表面改質領域を切り出しBr, HcJの強度分布等、  
微小変化量の比較測定が可能です。

また、試料の加工劣化の比較測定が可能です。

## 試料温度可変測定

-50°C ~ +200°C 温度可変UNIT (オプション)

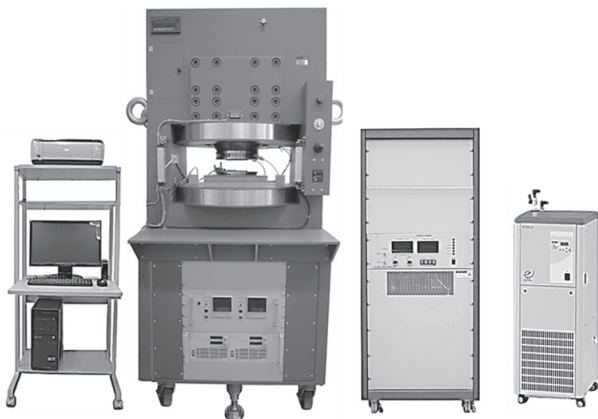
## 磁界発生部の小型化

マグネットシステム部寸法: 0.8m × 0.3m × 0.3m

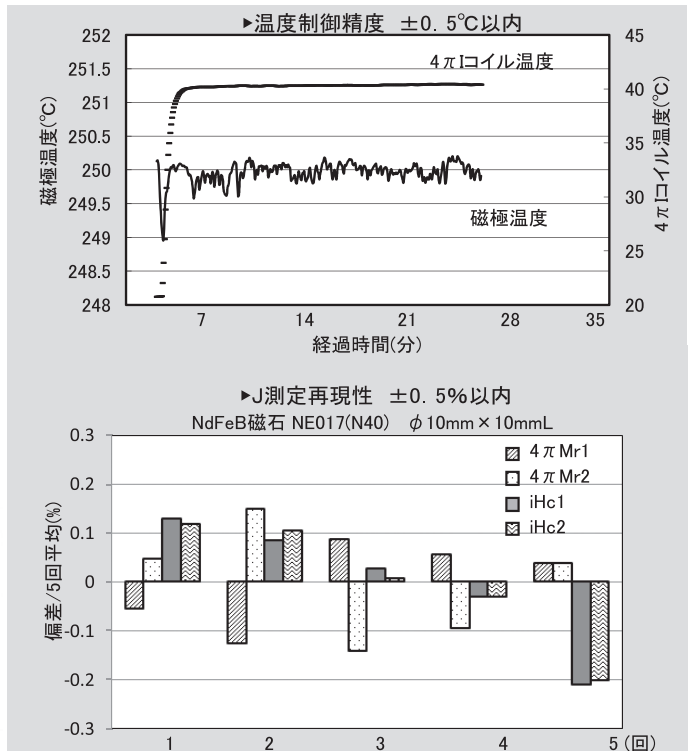


## 最大磁界発生±2.7T 250°C温度測定対応 B-Hカーブトレーサ

- ▶最大磁界発生±2.7T
- ▶室温～250°C温度可変対応：
  - 室温～250°Cまで温度制御精度±0.5%
  - 磁極直接温度可変
  - 40°Cからも対応可能
- ▶安定した測定再現性：
  - J測定再現性±0.5%
- ▶磁極間隔電導可変で扱いやすく、サンプルデータの管理がしやすい装置

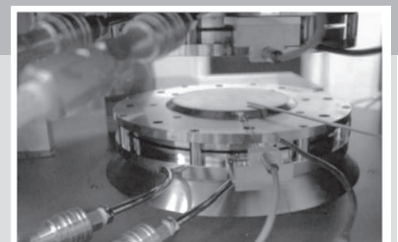


▶2.7T発生250°C温度測定可能 B-Hカーブトレーサ構成例  
同タイプ常設デモ機有 サンプル測定可能



### — 玉川製作所製B-Hカーブトレーサの特長 —

電磁石メーカーの強みを活かし、装置由来の測定誤差を最小限に抑えたB-Hカーブトレーサに特化した電磁石を開発し、高再現性を実現。  
温度制御装置は室温測定同様にサンプルを電磁石磁極へ直接のはさみ込みを可能とし、反磁界の影響を受けにくい測定が可能。  
電磁石用電源は各象限間の掃引が極めてスムーズに行えるバイポーラ直流定電流電源、積分器はドリフトが少なく、また経時的変化に強く管理を行いやすいLakeShore製480型を採用。

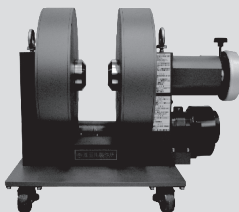


温度測定用磁極

## 電磁石

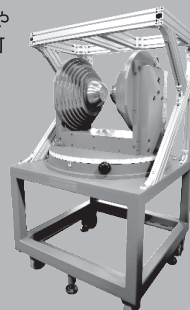
オーダーメイド品を得意としております、磁界発生装置をご検討の際は御気軽にご相談ください。  
実験用途に合わせた電磁石および超電導コイルの製作を行います、ご要望をお聞かせください。

発生磁界: 1.2T(Gap10mm)  
空冷式で冷却水不使用  
連続通電可能



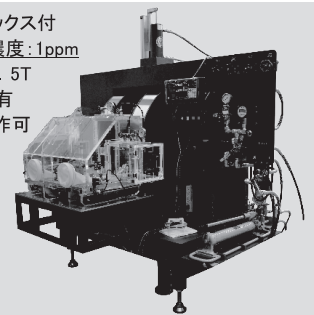
▶横型片可変式電磁石  
立て型や両可変式に変更可能

磁極にスリットや  
孔開け加工も可



▶特殊型電磁石(回転台付)  
X線やKerr効果測定に最適

グローブボックス付  
酸素濃度: 1ppm  
発生磁界: 2.5T  
常設デモ機有  
サンプル試作可



▶磁場中成形油圧プレス機用電磁石  
低酸素・高磁界にて磁性粉成形が可能

株式会社玉川製作所

〒982-0014 宮城県仙台市太白区大野田三丁目10-19

TEL:022-247-5671 FAX:022-249-3648

E-mail:sales@tamakawa.co.jp URL:http://www.tamakawa.co.jp

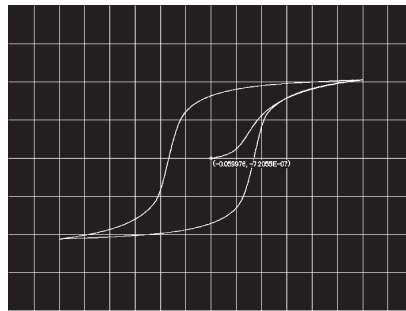
## 磁気特性アナライザ

### BH-1000

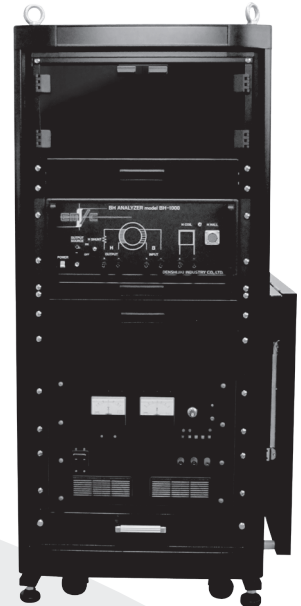
軟磁性材料に最適！

測定モード

- ・ 直流磁化特性
- ・ 非履歴磁化特性
- ・ 偏磁磁化特性
- ・ 交流磁化特性



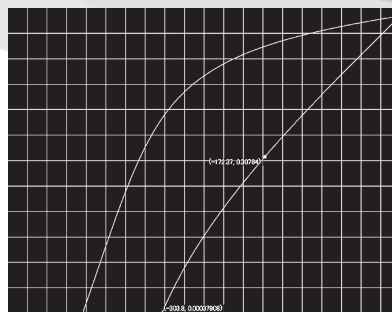
軟磁性材料（ソフト材）の各種磁化特性を測定。オリジナルサンプリング方式を採用し、ドリフトレスを実現。任意波形によるマイナーループなどの実環境下での測定が可能。



硬磁性材料に最適！

測定モード

- ・ 直流磁化特性
- ・ 高保磁力材料減磁特性



硬質磁性材料（ハード材）の各種磁気特性を測定。オプションで軟磁性材料測定機能も搭載可能。BH-1000と同様、ドリフトレス。減磁曲線のリコイル透磁率算出に役立つ任意波形機能も標準搭載。



### BH-1000H

※カタログの仕様及び外観等は、改良の為予告なしに変更する場合がございます。