

## **Commission K (Electromagnetics in Biology & Medicine) Activity Report 2011-2012**

November 6<sup>th</sup>, 2012 By Yasuhiko Jimbo

### **1 Activity**

#### **1.1 1<sup>st</sup> preparatory meeting of Japanese URSI-Commission K for 22<sup>nd</sup> term of the Science Council of Japan**

- ◆ Date: December 19, 2011
- ◆ Place: Tokyo Metropolitan University's Akihabara satellite campus, Tokyo
- ◆ Topics:
  - Improvement of the proposal list of the members of Japanese URSI-Commission K for the 22nd term of the Science Council of Japan: Among the member, Prof. Yasuhiko Jimbo (The University of Tokyo) was elected as the nominee of the committee chairperson with bylaw.
  - Definition of activity as Japanese URSI-Commission K for 22nd term: To make an effort to expand the study field, especially application in medicine. For this purpose, Dr. Masaki Sekino (The University of Tokyo) joined us as a secretary. And Japanese URSI-Commission K will act in collaboration with the society of electromagnetics in biology and medicine. Furthermore, since Prof. Masao Taki (Tokyo Metropolitan University) was elected for the chair of the international URSI-Commission K, international collaboration will be also emphasized in this term.
  - Summary of the XXXth URSI General Assembly: Number of presentations in the sessions related to URSI-Commission K (90 oral and 21 poster) and topics in the business meeting of the international URSI-Commission K were reported.
- ◆ Topical Lecture:
  - "Carcinogenicity assessment of radio frequency electromagnetic field by IARC" by Dr. Kanako Wake (National Institute of Information and Communications Technology; NICT)
  - "Bioinstrumentation using terahertz frequency" by Prof. Kodo Kawase (Nagoya University)

#### **1.2 2<sup>nd</sup> preparatory meeting of Japanese URSI-Commission K for 22<sup>nd</sup> term of the Science Council of Japan**

- ◆ Date: March 7, 2012
- ◆ Place: Tokyo Metropolitan University's Akihabara satellite campus, Tokyo
- ◆ Topics:
  - A trend of International Commission on Non-Ionizing Radiation Protection (ICNIRP): Dr. Soichi Watanabe (NICT) was elected as a member of main commission and will serve from May, 2012. Public consultation about "Draft guideline for limiting exposure to electromagnetic fields induced by movement of the human body in a static magnetic field and by time-varying magnetic field below 1Hz" was introduced.
  - Brief topics of the Bioelectromagnetics society (BEMS) board of directors meeting
- ◆ 4th symposium on electromagnetics in biology and medicine (under the auspices of the society of electromagnetics in biology and medicine): There were 8 technical presentations and 2 special lectures. The titles of special lectures were follows;
  - "Heavy particle radiotherapy –from basic study to recent trend" by Dr. Shinichi Minohara (Kanagawa Cancer Center)
  - "Biological effect of electromagnetic field –historical progress" by Dr. Tsukasa Shigemitsu (Committee chairperson of Japanese URSI-Commission K for 21st term of the Science

Council of Japan)

### **1.3 3<sup>rd</sup> preparatory meeting of Japanese URSI-Commission K for 22<sup>nd</sup> term of the Science Council of Japan**

- ◆ Date: August 2, 2012
- ◆ Place: Tokyo Metropolitan University's Akihabara satellite campus, Tokyo
- ◆ Topics:
  - URSI-Commission K international workshop: The workshop will be scheduled in Europe under organization of URSI-Commission K chair, Prof. Taki (Tokyo Metropolitan University) collaborated with URSI-Commission K vice chair, Dr. Joe Wiart.
  - A trend of the related meetings: ICNIRP, 2012 Korea-Japan EMT/EMC/BE Joint Conference (KJJC-2012), Technical Committee on Medical Information & Communication Technology (MICT) and BEMS etc.
  - A trend of Radiofrequency Environmental Health Criteria Monograph: The World Health Organization was planned to publish EHC until summer, 2014.
- ◆ Topical Lecture:
  - “Teratogenicity study of intermediate frequency magnetic field and the review of BEMS2012” by Dr. Akira Ushiyama (National Institute of Public Health)
  - “Terahertz spectroscopic imaging technology for medical application” by Prof. Hitoshi Tabata (The University of Tokyo)

### **1.4 Update on electromagnetic field issue**

- 1) The draft of ICNIRP guideline “Draft guideline for limiting exposure to electromagnetic fields induced by movement of the human body in a static magnetic field and by time-varying magnetic field below 1Hz” was closed for public consultation in May, 2012. The final guidelines will be published in near future.
- 2) Ministry of Economy Trade and Industry, Japan introduced a regulation of power frequency magnetic field (50 and 60 Hz) generated from electric installations of utility company to protect general public from adverse health effects such as nerve stimulation. The regulation adopted the ICNIRP guideline (200 micro-T at 50/60 Hz) and came into force March 1, 2012.
- 3) Ministry of Land, Infrastructure, Transport and Tourism, Japan introduced a regulation of power frequency magnetic field (50 and 60 Hz) generated from fixed installations in railway field to protect general public from adverse health effects such as nerve stimulation. The regulation adopted the ICNIRP guideline (200 micro-T at 50/60 Hz) and came into force August 1, 2012.

## **2 Meetings**

### **2.1 Past meetings**

- 1) (Domestic) 2012 IEICE General Conference, Okayama, Japan, March 20-23, 2012  
<http://www.ieice.org/jpn/event/program/2012G/index.html>
- 2) (Domestic) 2012 IEEE General Conference, Hiroshima, Japan, March 21-23, 2012  
<http://www2.iee.or.jp/ver2/honbu/03-conference/12-taikai/index.html>
- 3) 6th European Association on Antennas and Propagation (EuCAP2012), Prague, Czech Republic, March 26-30, 2012  
<http://www.eucap2012.org/>
- 4) ISMRM 20th Annual Meeting & Exhibition, Melbourne, Australia, May 5-11, 2012  
<http://ismrm.org/12/>

- 5) 7th ICNIRP International NIR workshop, Edinburgh, Scotland, May 9-11, 2012  
<http://www.icnirp.de/NIR2012/NIR2012.htm>
- 6) 2012 Korea-Japan EMT/EMC/BE joint Conference (KJJC-2012), Seoul, Korea, May 18-19, 2012  
<http://www.kiees.or.kr/kjic2012/>
- 7) Asia-Pacific Symposium on Electromagnetic Compatibility (APEMC), Singapore, May 21-24, 2012  
<http://www.apemc2012.org/>
- 8) The 34<sup>th</sup> Annual Meeting of the Bioelectromagnetics Society, Brisbane, Australia, June 17-22, 2012  
<http://www.bems2012.com.au/2012/>
- 9) The 11<sup>th</sup> International Congress of Hyperthermic Oncology (ICHO) & The 29<sup>th</sup> Japanese Congress of Thermal Medicine (JCTM), Kyoto, Japan, August 28-31, 2012  
<http://icho2012.umin.jp/>
- 10) (Domestic) JBMES 2012, Osaka, Japan, September 7-8, 2012  
<http://www.jbmcs2012.bpe.es.osaka-u.ac.jp/>
- 11) (Domestic) 2012 IEICE Society Conference, Toyama, Japan, September 11-14, 2012.  
<http://www.gakkai-web.net/gakkai/ieice/2012Spro/index.html>
- 12) EMC Europe, Rome, Italy, September 17-21, 2012.  
<http://www.emceurope2012.it/>
- 13) IEEE Life Sciences Grand Challenges Conference, Washington DC, USA, October 4-5, 2012  
<http://lifesciences.ieee.org/articles/169-ieee-life-sciences-grand-challenges-conference-schedule>
- 14) 7th International Workshop on Biological Effects of Electromagnetic Fields (7<sup>th</sup> IWSBEEMF), Malta, Greece, October 8-12, 2012

## 2.2 Future meetings

- 1) 2012 International Symposium on Antennas and Propagation, Nagoya, Japan, October 29 – November 2, 2012  
<http://www.isap12.org>
- 2) ICNIRP/WHO International Workshop on NIR in Medicine, Bonn, Germany, December 2, 2012  
<http://www.icnirp.de/NIRmed/NIRmed.htm>
- 3) (Domestic) 2012 IEICE General Conference, Gifu, Japan, March 19-22, 2013  
[http://www.toyoag.co.jp/ieice/G\\_top/g\\_top.html](http://www.toyoag.co.jp/ieice/G_top/g_top.html)
- 4) (Domestic) 2013 IEEEJ General Conference, Nagoya, Japan, March 20-22, 2013  
<http://www2.iee.or.jp/ver2/honbu/03-conference/13-taikai/index.html>
- 5) 7th European Association on Antennas and Propagation (EuCAP2013), Gothenburg, Sweden, April 8-12, 2013  
<http://www.eucap2013.org/>
- 6) ISMRM 21th Annual Meeting & Exhibition, Salt Lake City, USA, April 20-26, 2013  
<http://ismrm.org/13/>
- 7) 2013 International Symposium on Electromagnetic Theory (ETMS 2013), Hiroshima, Japan, May 20-23, 2013  
<http://ursi-emts2013.org/>
- 8) BioEM2013, Thessaloniki, Greece, June 10-14, 2013  
<http://www.bioem2013.org/bioem2013/>

- 9) International Workshop on Electromagnetics in Medicine and Biology organized by International Union of Radio Science, Commission-K, (URSI-K WS), Paris, France, August, 2013.
- 10) (Domestic) IEICE Society Conference 2013, Fukuoka, Japan, September 17-20, 2013  
[http://www.toyoag.co.jp/ieice/S\\_top/s\\_top.html](http://www.toyoag.co.jp/ieice/S_top/s_top.html)
- 11) CIGRE 3<sup>rd</sup> International Colloquium on Low Frequency Electric and Magnetic Fields (EMF-ELF-2013), Nara, Japan, October 15-16, 2013
- 12) 10<sup>th</sup> World Congress on Railway Research, Sydney, Australia, November 25-28, 2013  
<http://www.wcrr2013.org/>
- 13) 2014 International Symposium on Electromagnetic Compatibility, Tokyo, May 20-23, 2014  
<http://www.ieice.org/~emc14/>

### **3 Published papers by the member of Japanese URSI-Commission K (2011 Oct.-2012 Oct.)**

#### **3.1 Static, Low and Intermediate Frequency Field**

- Ikehata, M., [2011] “Evaluation of Biological Effects of Magnetic Fields -from static to intermediate frequency-”, International Symposium on Antennas and Propagation 2011 (ISAP2011), 2011. Oct. 25-28, Jeju-do, Korea, abstract USB.
- Hirata H, Nagai T, Koyama T, Hattori J, Chan K-H, and Kavet R, [2012] “Dispersive FDTD analysis of induced electric field in human models due to electrostatic discharge”, *Physics in Medicine and Biology*, vol.57, pp.4447-4458
- Laakso I and Hirata A, [2012], “Reducing the staircasing error in computational dosimetry of low-frequency electromagnetic fields”, *Physics in Medicine and Biology*, vol.57, pp.N25-N34.
- Lu M and Ueno S [2011], “Dosimetry of exposure of patients to pulsed magnetic fields in MRI”, *IEEE Transactions on Magnetics*, vol. 47, No. 10, pp. 3841-3844.
- Sakurai T, Hashimoto A, Kiyokawa T, Kikuchi K, Miyakoshi J, [2012], “Myotube orientation using strong static magnetic fields”, *Bioelectromagnetics*. Vol.33, No. 5, pp. 421-7
- Sakurai T, Narita E, Shinohara N, Miyakoshi J., [2012], “ Intermediate frequency magnetic field at 23 kHz does not modify gene expression in human fetus-derived astroglia cells”., *Bioelectromagnetics*. 2012 May 7. doi: 10.1002/bem.21734. [Epub ahead of print]
- Shigemitsu T and Yamazaki K, [2012], “Interaction of extremely low-frequency electromagnetic fields with biological systems”. in *Electromagnetic fields in biological systems* (ed.), James C. Lin, pp.197-260, CRC Press, Boca Raton, London, New York.
- Ueno, S and Okano, H [2011], “Chapter 3 Static, low frequency, and pulsed magnetic fields in biological systems” in *Electromagnetic Fields in Biological Systems* (Edited by James C. Lin), pp. 115-196, CRC Press, Boca Raton, London, New York.
- Ueno S, [2012], “Biomagnetism—Past, Present and Future—“, Theme Keynote Lecture, World Congress on Medical Physics and Biomedical Engineering, T.08, Beijing, China, 26th-31st May.
- Yamaguchi-Sekino S, Sekino S, and Ueno S, [2012], “Biological Effects of Electromagnetic Fields and Discussion of the Recently Updated Safety Guidelines for Strong Static Electromagnetic Fields” *Magnetic Resonance in Medical Science* Vol. 10 no. 1, pp. 1-10.
- Yoshie S, Ikehata M, Hirota N, Takemura T, Minowa T, Hanagata N, Hayakawa T. [2012], “Evaluation of mutagenicity and co-mutagenicity of strong static magnetic fields up to 13 Tesla in *Escherichia coli* deficient in superoxide dismutase”. *J Magn Reson Imaging*. Vol. 35. No. 3, pp. 731-6.

### 3.2 Radiofrequency Field

- Arima T., Watanabe H., Wake K., Masuda H., Watanabe S., Taki M., Uno T., [2011], "Local Exposure System for Rats Head Using a Figure-8 Loop Antenna in 1500-MHz Band", IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING, vol.58, no. 10, pp. 2740-2747.
- Cardis E., Varsier N., Bowman J. D., Deltour I., Figuerola J., Mann S., Moissonier M., Taki M., Vecchia P., Villegas R., Vrijheid M., Wake K., Wiart J., [2011], "Estimation of RF energy absorbed in the brain from mobile phones in the Interphone Study", Occup Environ Med, vol.68, no. 9, pp. 686-693.
- Deji S., Nishizawa K. [2012], "The Case of Semiconductor-Type Dosimeters Using in Radiation Control Facilities", J. Plasma Fusion Res. vol.88, No.8, 448 - 452 (in Japanese).
- Deltour I., Wiart J., Taki M., Wake K., Varsier N., Mann S., Schuz J., Cardis E., [2011], "Analysis of Three-Dimensional SAR Distributions Emitted by Mobile Phones in an Epidemiological Perspective", Bioelectromagnetics, vol.32, no. 8, pp. 634-643.
- Endo Y., Saito K., Watanabe S., Takahashi M., Ito K., [2011], "Experimental evaluation on SAR around the implanted cardiac pacemaker by mobile phone," Proceedings of ISABEL2011, Oct.,
- Endo Y., Saito K., Watanabe S., Takahashi M., Ito K. [2012], "Experimental evaluation of SAR around an implanted cardiac pacemaker caused by mobile radio terminal," IEICE Transactions on Communications, vol.E95-B, no. 6, pp. 2129-2132.
- Hamaji T., Kik A., Aoyagi T., Nishikata A., Watanabe S., [2011], "In vivo Measurement of Equivalent Complex Permittivity of Fingers Using the Waveguide-Penetration Method", IEICE Trans. B, vol.94, no. 11, pp. 1503-1507.
- Higashiyama J., Tarusawa Y., Onishi T., [2012], "Electromagnetic Power Density and SAR from Multiband-Sector Mobile Base Station Antenna for Exposure Assessment", 34th BEMS Annual Mtg., PA-61, Brisbane, June 2012.
- Hirata A., Masuda H., Kanai Y., Asai R., Fujiwara O., Arima T., Watanabe S., Lagroye I., Veyret B., [2011], "Computational modeling of temperature elevation and thermoregulatory response in the brains of anesthetized rats locally exposed at 1.5 GHz", Physics in Medicine and Biology, vol.56, no. 23, pp. 7639-7657.
- Hirata A., Onishi T., Watanabe S., [2012], "Biological Effects of Electromagnetic Fields and Compliance Assessment of Wireless Communication Equipments", IEICE Communications Society magazine, no. 20pp. 312-320.
- Hirata A., Fujiwara O., [2012], "Health Effects of Electromagnetic Fields on Humans", J. Plasma Fusion Res. vol.88, No.8, 420 - 424 (in Japanese).
- Ishii N., Miyota Y., Hamada L., Watanabe S., [2011], "Effect of Higher Modes on Waveguide Aperture Covered by a Dielectric Slab in the Liquid", International Symposium on Antennas and Propagation 2011 (ISAP 2011),
- Ishii N., Miyota Y., Sato K., Hamada L., Watanabe S., [2012], "SAR-Probe Calibration System Using Reference Dipole Antenna in Tissue-Equivalent Liquid", The IEICE Transactions on Communications, vol.E95-B, no. 1, pp. 60-68.
- Ito A., Simba A. Y., Arima T., Hamada L., Watanabe S., Uno T., [2011], "A Liquid-Type Human-Body Equivalent Antenna with Improved Induced Current Distribution", International Symposium on Antennas and Propagation 2011 (ISAP 2011),
- Iyama T., Onishi T., [2011], "Variations in SAR of wireless communication devices caused by host devices", IEICE Trans. Commun., vol. E94-B, no. 12, pp. 3603 - 3606, Dec. 2011,
- Kawai H., Wake K., Arima T., Watanabe S., [2011], "A head-local-exposure system for rats using a figure-8 loop antenna in the 2 GHz band", IEICE TRANSACTIONS ON

- COMMUNICATIONS, vol.E94-B, no. 6, pp. 1757-1760.
- Kawasaki K., Takahashi M., Saito K., Ito K., [2012], "Design of implanted antenna having planar structure for monitoring biological information", Proceedings of International Conference on Electromagnetics in Advanced Applications, pp. 156-158.
- Knezevic M., Kobayashi K., Ikegami J., Matsuo S., Sato A., Kocabas U., Fan J., Katashita T., Sugawara K., Sakiyama K., Verbaughede I., Ota K., Honma N., Aoki K., [2012], "Fair and Consistent Hardware Evaluation of Fourteen Round Two SHA-3 Candidates", IEEE Transactions on Very Large Scale Integration Systems, vol. 20, no. 5, pp. 827-840
- Kojima M., Naillia H., Suzuki Y., Sasaki K., Wake K., Watanabe S., Taki M., Kamimura Y., Hirata A., Sasaki K., Sasaki H., [2012], "Ocular temperature measurement during 40 GHz exposure to rabbit", 2012 Korea-Japan EMT/EMC/BE Joint Conference, pp. 119-122.
- Laakso I., Hirata A., [2011], "Dominant factors affecting temperature rise in simulations of human thermoregulation during RF exposure", Physics in Medicine and Biology, vol.56, no. 23, pp. 7449-7471.
- Laakso I., Hirata A., [2012], "Computational analysis of thresholds for magnetophosphenes", Physics in Medicine and Biology, vol.57, no. 19, pp. 6147-6165.
- Laakso I., Tsuchida S., Hirata A., Kawamura Y., [2012], "Evaluation of SAR in a human body model due to wireless power transmission in the 10 MHz band", Physics in Medicine and Biology, vol.57, pp. 4991-5002.
- Nagaoka T., Watanabe S., [2011], "Multi-GPU Accelerated Three-Dimensional FDTD Method for Electromagnetic Simulation", 33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society, pp. 401-404.
- Nagaoka T., Watanabe S., [2011], "Personalized Computational Models in Human Anatomy for Electromagnetic Dosimetry", 4th International Symposium on Applied Sciences in Biomedical and Communication Technologies (isabel2011),
- Ohkubo C., [2012], "Trends of International Guidelines for Limiting Exposure to Electric and Magnetic Fields to Protect Humans", J. Plasma Fusion Res. vol.88, No.8, 425 - 431 (in Japanese).
- Oizumi T., Laakso I., Hirata A., Fujiwara O., Watanabe S., Taki M., Kojima M., Sasaki H., Sasaki K., [2012], "Analysis of temperature elevation in the lens of human and rabbit models for localized microwave exposure at 2.45 GHz", IEICE Trans. B, J95-B2pp. 381-384.
- Onishi T., Higashiyama J., Tarusawa Y., [2012], "Phatonic technologies applied to evaluation of the human exposure to electromagnetic fields", APMP2012, FB-1, Kyoto, April 2012,
- Onishi T., Nagaoka T., Iyama T., Hamada L., Watanabe S., Hirata A., [2012], "Exposure evaluation with respect to wireless data transmission terminals used close to the body", KCCJ2012, J-20, Seoul, May 2012,
- Onishi T., [2012], "AR variations in wireless data communication terminals caused by host devices", 34th BEMS Annual Mtg., PB-24, Brisbane, June 2012,
- Park S. W., Wake K., Watanabe S., [2012], "Dosimetry for a wireless power transfer system using resonance, and investigation of electric coupling to a human body", 2012 Korea-Japan EMT/EMC/BE Joint Conference, pp. 305-308.
- Sato K., Kamimura Y. [2012], "T Measurement and Visualization of EMF Distributions", J. Plasma Fusion Res. vol.88, No.8, 432 - 436 (in Japanese).
- Sato Y., Hirata A., Fujiwara O., [2011], "In-vivo Measurement of Complex Relative Permittivity for Human Skin Tissues Using Open-Ended Coaxial Probe", IEEJ Trans. EIS, vol.131, no.12, pp.2040-2045.

- Sasaki K., Suzuki Y., [2012], "A Mur type analytical absorbing boundary condition for multidimensional wave analysis with the directional splitting technique", *IEICE Transaction on Electronics*, vol.E95-C, no. 2, pp. 309-312.
- Simba A. Y., Ito A., Hamada L., Watanabe S., Arima T., Uno T., [2012], "Development of liquid-type human-body equivalent antennas for induced ankle current measurements at VHF band", *IEEE Transactions on Electromagnetic Compatibility*, vol.54, no. 3, pp. 565-573.
- Suzuki Y., Koike A., Kojima M., Sasaki K., Wake K., Taki M., Watanabe S., Naillia H., Sasaki K., Sasaki H., [2012], "Computational and experimental dosimetry for rabbit eyes exposed to millimeter waves", 2012 Korea-Japan EMT/EMC/BE Joint Conference, pp. 111-114.
- Takeda A., Takada K., Nagao H., Wang J., Fujiwara O., [2011], "Measurement and hemodialysis effect of complex relative permittivity for blood of kidney patients using open-ended coaxial measurement probe", *IEEJ Trans. EIS*, vol.131, no.12, pp.2046-2050.
- Takeda A., Takada K., Nagao H., Wang J., Fujiwara O., [2011], "Correlation analysis between complex relative permittivity and biochemical components for blood of dialysis patients before and after hemodialysis", *IEEJ Trans. FM*, vol.132, no.8, pp.616-622.
- Tanaka K., Tateno A., Saito K., Takahashi M., Ito K., [2012], "Construction of a calculation model of a tablet computer for SAR evaluations", *Proceedings of Bioelectromagnetics Society 34rd Annual Meeting*, pp. 124-126.
- Tanaka M., Uda T., Wang J., Fujiwara O., [2011], "Performance test of personal RF monitor for area monitoring at magnetic confinement fusion facility", *Radiation Protection Dosimetry*, vol.148, no.3, pp.277-283.
- Tateno A., Saito K., Nagaoka T., Watanabe S., Takahashi M., Ito K., [2012], "Temperature elevation in human fetuses at 13 weeks, 18weeks, and 26weeks of gestation due to a wireless radio terminal", *Proceedings of Bioelectromagnetics Society 34rd Annual Meeting*, pp. 284-286.
- Uda T., Wang G. [2012], "Electromagnetic Compatibility and Safety Consideration in Magnetic Confinement Fusion Facilities", *J. Plasma Fusion Res.* vol.88, No.8, 437 - 443 (in Japanese).
- Wang J., Wake K., Kawai H., Watanabe S., Fujiwara O., [2012], "Statistical determination of whole-body average SARs in a 2 GHz whole-body exposure system for unrestrained pregnant and newborn rats", *Physics on Medicine and Biology*, vol.57, no. 1, pp. 143-154.
- Yamanaka Y., Wang J., Fujiwara O., Uda T., [2012], "measurement of leaked high-frequency burst electric field and EMI evaluation for cardiac pacemaker in fusion facility", *IEEJ Trans. FM*, vol.132, no.5, pp.356-361.
- Yanase K., Hirata A., [2011], "Effective resistance of grounded humans for whole-body averaged SAR estimation at resonance frequencies", *Progress in Electromagnetic Research B*, vol.35, pp. 15-27.
- Yanase K., Hirata A., Fujiwara O., Nagaoka T., Watanabe S., [2011], "Estimation of Whole-Body Average SAR in Grounded Human Models for RF Far-Field Exposure", *IEICE Trans. B*, vol.J94-B, no. 2, pp. 226-233.

### 3.3 Medical application

- Abe Y, Sekino M, Terazono Y, Ohsaki H, Fukazawa Y, Sakai S, Yawo H and Hisatsune T "Opto-fMRI analysis for exploring the neuronal connectivity of the hippocampal formation in rats." *Neuroscience Research* (in press).
- Hasebe T, Yamada Y and Tabata H [2012] "Analysis of Sharp Dip Structures on Terahertz Transmission Spectra of Metallic Meshes." *Japanese Journal of Applied Physics*, Vol. 51, pp. 04DL03(10 pages).

- Itakura H, Saito K, Takahashi M and Ito K [2012] "Development of biliary stent compatible with microwave hyperthermia for bile duct carcinoma." *Thermal Medicine*, vol.28, no.3, pp.43-51.
- Itakura H, Saito K, Takahashi M, and Ito K [2011] "Microwave heating on outside of biliary stent by coaxial probe." *Proceedings of ISABEL2011*, Oct.
- Ito K and Saito K [2011] "Development of microwave antennas for thermal therapy." *Current Pharmaceutical Design*, vol.17, no.22, pp.2360-2366.
- Kato K, Iwasaki K, Furiya K, Tamura N, Sato T, Takura T, Sato F and Matsuki H [2012] "Decreasing Coupling between Feeding Coils for Functional Electrical Stimulation with Direct Feeding Method." *J. Magn. Soc. Jpn.*, 36, pp.268-271.
- Kato T, Sekino M, Matsuzaki T, Nishikawa A, Saitoh Y and Ohsaki H [2012] "Electromagnetic characteristics of eccentric figure-eight coils for transcranial magnetic stimulation: A numerical study." *Journal of Applied Physics*, vol. 111, pp. 07B322.
- Kotani K, Yamaguchi I, Ogawa Y, Jimbo Y, Nakao H and Ermentrout G [2012] "The adjoint method provides phase response functions for delay-induced oscillations." *Phys. Rev. Lett.* 109, 044101.
- Lu M and Ueno S [2011] "Transcranial Magnetic Stimulation of Deep Brain Regions by Consideration of Conventional Coils." 56th MMM (Magnetism and Magnetic Materials) Conference of the American Physics Society, HS-06, Scottsdale, USA, 1st-4th Nov.
- Lu M and Ueno S [2012] "Assessment of Induced Electric Currents in Patient's Head Exposed to Pulsed Z-Gradient Coil in Magnetic Resonance Imaging." 18th International Conference on Biomagnetism (BIOMAG), TU-30, Paris, France, 26th-30th August.
- Lu M and Ueno S [2012] "Calculating the Electric Fields in Real Human Head by Transcranial Magnetic Stimulation Using H-Coil." 18th International Conference on Biomagnetism (BIOMAG), TU-29, Paris, France, 26th-30th August.
- Lu M and Ueno S [2012] "Calculating the Induced Electric Fields in Deep Brain Regions by Two Separate Circular Coil." 34th Annual Conference of the Bioelectromagnetics Society, O11-4, Brisbane, Australia, 17th-22th June.
- Lu M and Ueno S [2012] "Comparison of Induced Electric Fields in Child and Adult Head Models by Transcranial Magnetic Stimulation." 18th International Conference on Biomagnetism (BIOMAG), TU-31, Paris, France, 26th-30th August.
- Lu M and Ueno S [2012] "Dependence of Induced Electric Fields in Human Brain on Working Frequency in Transcranial Magnetic Stimulation." World Congress on Medical Physics and Biomedical Engineering, TH.16/07.1-1, Beijing, China, 26th-31th May.
- Lu M and Ueno S [2012] "Realization of Deep Transcranial Magnetic Stimulation by Novel Coil Design." World Congress on Medical Physics and Biomedical Engineering, TH.16/07.1-5, Beijing, China, 26th-31th May.
- Lu M, Ueno S [2012] "Dependence of induced electric fields in human brain on working frequency in transcranial magnetic stimulation." *IFMBE Proceedings*, Vol. 39, pp. 1588–1588-1591.
- Matsui H and Tabata H [2012a] "The contribution of quantum confinement to optical anisotropy of a-plane Cd<sub>0.06</sub>Zn<sub>0.94</sub>O/ZnO quantum wells." *Applied Physics Letters*, vol. 100, pp. 171910.
- Matsumura T, Takahashi M, Saito K, Yamamoto E and Ito K [2012] "Performance evaluations on RFID tag antenna for managing surgical instrument." *Proceedings of International Conference on Electromagnetics in Advanced Applications*, pp. 156-158, Sep.
- Misawa T, Sato T, Takura T, Sato F and Matsuki H [2012] "Stabilization of input impedance for wireless power supply circuit," *J. Appl. Phys.*, 111, 07E720.
- Nakajima H, Takahashi M, Saito K and Ito K [2012] "Basic characteristics of RFID antenna for urination detection." *Proceedings of International Conference on Modern Materials and*



- Technologies, pp.59-64, Jun.
- Ogawa Y, Takeno S, Kotani K and Jimbo Y [2012] "Analysis of EEG Phase Properties with Pulse and Noise Stimuli in Visual Cortex." *Electron. Commun. Jpn.* 95, pp. 58- 64.
- Saito K, Endo Y, Yoshida S, Takahashi M and Ito K [2012] "SAR evaluations around implanted cardiac pacemaker caused by mobile radio terminal." *Proceedings of 7th International Workshop on Biological Effects of Electromagnetic Fields*, Oct.
- Saito K, Itakura H, Takahashi M, and Ito K [2012], "Microwave heating for treatment of bile duct carcinoma -evaluations on influence of metallic stent-." *Proceedings of International Conference on Electromagnetics in Advanced Applications*, pp.156-158, Sep.
- Sato F, Morita J, Takura T, Sato T and Matsuki H [2012] "Research on Highly Efficient Contactless Power Station System using Meander Coil for Moving Electric Vehicle Model." *J. Magn. Soc. Jpn.* 36, pp.249-252 .
- Seki M, Tabata H, Ohta H, Inaba K and Kobayashi K [2011] "Epitaxial thin films of p-type spinel ferrite grown by pulsed laser deposition." *Applied Physics Letters*, vol. 99, pp. 242504-242507.
- Sekino M, Kato T and Ohsaki H [2012] "Coil design for magnetic brain stimulation." *International Symposium on Secure-Life Electronics*, Tokyo, Japan, 17 January.
- Sekino M, Ohsaki H and Wada H [2011] "Novel superconductor configurations for MRI magnets." *24th International Symposium on Superconductivity*, Tokyo, Japan, 26 October.
- Sekino M, Tsugeki T, Ohsaki H and Kusakabe M [2012] "Numerical simulations of magnetic sensing systems for identifying sentinel lymph nodes." *World Congress on Medical Physics and Biomedical Engineering*, Beijing, China, 28 May.
- Suga R, Saito K, Takahashi M, and Ito K [2011] "Magnetic field distribution of birdcage coil for 4 T MRI system with no lumped circuit elements." *Proceedings of ISABEL2011*, Oct.
- Tabata H [2012a] "Fermi level control of spinel ferrite and their polaron properties -Toward the realization of spin Esaki diodes-." *Proceedings of India – Japan Conference*, Bangalore, October. p.12.
- Tabata H [2012b] "Spin and Charge Ordering in Ferrite Related Thin Films and Their Electric and Magnetic Properties." *Proceedings of International Union of Materials Research Societies-International Conference on Electronic Materials (IUMRS-ICEM2012 Symposium)*, Yokohama, September. p.91.
- Tabata H [2012c] "Room Temperature Polaron and Ferrimagnetic Properties on Spinel Type Ferrite Thin Films and their p-n Junctions." *Proceedings of Collaborative Conference on Materials Research (CCMR)*, Seoul, June. p.55.
- Tabata H [2012d] "Hetero epitaxial p-n junctions of complex oxides based on spinel type Ferrite and their polaron conducting and ferri-magnetic properties." *Proceedings of Villa Conference on Energy, materials, and Nanotechnology (2012 EMN Meeting)*, Orlando, p.112 , April.
- Takayama Y, Moriguchi H, Kotani K, Suzuki T, Mabuchi K and Jimbo Y [2012] "Network-wide integration of stem cell-derived neurons and mouse cortical neurons using microfabricated co-culture devices." *BioSystems* 107, pp. 1-8.
- Takayama Y, Saito A, Moriguchi H, Kotani K, Suzuki T, Mabuchi K and Jimbo Y [2011] "Simultaneous induction of calcium transients in embryoid bodies using microfabricated electrode substrates." *J. Biosci. Bioeng.* 112, pp. 624-9.
- Ueno S [2012] "Medical Applications of Electromagnetic Fields." *34th Annual Conference of the Bioelectromagnetics Society, ENA-4*, Brisbane, Australia, 17th-22nd June, 2012.
- Ueno S [2012] "Studies on magnetism and bioelectromagnetics for 45 years: From magnetic analog memory to human brain stimulation and imaging." *Bioelectromagnetics*, Vol. 33, No. 1, pp.

3-22.

Yamaguchi I, Ogawa Y, Jimbo Y, Nakao H and Kotani K [2011] "Reduction theories elucidate the origins of complex biological rhythms generated by interacting delay-induced oscillations." PLoS ONE 6, e26497.

Yamahara H, Mikami M, Seki M and Tabata H [2011] "Epitaxial strain-induced magnetic anisotropy in Sm<sub>3</sub>Fe<sub>5</sub>O<sub>12</sub> thin films grown by pulsed laser deposition." Journal of Magnetism and Magnetic Materials, vol. 323, pp. 3143-3146.

Zhu H, Demachi K, Pei C, Sekino M and Uesaka M [2012] "Correction of chemical shift misregistration by images from two different bandwidths." Magnetic Resonance Imaging, vol. 30, pp. 583-588.