

The 13th International Symposium on Applied Electromagnetics and Mechanics

ISEM 2007



September 9-12, 2007, Kellogg Center, Michigan State University,
East Lansing, Michigan, U.S.A.

PRELIMINARY PROGRAM

Sunday, September 9, 2007

5:00 – 7:00 pm Registration – Centennial Room
6:30 – 8:30 pm Welcoming Reception – Big 10C

Monday, September 10, 2007

7:30 – 8:30 am Continental Breakfast – Big 10A

7:30 – 9:30 am Registration – Centennial Room

Plenary Session 1 – Big 10 A **Chairperson: Satish Udpa**

8:30 – 8:40 am Opening Remarks

8:40 – 9:35 am “Electromagnetic Analysis of Plasmon Resonances in
Nanoparticles” Isaak D. Mayergoyz, University of Maryland

9:35 – 10:30 am “Engineering Macromolecular Transport in Tissues,” Brian E.
O’Neill, National Institute of Health

10:30 – 10:45 am Coffee Break – Lincoln Room

- 10:45 – 12:25 pm M-AM 1 - Computational Modeling – Lincoln Room**
Co-Chairs: T. Takagi, L. Udpa
- 10:45 – 11:05 am Dedicating Finite Volume Method to Electromagnetic Plasma Modeling: Circuit Breaker Application - *L. Rondot, V. Mazauric, Y. Delannoy and G. Meunier, Schneider Electric Science and Technology, France*
- 11:05 – 11:25 am Numerical Evaluation of 3D Uniform Potential Integrals with the Fast Near-Field Method - *D. Chen, B. Shanker and R. J. McGough, Michigan State University, USA*
- 11:25 – 11:45 am The Numerical Analysis of Ventilation and Temperature Field for the Bulb Tubular Turbine Generator - *H. Xia, Y. Yao, P. Ni and G. Ni, Zhejiang University, China, and T. Li, Research Station of Manufacture Quality Criterion, China*
- 11:45 – 12:05 pm Trefftz Discontinuous Galerkin Methods for Time-Harmonic Electromagnetic and Ultrasound Transmission Problems – *Z. Badics, E-Sol, Ltd., Hungary, and Y. Matsumoto, Nuclear Engineering Ltd., Japan*
- 12:05 – 12:25 pm Facing Dynamic Hysteresis Models for Finite Element Analysis - *V. Mazauric, D. Ladas, Schneider Electric, Science and Technology, France and P. Wendling, Magsoft Corporation, USA*
- 10:45 – 12:25 pm M-AM-2 – RF Materials – Room 106**
Co-Chairs: E. Rothwell, N. Bowler
- 10:45 – 11:05 am Material Characterization Using a Hand-Held Network Analyzer – *J. Stewart, Air Force Research Laboratory, USA, M. Havrilla, Air Force Institute of Technology, USA, J. Berrie, N. Kornbau, BarrieHill Research Corporation, USA, G. Stenholm, and A. Albert, Air Force Research Laboratory, USA*
- 11:05 – 11:25 am Scattering Parameters of a Small Sphere in a Rectangular Waveguide - *D. C. Love, General Dynamics, USA*
- 11:25 – 11:45 am Wideband Notched Compact UWB Antenna - *C. B Kim, J. S. Lim, J. S. Jang, Y. H. Jung, H. S. Lee, D. K. Cho and M. S. Lee, Gyeongsang University, Korea*
- 11:45 – 12:05 pm Pulse Reflection From a Generally Dispersive Material - *E. J. Rothwell, Michigan State University, USA*
- 12:05 – 12:25 pm Nonreciprocal Microwave Transmission of Metastructures Containing Transversely Magnetized Ferrite and Gratings of Resonant Elements - *G. Kraftmakher and V. Butylkin, Institute of Radioengineering and Electronics RAS, Russia*
- 12:30 – 1:30 pm Lunch – Big 10A**

1:30 – 3:10 pm

Poster Session I – Big 10 A

Co-Chairs: I. Elshafiey, R. McGough

Biomedical

1. Susceptibility of Weighted Imaging SWI - *E. M. Haacke, M. Ayaz and E. Manova, Wayne State University, USA*
2. An Improved Approach of Quantifying Magnetic Movements of Small *In-Vivo* Objects - *C-Y. Hsieh, Y-C. N. Cheng, J. Neelavalli and E. M. Haacke, Wayne State University, USA*
3. An Efficient Extraction Method of Cortical Surfaces from MRI - *K-O. An and H-K. Jung, Seoul National University, Korea*
4. Tissue Fragmentation Treatment by Pulsed Cavitation Ultrasound Therapy-Histotripsy - *F. Winterroth, Z. Xu, T-Y. Wang, W. W. Roberts, J. B. Fowlkes and C. A. Cain, University of Michigan, USA*
5. Measuring the Layer Thickness Distribution in Aortic Valve Cusps Using High Frequency Ultrasound - *Z. Khan, University of Western Ontario, Canada, D. R. Boughner, Robarts Research Institute, Canada, and J. C. Lacefield, London Health Sciences Centre, Canada*
6. A Needle-Positioning Device Registered to 3-D High-Frequency Ultrasound Images for Guided Preclinical Interventions - *A. C. Waspe, J. C. Lacefield and A. Fenster, University of Western Ontario and Robarts Research Institute, Canada*
7. Automated Follicle Segmentation in Ultrasound Scans of Bovine Ovaries - *D. J. Vanderlaan, K. Khurshid, J. J. Ireland, F. Jimenez-Krassel and R. J. McGough, Michigan State University, USA*
8. Detection of Antigen-Antibody Reactions on Individual Cell's Surface Using Micro-Channels - *A. Aki, Y. Nihel, H. Morimoto, T. Maekawa, Toyo University, Japan, and T. Ukai, Saitama Small Enterprise Promotion Corporation, Japan*
9. Region of Support Calculations for a Focused Linear Array of Circular Pistons - *S. Shane, J. F. Kelly and R. McGough, Michigan State University, USA*
10. Power Optimization in Hyperthermia with Waveform Diversity - *X. Zeng and R. McGough, Michigan State University, USA*
11. Evaluation of the Signal Enhancement and Smoothing Using Selected Smoothing Method and Frequency Warping - *M. Akita, Y. Midorikawa, T. Miyamoto and Y. Yoshioka, Oita University, Japan*
12. Physical Properties and Biological Adaptability of Porous Composite Materials Based on Nickel Titanium Shape Memory Alloy for Application to Dentistry - *R. M. Gizatullin, S. P. Anan'ev, N. I. Borisenko, T. S. Grinenko, V. V. Koledov, E. P. Krasnoperov, P. A. Arsen'ev, M. T. Alexandrov, N. A. Yusov, B. I. Beletskiy and V. I. Suslov, IRE RAS, Russia*

Modeling

13. Computation of Solid Iron Rotor Induction Machines Using a Combined 3D Reluctance Networks and Analytical Approach - *M. Mirzaei, S. E. Abdollahi, Amirkabir University of Technology, Iran, and A. Vahedi, Iran University of Technology, Iran*

14. FEM-3D Electromagnetic Field Analysis for Measurement Uncertainties Estimation of an Instrument Transformer - *M. Cundeva-Blajer and L. Arsov, Ss. Cyril & Methodius University, R. Macedonia*
15. Numerical Analysis of Magnetic Fluid's Behavior in Traveling Magnetic Field Using the ALE GSMAC FEM - *Y. Ido, Nagoya Institute of Technology, Japan, and H. Nakagawa, Daikin Industries, Ltd., Japan*
16. Dedicated Adaptive Meshing for Eddy Currents in Conductors - *D. Ladas, V. Mazauric, Schneider Electric, France, G. Meunier, O. Chadebec, M. Ebene Ebene, Y. Marechal, G2ELAB, France, and P. Wendling, Magsoft Corporation, USA*
17. Implementation of a Vector Hysteresis Model in 2D Finite Element Analysis: Study of a RSST with Anisotropic Sample - *J. V. Leite, N. Sadowski, P. A. Da Silva Jr., GRUCAD/EEL/CTC UFSC, Brazil, A. Benabou, Y. Le Menach and S. Clenet, L2EP, France*
18. The Modeling Method of 2D Magnetic Properties of Grain-Oriented Electrical Steel - *Y. Yao, G. Ni, Zhejiang University, China, and C. S. Koh, Chungbuk National University, Korea*
19. Moving Surface Method to Consider a Motion in FEA Program - *J. Bae and J. Lee, Hanyang University, Korea*
20. Coupled Electromagnetic/Thermal Processes: Using a PID Control Approach in Conjunction with a Finite Element Model - *D. Cardinaux, F. Bay, CEMEF-ENSMP, France, J. Vincent and C. Dumont, Aubert & Duval Alliage, France*
21. Modelling and Characterization Tools Dedicated to the Optimization of Eddy Current Displacement Transducers - *L. Maurice, P-Y. Joubert, SATIE, France, and D. Lalu, Eddysense, France*
22. Numerical Simulation of Coupled Magnetic and Thermal Fields in Large Power Coils - *I. Carstea and D. Carstea, University of Craiova, Romania*
23. From Electromagnetic Modeling to Life Cycle Assessment: A Complete Framework for Eco-Design - *D. Ladas, V. Mazauric, Schneider Electric, France, and P. Wendling, Magsoft Corporation, USA*

Smart Materials

24. New Approach to Giant Reversible Bending of Shape Memory Materials - *V. V. Koledov, V. V. Khovailo, V. G. Pushin, V. G. Shavrov, E. P. Perov, Institute of Radioengineering and Electronics of RAS, Russia, G. A. Lebedev, D. I. Zakharov, Moscow State Institute of Steel and Alloys, Technological University, Russia, M. Ohtsuka, Tohoku University, Japan, H. Miki and T. Takagi, Tohoku University, Japan*
25. Application of Nickel Titanium Implants with Shape Memory Effect and Composite Materials to Modern Dental Practice - *R. Gizatullin, S. Anan'ev, N. Borisenko, V. Koledov, E. Krasnoperov, P. Arsen'ev, M. Alexandrov, N. Yusov, B. Beletskiy and V. Suslov, IRE RAS, Russia*

26. Giant Strain Due to Magnetic-Field-Induced Martensitic Transformation in NiMaGa Melt-Spun Ribbons, *V. Koledov, V. Shavrov, V. Khovaylo, D. Kuchin, E. Krasnoperov, Institute of Radioengineering and Electronics of RAS, Russia, F. Albertini, L. Pareti, IMEM-CNR, Italy, R. M. Grechishkin, D. S. Yuolenkov, Tver State University, Russia, M. Pasquale, INRIM, Italy, and S. Besseghini IENI-CNR, Italy*

RF, Signal Processing

27. A Small Size Dual-Mode Patch Filter - *A. F. Sheta, King Saud University, Saudi Arabia*
28. A New Shaped Reflector Antenna for Wide Beam Radiation Patterns - *S. Karimkashi, J. Rashed-Mohassel, University of Tehran, Iran, and A. Mallahzadeh, University of Shahed, Iran*
29. Pedagogical Considerations in EMC Education - *A. Nafalski and O. Göl, University of South Australia, South Australia*
30. Enhancement of a Screened Room for EMC Testing - *A. Nafalski and O. Göl, University of South Australia, South Australia*

Magnetic Fluids, Magnetic Processing of Materials I

31. Velocity and Attenuation of Ultrasonic Propagation in Magnetic Fluids Under a Uniform Magnetic Field - *M. Motozawa, Y. Iizuka and T. Sawada, Keio University, Japan*
32. Simulation of a Tuned Magnetic Fluid Damper Using Analogy of a Tuned Mass Damper - *K. Ohno, M. Shimoda and T. Sawada, Keio University, Japan*

3:10 – 3:30 pm Coffee Break – Lincoln Room

3:30 – 5:30 pm M-PM-1 - Biomedical Engineering I– Lincoln Room

Co-Chairs: K. Berger, G. Raguin

- 3:30 – 3:50 pm Design of Optimal Experimental Parameters for Diffusion-Weighted MRI Fibre-Tracking Protocols (Invited) - *L. G. Raguin, S. Majumdar and S. S. Udpa, Michigan State University, USA*
- 3:50 – 4:10 pm Magnetic Susceptibility Weighted Imaging SWI (Invited) - *E. M. Haacke and N. Cheng, Wayne State University, USA*
- 4:10 – 4:30 pm Finite Element Modeling of Multi-Exponential Diffusion Phenomenon in MRI - *I. Elshafiey, King Saud University, Saudi Arabia, M. El-Messery, Cairo University, Saudi Arabia, M. Radwan and A. Abdel-Latif, Fayoum University, Saudi Arabia*
- 4:30 – 4:50 pm Optimal Cardiac Phase of CT for the Accurate Attenuation Correction of PET - *K. Khurshid, K. Berger and R. J. McGough, Michigan State University, USA*
- 4:50 – 5:10 pm A Monte Carlo Based Probabilistic Model for PET Imaging - *Y. Deng, R. McGough, K. Berger and L. Udpa, Michigan State University, USA*

- 5:10 – 5:30 pm Flow-Induced Motion of Spikes on Magnetic Fluid Droplet - *R. Yamane, N. Sakiyama, Kokushikan University, Japan and M-K. Park, Pusan National University, Korea*
- 3:30 – 5:30 pm M-PM-2 - Smart Materials – Room 106**
Co-Chairs: X. Tan, R. V. Iyer
- 3:30 – 3:50 pm Thermodynamic Model for Magnetization and Magnetostriction in Stressed $\text{Fe}_{1-x}\text{Ga}_x$ - *P. G. Evans, M. Dapino, The Ohio State University, USA, J. Restorff, Naval Surface Warfare Center, USA*
- 3:50 – 4:10 pm Asymptotic Behavior of a Low-Dimensional Model for Magnetostriction for Periodic Input - *D. Ekanayake and R. Iyer, Texas Tech University, USA*
- 4:10 – 4:30 pm Inductively Coupled Multifunctional Carbon Nanotube-Gold Nanocomposite Sensors - *K. Loh, J. Lynch and N. Kotov, University of Michigan*
- 4:30 – 4:50 pm Piezoelectric Energy Harvesting in a High Vibration Civil Structure - *N. Lajnef, N. Elvin, Michigan State University, USA, and A. Elvin, University of Witwatersrand, South Africa*
- 4:50 – 5:10 pm Ni-Mn-Ga Magnetic Shape Memory – How to Make it Smart - *P. Ari-Gur, G. Kimmel, Western Michigan University, USA, and J. W. Richradson, Argonne National Laboratory, USA*
- 5:10 – 5:30 pm Embedded Inverse Compensation of Hysteresis in Smart Material Actuators - *X. Tan and O. Bennani, Michigan State University, USA*

6:30 – 7:00 pm Cocktail Hour – Big 10A

7:00 – 9:00 pm Dinner – Big 10A

Tuesday, September 11, 2007

7:15 – 8:00 am Continental Breakfast – Big 10A

Plenary Session II – Big 10A

Chair: Fumio Kojima

8:00 – 8:50 am Dr. Hironobu Yamashita, UTVES, Japan

8:50 – 9:45 am “Research Priorities at the Joint Research Centre of the European Commission in Relation to Maintenance Optimisation and Nuclear Power Plant Life Management,” Dr. Paolo Contri, European Commission, DG-JRC

9:45 – 10:00 am Coffee Break – Lincoln Room

- 10:00 – 12:00 pm** **T-AM-1 – Biomedical Engineering II – Lincoln Room**
Co-Chairs: S. Baek, I. Elshafiey
- 10:00 – 10:20 am Multimodal Ultrasound Imaging of the Cardiovascular Inflammatory Response: From Whole-Organ to Molecular-Scale (Invited) - *K. Kim, W. F. Weitzel, J. M. Rubin, C. Jia, T. J. Koliass, S-W. Huang, R. S. Witte, T. L. Hall, T. L. Chenevert, A. Agarwal, M. F. Denny, M. J. Kaplan, S. Ashkenazi, N. A. Kotov, and M. O'Donnell, University of Michigan, USA*
- 10:20 – 10:40 am High-Frequency Ultrasound Imaging of Antivascular Treatment Responses in Mouse Cancer Models (Invited) - *J. Lacefield, University of Western Ontario, Canada*
- 10:40 – 11:00 am Mapping Lens Elasticity Using Bubble-Based Acoustic Radiation Force (Invited) - *T. Erpelding, M. O'Donnell and K. Hollman, University of Michigan, USA*
- 11:00 – 11:20 am Three Dimensional Ultrasound Elasticity Imaging (Invited) - *M. S. Richards, J. M. Rubin, University of Michigan Medical Center, USA, P. E. Barbone, Boston University, USA, and A. A. Oberai, Rensselaer Polytechnic Institute, USA*
- 11:20 – 11:40 am Magnetic Separation and Alignment of DNA-Containing Particles Detected with Fluorescence Dye to Mimic Chronic Polyarthritis – *S. Norina, Moscow State University, Russia*
- 11:40 – 12:00 pm Model of a Multiple Lens-Single Fiber System in a Compound Eye - *J. Meixner, R. Iyer, Texas Tech University, USA*
- 10:00 – 11:40 am** **T-AM-2 – Motors and Machines I – Room 106**
Co-Chairs: K. Nagaya, S. Jurkovic
- 10:00 – 10:20 am Low Driving Energy Engine Valve Mechanism Using Permanent-Electromagnet and Conical Spring - *K. Nagaya, K. Kobayashi, Y. Hosokawa and M. Neno, Gunma University, Japan*
- 10:20 – 10:40 am Research of the Coupling Transformer in the New Bridge-Type Solid State Fault Current Limiter System - *D. Wang, Y. Yao, Z. Ao, D. Jiang and Z. Wu, Zhejiang University, China*
- 10:40 – 11:00 am Designing of Zero-Power Maglev Control for a 4-Pole Hybrid Electromagnet by Estimated Currents Approach with Reduced Order Disturbance Observers - *K. Erkan, B. Acarkan, Yildiz Technical University, Turkey, and T. Koseki, The University of Tokyo, Japan*
- 11:00 – 11:20 am A Method for Diagnosis of Induction Machine Fed by PWM Vector Control - *M-J. Kim, B-K. Kim, J. W. Moon, Y-H. Cho, Dong-A University, Korea , D-H. Whong and D-S. Kang, KERI, Korea*
- 11:20 – 11:40 am Design and Modelling of High Efficiency Switched Reluctance Drive for Centrifugal Pumping System - *J. Li and Y. Cho, Dong-A University, South Korea*
- 12:00 – 1:30 pm** **Lunch –Big 10A**

1:30 - -3:10 pm Poster Session II – Big 10A
Co-Chairs – F. Kojima, Z. Zeng

Maintenance and Reliability

1. Electromagnetic Characterization of PWHT of 9Cr-Mo Weldment - *W. Cheng and I. Komura, Japan Power Engineering and Inspection Corporation, Japan*
2. Simulator of Non-Destructive Test by EMAT for Corrosion Shape Identification of SUS Samples - *F. Kojima, Kobe University, Japan*
3. Electromagnetic NDT Data Fusion Algorithms for Evaluation of Stress Loaded Steel Samples - *T. Chady and G. Psuj, University of Technology, Poland*
4. Image Fusion Based Enhancement of Eddy Current Nondestructive Evaluation - *I. Elshafiey, M. Alkanhal and A. Algarni, King Saud University, Saudi Arabia*
5. Eddy Current Determination of Crack Area - *J. A. Murphy, GE Aviation, USA*
6. Progress of Performance Demonstration in Japan - *T. Sasahara and T. Jikimoto, Central Research Institute of Electric Power Industry, Japan*
7. Self-Localization Based Particle Filter for Underwater Inspection Robot - *F. Kobayashi and F. Kojima, Kobe University, Japan*
8. NDE for Specimens with Cooling Fins - *S. Nagata, University of Miyazaki, Japan, and M. Enokizono, Oita University, Japan*
9. Non-Destructive Evaluation of Fatigue Damage in the Stainless Steel by Using Electromagnetic Methods - *M. Oka, K. Ono, T. Yakushiji, Oita National College of Technology, Japan, Y. Tsuchida and M. Enokizono, Oita University, Japan*
10. Electromagnetic Nondestructive Evaluation of Rotating Blades - *D. Kosaka, Hokuriku Polytec College, Japan, H. Huang, N. Yusa and K. Miya, IIU Corp., Japan*
11. Evaluation of Crack Propagation by In-Situ Eddy Current Monitoring Under High Temperature Environment - *T. Takagi, T. Uchimoto, T. Kasuya and T. Shoji, Tohoku University, Japan*
12. Stress Corrosion Cracking of Low Carbon Stainless Steel in Japanese Boiling Water Reactors - *T. Futami, The Kenichi Ohmae Graduate School of Business, Japan, S. Suzuki, J. Matsumoto and N. Yamashita, Tokyo Electric Power Company, Japan*
13. Automated Analysis Systems for Characterizing Eddy Current SG Inspection Data - *J. Benson, Electric Power Research Institute, USA, O. Uduebhoo, R. Dayana, S. Ramakrishnan, S. Majumdar, P. Ramuhalli, L. Udpa and S. Udpa, Michigan State University USA*
14. Application of Residual Stress Measurements Using NDT in Residual Life Assessment of Components - *G. Prabhu-Gaunkar, Indian Institute of Technology – Bombay, India, and M. S. Rawat, BHEL, India*
15. Pressure Tubes Lifetime Prediction Using EC Data - *R. Grimberg, A. Savin, R. Steigmann, N. Iftimie, National Institute of R&D for Technical Physics, Romania, L. Udpa, S. S. Udpa, Michigan State University, USA, and A. Burma, Al. I. Cuza University, Romania*
16. Simulation for Predictive Maintenance with LabView Software - *V. Anghel, National R&D Institute of Cryogenics and Isotopes Technologies, Romania*

17. Characterization and Implementation of a GMR Based Probe for Eddy Current Testing - *A. Tamburrino, S. Ventre, L. Ferrigno, Università di Cassino, Italy, and S. Udpa, Michigan State University, USA*
18. Detection and Diagnosis of Surface Natural Cracks by Perpendicular Eddy Current - *M. Hashimoto, K. Fukuoka and S. Mizukami, Polytechnic University, Japan*
19. Automatic Fuzzy Based Identification of Bad Rivet in Magneto Optic Images - *M. Cacciola, F. C. Marabito, M. Versaci, University Mediterranea of Reggio Calabria, Italy, L. Udpa and S. S. Udpa, Michigan State University, USA*
20. Quantitative NDE of Cellular Metallic Material and Structures by Using Eddy Current Testing Technique - *D. Zhang, Z. Chen, M. Xu and T. Lu, Xi'an Jiaotong University, China*
21. A Statistical Image Fusion Algorithm for NDE Applications - *M. Kumar and P. Ramuhalli, Michigan State University, USA*
22. Development of a Prototype "FreeScan" System for Giant Magneto-Resistive Eddy Current Inspection of Aircraft Structures - *V. Melapudi, N. Nair, R. Clifford, S. S. Udpa and L. Udpa, Michigan State University, USA*
23. Numerical Analysis for Eddy Current Testing with a Conductive Crack by BEM - *K. Ishibashi and H. Fujita, Tokai University, Japan*
24. Eddy Current Testing System for In Situ Automatic Discrimination of Fatigue and Stress Corrosion Cracks, *S. Perrin, N. Yusa, K. Miya, IJU, Japan, D. Gombárska and L. Janousek, University of Zilina, Slovakia*
25. Methods of Optimizing Inspection & Replacement Cycle Length Using Bayesian Updating Technique, *M. Kasai, J. Notoya and Y. Kusakari, Akita Prefectural University, Japan*
26. Investigations of Multi-Frequency Algorithms for Detection of Defects in FBR Magnetic Steam Generators Tubes Covered with Sodium, *O. Mihalache, S. Miyahara, T. Yamaguchi and T. Yamashita, Japan Atomic Energy Agency, Japan*
27. Changes of Magnetic Minor Hysteresis Loops Due to Neutron Irradiation in Nuclear Reactor Pressure Vessel Steels - *S. Kobayashi, H. Kikuchi, S. Takahashi, K. Chiba, Y. Kamada and K. Ara, Iwate University, Japan*
28. Examination of Relation between IASCC Susceptibility and Magnetic Property – *S. Takaya, Y. Nagae, T. Yoshitake, K. Aoto, Y. Nemoto, J. Nakano, F. Ueno and T. Tsukada, Japan Atomic Energy Agency, Japan*
29. Magnetoelastic Coupling Effect of Ni-Fe Alloys Under Tensile Stress, *K. Yun, S. Biwa and E. Matsumoto, Kyoto University, Japan*
30. Resolution by Equivalent Diagram of the Field Penetration in Laminations – Joule Losses Estimation - *B. Bouaoune, Y. Bernard, LGEP, France, B. Bouaoune, and Y. Mulet Marquis, LACME S.A.S., France*
31. Magnetic Properties of Hardened Low Carbon Steel - *Y. Kai, Y. Tsuchida, M. Enokizono, Oita University, Japan, Y. Takada and E. Fujita, Delta Tooling Co., Ltd., Japan*
32. Influence of Magnetic Field Distribution on Inner Tube Walls Polishing Using Magnetic Compound Fluid - *H. Nishida, Toyama National College of Technology, Japan, K. Shimada, Fukushima University, Japan, and Y. Ido, Nagoya Institute of Technology, Japan*

33. Theory of Four-Point Alternating Current Potential Drop Measurements on a Conductive Cylindrical Rod - *J. R. Bowler and N. Bowler, Iowa State University, USA*
34. Diagnosis of Damages of Wings of Rotor by Electromagnetic Filed Measurement – *K. Demachi, N. Yusa, and S. Rybalko, The University of Tokyo, Japan*
35. Detection of Cracks Under Fastener Heads by Applying Detection Angle Techniques in Signal Processing – *Z. Zeng, Y. Deng, X. Liu, L. Udpa, S. Udpa, Michigan State University, USA, B. Koltenbah, R. Bossi, Boeing Phantom Works, USA, and G. Steffes, Air Force Research Laboratory, USA*

3:10 – 3:30 pm Coffee Break – Lincoln Room

**3:30 – 5:30 pm T-PM-1 – Nondestructive Evaluation – Lincoln Room
Co-Chairs – G. Ni, R. Ramuhalli**

3:30 – 3:50 pm Recent Advances in Eddy Current Testing: The AMDE Project - *A. Tamburrino, S. Ventre, Università di Cassino, Italy, E. Cardelli, A. Faba, Università di Perugia, Italy, R. Specogna, F. Trevisan, Università di Udine, Italy, R. Martone, A. Formisano, Seconda Università, Italy, F. C. Morabito, and M. Versaci, Università di Reggio Calabria, Italy*

3:50 – 4:10 pm Evaluation of Fatigue Cracks by Novel Combined System of Electromagnetic Acoustic Transducer and Eddy Current Probe - *T. Uchimoto, T. Takagi, T. Ichihara and T. Sato, Tohoku University, Japan*

4:10 – 4:30 pm Wireless Monitoring Technologies for Structural Health Monitoring - *K. Loh, A. Zimmerman and J. Lynch – University of Michigan, USA*

4:30 – 4:50 pm Eddy Current Inspection on Complex Geometry Surface - *C. Wang, Y. Plotnikov, H. Sun, S. Nath, General Electric GRC, USA, S. Dewangan and M. Togo, General Electric GRC, India*

4:50 – 5:10 pm Eddy Current and Ultrasound Data Fusion Applied to Nondestructive Evaluation of Carbon-Epoxy Composite Plates - *R. Grimberg, A. Savin, R. Steigmann, National Institute of R&D for Technical Physics, Romania, L Udpa and S. S. Udpa, Michigan State University, USA*

5:10 – 5:30 pm Computation of Quantitative Statistical Sizing Accuracy of a Nondestructive Evaluation System - *A. Joshi, Microline Technology Corp., USA*

**3:30 – 5:10 pm T-PM-2 – Magnetics – Room 106
Co-Chairs – A. J. Moses, R. Grimberg**

3:30 – 3:50 pm Local Distribution of Two Dimensional Magnetic Properties in a Three-Phase Transformer Model Core - *A. Kurakazu, T. Todaka, Y. Shimoji and M. Enokizono, Oita University, Japan*

3:50 – 4:10 pm Room Temperature Dependence of the Complex Magnetic

- Permeability of a Ni-Zn Ferrite - *V. L. O. de Brito, A. C. de Cunha Migliano, Instituto de Estudos Avançados, Brazil and F. C. L. de Milo, Instituto de Aeronáutica e Espaço – AMR, Brazil*
- 4:10 – 4:30 pm Evaluation of Magnetic Parameters on Dual Layer Materials by Single-Yoke Probe - *H. Kikuchi, H. Murakami, K. Ara, Y. Kamada, S. Kobayashi and S. Takahashi, Iwate University, Japan*
- 4:30 – 4:50 pm Effect of DC Voltage on AC Magnetisation of Transformer Core Steel - *A. J. Moses, P. Marketos and S. Zurek, Cardiff University, United Kingdom*
- 4:50 – 5:10 pm A Manufacturing Process for Nano Structured Magnetic Ferrite MnO-MgO-Fe₂O₃ Milling by CuHBr Laser - *C. A. Reis de Freitas, A. C. C. Migliano, and F. C. L. de Milo, Instituto de Estudos Avançados, Brazil*
- 8:00 – 10:00 pm** **Panel Discussion on Maintenance and Reliability in the Nuclear Industry - Big 10B**
Chair: Dr. Satish Udpa, Michigan State University
 Professor Joon Hyun Lee, School of Mechanical Engineering, Pusan National University, Korea –“Current Situations and Future Directions to Monitoring Techniques in Korean Nuclear Power Plants”
 Mr. Ken Huffman, NDE Center, Electric Power Research Institute, USA – “U.S. Perspectives on Nuclear Power Plant Maintenance and Equipment Reliability”
 Dr. Paolo Contri, European Commission, Institute for Energy, The Netherlands – “Maintenance and Reliability Issues in the Nuclear Industry in Europe”
 Dr. Shunichi Suzuki, Materials Engineering Center, Tokyo Electric Power Company, Japan – “Evaluation, Maintenance and Monitoring of SCC for BWR Components”

Wednesday, September 12, 2007

7:30 - 8:30 am **Continental Breakfast**

Plenary Session III – Big 10A

Chair: Lalita Udpa

8:30 – 9:30 am “Science and Engineering Activities at the NSCL National Superconducting Cyclotron Laboratory,” - *Konrad Gelbke, National Superconducting Cyclotron Laboratory, Michigan State University*

9:30 – 10:00 am **Coffee Break – Lincoln Room**

- 10:00 – 12:00 am** **W-AM-1 – Inverse Problems – Lincoln Room**
Co-Chairs – D. Lesselier, N. Yusa
- 10:00 – 10:20 am Deep-Lying Profiles Identification of Stress Corrosion Crack in SUS Sample Using Eddy Current Analysis - *F. Kojima and K. Ikeda, Kobe University, Japan*
- 10:20 – 10:40 am Wavelet Transform and Neural Network Based 3D Defect Characterization Using Magnetic Flux Leakage - *A. Joshi, Microline Technology Corp., USA*
- 10:40 – 11:00 am Sizing of Long Stress Corrosion Crack from 2D ECT Signals by Using a Multisegment Inverse Analysis Strategy - *L. Wang, Z. Chen, T. Lu, M. Xu, Xi'an Jiaotong University, China, N. Yusa and K. Miya, International Institute of Universality, Japan*
- 11:00 – 11:20 pm A New Response Surface Model Based on Support Vector Machines Applied to Inverse Electromagnetic Problems - *S. Yang, C. Fan, and G. Ni, Zhejiang University, China*
- 11:20 – 11:40 am Materials Characterization Using Magnetic Force Microscopy *T. Suzuki, A. Sasamoto, Y. Nishimura, National Institute of Advanced Industrial Science and Technology, Japan, and T. Teramoto, University of Tsukuba, Japan*
- 11:40 – 12:00 pm Depth Sizing of Complex Shape Cracks Using ECT Signals *S. Kanemoto, The University of Aizu, Japan, W. Cheng and I. Komura, JAPEIC, Japan*
- 10:00 – 11:40 am** **W-AM-2 – Electromagnetic Sensors – Room 106**
Co-Chairs – K. Ishibashi, M. Oka
- 10:00 – 10:20 am Torque Control of Synchronous Reluctance Motor Considering DC Link Voltage Fluctuation, *S-J. Kim, S-C. Go, D-S. Jung, J. Bae, J-S. Ahn and J. Lee, Hanyang University, Korea*
- 10:20 – 10:40 am Electromagnetic Transducer for the Determination of Soil Condition - *R. Grimberg, National Institute of R&D for Technical Physics, Romania, L. Udpa and S. S. Udpa, Michigan State University, USA*
- 10:40 – 11:00 am Guns and Knives Detection Using Electromagnetic Methods - *Y Li, G. Y. Tian, University of Newcastle Upon Tyne, United Kingdom, and A. Agurto, University of Huddersfield, United Kingdom*
- 11:00 – 11:20 am Investigation of an On-Line Pipe Wall Thinning Monitoring Using a High Accuracy Sensor - *A. Tagawa, K. Fujiki and T. Yamashita, Japan Atomic Energy Agency, Japan*
- 11:20 – 11:40 am Strain Sensitivity in Tungsten-Containing Diamond-Like Carbon Films for Strain Sensor Applications - *T. Takeno, H. Miki and T. Takagi, Tohoku University, Japan*
- 12:00 – 1:30 pm** **Lunch**

1:30 – 3:10 pm Poster Session III – Big 10A
Co-Chairs – X. Tan, T. Honma

Nanotechnology

1. Manipulation of Iron-Contained Carbon Nanotubes Using a Rotational Magnetic Field - *A. Eto, Y. Nagaoka, H. Morimoto, T. Maekawa, Toyo University, Japan, and N. Grobert, University of Oxford, United Kingdom*

Induction Heating

2. 3-D Modelling of Induction Heating Processes – Computational Issues - *F. Bay, L. Arbaoui and D. Cardinaux, Ecole des Mines de Paris, France*
3. A Domain Decomposition Approach for Coupled Fields in Induction Heating Devices - *I. Carstea and D. Carstea, University of Craiova, Romania*

Superconductivity

4. Thermal Effects Limiting the Critical Current in the Ceramics Superconductors YBa₂Cu₃O_{7-x} - *M. Hadj, University Mustapha Stamboli, Algeria*
5. The Conceptual Design of a 300MJ High Temperature Superconducting Magnet - *P. Luo, Hangzhou Dianzi University, China, L. Yao, Zhejiang University City College, China, S. Yang and G. Ni, Zhejiang University, China*

Electromagnetic Sensor and Actuator

6. Static and Dynamic Vibration Analyses of Axial Flux PM Synchronous Machines by 3D FEM - *W-Y. Jo, B-J. Lee, Y-H. Cho, Dong-A University, Korea, D-Y-H. Koo, and Y-D. Chun, Korea Electrotechnology Research Institute, Korea*
7. Simple Voltage Detection Circuit for Sensorless Control of Brushless DC Motor - *S. C. Go, S. J. Kim, D. S. Jung, J. S. Ahn and J. Lee, Hanyang University, Korea*
8. Optimal Design for Starting Torque of Line Start Permanent Magnet Synchronous Motor - *B-K. Kim and Y-H. Cho, Dong-A University, Korea*
9. Approximate Optimization for Maximum Efficiency of High Speed Single Phase Switched Reluctance Motor Using Response Surface Modelling - *S. Kim, Yuhan College, Korea, J-H. Choi, LG Electronics, Korea, and J. Lee, Hanyang University, Korea*
10. A Study on the Improvement of Construction Error in Permanent Magnet Stepping Motor with Claw Pole - *D-S. Jung and J. Lee, Hanyang University, Korea*
11. Detection of Stator Winding Inter-Turn Shorts in PWM Vector Controlled Induction Machines - *M-J. Kim, B-K Kim, J. W. Moon, Y-H. Cho, Dong-A University, Korea, D-H. Whong, and D-S. Kang, KERI, Korea*
12. Analysis of Large High Speed Linear Induction Motors Using a Modified Numerical Method - *M. Mirzaei, S. E. Abdollahi, Amirkabir University of Technology, Iran, and A. Vahedi, Iran University of Science and Technology, Iran*
13. Design of High Power Factor Switched Reluctance Motor - *J. Li and Y. Cho, Dong-A University, South Korea*
14. The Analysis of Permanent Magnet Linear Synchronous Motor for Advanced Control - *Y-W. Zhu and Y-H. Cho, Dong-A University, Korea*
15. Analysis and Design of a Rotary Ultrasonic Motor - *J-S Rho, C-H. Lee, H-W. Joo and H-K. Jung, Seoul National University, Korea*

16. Optimization of Resistive Reading Probe for Electric Data Storage System with a Bit of 50 nm - *S. Kim, Yuhan College, Korea, J-H. Choi, LG Electronics, Korea, and J. Lee, Hanyang University, Korea*
17. Torque Ripple Minimization of Switched Reluctance Motor Using Direct Torque Control - *S. Kim, Yuhan College, Korea, Y-H. Kim, National Hanbat University, Korea, and J-H Choi, LG Electronics, Korea*
18. Speed Estimation of Synchronous Reluctance Motor - *W-S. Oh, S. Kim, Yuhan College, Korea, J. Ahn and J. Lee, Hanyang University, Korea*

Magnetic Fluids, Magnetic Processing of Materials II

19. Key MHD Phenomena in the Poloidal Duct Flows of the Dual-Coolant Lead-Lithium Blanker - *S. Smolentsev and M. Abdou, University of California – Los Angeles, USA*
20. Vibration Properties of a Coupled System of a Magnetic Fluid Layer and a Magnetic Rubber Membrane - *Y. Ido, T. Yamada, Nagoya Institute of Technology, Japan, and K. Shimada, Fukushima University, Japan*
21. Temperature Sensitive Rubber Utilizing MCF Magnetic Compound Fluid - *K. Shimada, Y. Zheong, Fukushima University, Japan, and K. Ido, Nagoya Institute of Technology, Japan*

Laser and Particle Beams, Plasma

22. Proposal of Micro-Particle Vibration Using Optical Trapping - *N. Watanabe, K. Tanaka and K. Taguchi, Ritsumeikan University, Japan*
23. A Study of Dual-Beam Fiber Optic Trap - *K. Taguchi and N. Watanabe, Ritsumeikan University, Japan*
24. Investigation on the Radius of Hemispherical Microlens of Optical Fiber End for Single-Beam Optical Fiber Trap - *K. Taguchi and N. Watanabe, Ritsumeikan University, Japan*

Inverse Problems, Optimization

25. The Study of 3D Image Reconstruction Using EMAT - *Y. Nishimura, A. Sasamoto and T. Suzuki, AIST, Japan*
26. Optimization of Eddy Current Adaptive Transducer - *T. Chady and P. Lopato, Szczecin University of Technology, Poland*

3:10 – 3:30 PM Coffee Break – Lincoln Room

**3:30 – 5:30 pm W-PM-1 – Optimization – Lincoln Room
Co-Chairs – A. Tamburrino, H. Kikuchi**

3:30 – 3:50 pm A Particle Swarm Optimization Algorithm to Find the Robust Solutions of Engineering Design Problems - *S. Yang and P. Ni, Zhejiang University, China*

3:50 – 4:10 pm Reduction of Computational Time for Robust Genetic Algorithm - *T. Maruyama and H. Igarashi, Hokkaido University, Japan*

4:10 – 4:30 pm Topology Optimization with Smoothness Considerations – *F. Campelo, K. Watanabe and H. Igarashi, Hokkaido University, Japan*

- 4:30 – 4:50 pm Optimisation of Magnetostrictive Bilayer Sensors for Medical Applications - *E. Kaniusas, H. Pfützner, L. Mehnen and J. Kosel, Vienna University of Technology, Austria*
- 4:50 – 5:10 pm An Algorithm for Adaptively Constructing the Response Surface in the Global Optimization of Devices - *Y. Yao, J. Xie, J. Wang and G. Ni, Zhejiang University, China*
- 5:10 – 5:30 pm The Optimization of Design Factors for Improving the Efficiency of the Induction Motor by Using Response Surface Methodology - *P-W. Han, YD. Chun and D-H. Koo, Korea Electrotechnology Research Institute, Korea*
- 3:30 – 5:10 pm W-PM-2 – Motors and Machines II – Room 106**
- Co-Chairs – Z. Chen, L. Kempel**
- 3:30 – 3:50 pm Smooth Impact Drive Mechanism Using Iron-Gallium Alloy - *T. Ueno and T. Higuchi, The University of Tokyo, Japan*
- 3:50 – 4:10 pm Simplified Iron Losses Evaluation Method for Actual Stator Cores of Rotating Machines - *N. Iwasaki, T. Todaka, M. Enokizono, Oita University, Japan, and Y. Ishihara, Doshisha University, Japan*
- 4:10 – 4:30 pm Motor Core Inductance Analysis Evaluating Shrink Fit and Stamping Effect by Finite Element Method - *R. Hirayama, K. Fujisaki and T Kawachi, Nippon Steel Corporation, Japan*
- 4:30 – 4:50 pm Analysis of a Novel Axial Flux PM Machine Considering the Laminated Stack Directions - *W-Y. Jo, B-J. Lee, Y-H. Cho, Dong-A University, Korea, D-H. Koo and Y-D. Chun, Korea Electrotechnology Research Institute, Korea*
- 4:50 – 5:10 pm Modeling and Design of Permanent Magnet Thrust Bearings - *H. Yang, R. Zhao and S. Yang, Zhejiang University, China*