



The Institution of Engineering and Technology
7th International Conference on Computation in Electromagnetics
(CEM 2008)

7 - 10 April 2008, Old Ship Hotel, Brighton, UK

<http://conferences.theiet.org/cem>

Monday, 7 April 2008

17.30-19.00 Registration & Drinks Reception

Tuesday, 8 April 2008

09.00 Registration & Refreshments

09.30 Chairman's Address

Dr Liz Davenport, *BAE SYSTEMS, UK (Conference Chairman)*

Professor Jan Sykulski, *University of Southampton, UK (Chairman of the IET Electromagnetics Network)*

09.45 Keynote Address

Implicit Adaptive Time Domain Schemes in Computational Electromagnetics

Professor Markus Clemens, *Helmut Schmidt University, Germany*

10.45 Refreshments

Session 1 – Methods and Techniques of CEM

Chairmen: Dr Liz Davenport, *BAE Systems, UK*

Professor Arnulf Kost, *International Compumag Society, UK*

Introductory Lectures

11.15 **Extraction of Lumped Parameters in Field Models**

Francois Henrotte, *RWTH-Aachen University, Germany*

11.35 **Applications of Meshfree Methods in Electromagnetics**

Gi-Ho Park, *Institute of High Performance Computing, Singapore*

11.55 **Computational Electromagnetics and a Virtual Laboratory**

Christos Christopoulos, *University of Nottingham, UK*

12.15 **Interactive Presentations & Exhibition**

Non-Uniform Surface Current Distribution on Parallel Wire Loop Antennas Using Curved Patches in the Method of Moments

R A Abd-Alhameed, P S Excell, *Bradford University, UK*

Magnetic Force and Couple Densities and Magnetoelastic Interactions

L Vandeveld, T G D Hilgert, J A A Melkebeek, *Ghent University, Belgium*

The Mathematics of Lumped Parameter Identification in Electrical Machines

F Henrotte, J Heidt, K Hameyer, *RWTH-Aachen University, Germany*

The Block-P³M Method for Fast MoM Calculations

J Eastwood, *Culham Electromagnetics Ltd, UK*

Improved Buffered Block Forward Backward Method Applied to 3D Scattering Problems

M Mullen, C Brennan, T Downes, *Dublin City University, Ireland*

Transient 3D Magnetic Field Simulations with Combined Space & Time Mesh Adaptivity for Lowest Order WFEM Formulations

M Clemens, G Wimmer, *Helmut Schmidt Universität, Germany*, J Lang, D Teleaga, *Technische Universität Darmstadt, Germany*

Completeness of Smoothed Particle Hydrodynamics (SPH) Method and its Corrective Methods in Time-Domain Electromagnetics

G H Park, K Krohne, L E Ping, *A-STAR Institute of High Performance Computing, Singapore*

Computational and Experimental Verification of the Equivalent Permeability of the Step-Lap Joints of Transformer Cores

N Hihat, E Napieralska-Juszczak, J P Lecoint, *Université d'Artois, France*, J K Sykulski, *University of Southampton, UK*

Validation of QO Design Tool for FSS Analysis

A Yamsiri, R S Donnan, *Queen Mary University of London, UK*

Validating a Numerical Electromagnetic Solver in a Reverberant Environment

J F Dawson, I D Flintoft, A C Marvin, S J Porter, *University of York, UK*, C J Smartt, *BAE Systems, UK*, C Christopoulos, P Sewell, *University of Nottingham, UK*

Treatment of Material Discontinuity in Meshless Methods for EM Problems Using Interpolating Moving Least Squares

E H R Coppoli, *Centro Federal de Educação Tecnológica de Minas Gerais, Brazil*, R S Silva, *Laboratório Nacional de Computação Científica, Brazil*, R C Mesquita, *Universidade Federal de Minas Gerais, Brazil*

13.15 Lunch & Exhibition

Session 2 – Design and Optimisation

Chairmen: Professor Adel Razek, *SUPÉLEC, Gif-sur-Yvette, France*
Professor Ana Vukovic, *University of Nottingham, UK*

Introductory Lectures

14.15 New Trends in Optimisation in Electromagnetic

Professor Jan Sykulski, *University of Southampton, UK*

14.45 The Role of Sensitivity Analysis in Electromagnetic Device Optimisation

Professor David Lowther, *McGill University, Canada*

15.15 Interactive Presentations, Exhibition & Refreshments

Probability of Improvement Methods for Constrained Multi-Objective Optimization

G I Hawe, J K Sykulski, *University of Southampton, UK*

Optimal Control of Electromagnetic Actuator Considering Energy Loss Minimisation in Electric Circuit

S Stepien, G Szymanski, *Poznan University of Technology, Poland*, K Hameyer, *RWTH Aachen University, Germany*

Smooth Boundary Topology Optimization Applied to an Electrostatic Actuator

D-H Kim, *Kyungpook National University, Republic of Korea*, D A Lowther, *McGill University, Canada*, J K Sykulski, *University of Southampton, UK*

Finite Element Assisted Method to Reduce Harmonic Content in the Airgap Flux Density of a High Temperature Superconducting Coreless Rotor Generator

B Lukasik, K F Goddard, J K Sykulski, *University of Southampton, UK*

Generation and Use of Optimized Databases in Microwave Characterization

H Acikgoz, L Santandrea, Y Le Bihan, O Meyer, L Pichon, *University of Paris Sud, France*, S Gyimóthy, J Pávó, *University of Technology and Economics, Hungary*

Electrodynamics and Optimization Problems in Designing of Three-Phase Power Busways with Permanent Insulation

K Bednarek, K Domke, J Jajczyk, R Nawrowski, A Tomczewski, *Poznan University of Technology, Poland*

Optimization of Complex Lighting Systems with the Use of Genetic Algorithm

K Bednarek, K Domke, J Jajczyk, R Nawrowski, A Tomczewski, *Poznań University of Technology, Poland*

16.00 Session 3A - Establishing an Archive of Papers in Computational Electromagnetics

B Trowbridge, *International Compumag Society, UK*,
J K Sykulski, *University of Southampton, UK*

16.30 Session 3B – Panel Discussion on Education in Electromagnetics

Chairman: Professor Richard Langley, *University of Sheffield, UK*

Panel Members:

Ian MacDiarmid, *BAE SYSTEMS, UK*
Henryka Danuta Stryczewska, *Lublin University of Technology, Poland*
Cris Emson, *Infolytica Ltd, UK*

Interactive Presentation

Magnetic Modelling Projects in University Courses - New Zealand and Polish Examples

D Kacprzak, B Guillemin, *University of Auckland, New Zealand*, P Surdacki, H D Stryczewska, *Lublin University of Technology, Poland*

Using Commercial Design Software as an Aid for Teaching Electromagnetics

C R I Emson, *Infolytica, UK*, J D Edwards, *University of Sussex, UK*

17.30 Close of Discussion

09.00 Registration

Session 4 – Numerical Methods

Chairmen: Professor Kay Hameyer, *RWTH-Aachen University, Germany*
Ian MacDiarmid, *BAE SYSTEMS, UK*

Introductory Lectures

09.30 Network Models of 3D Electromagnetic Fields

Professor Andrzej Demenko, *Poznan University of Technology, Poland*

09.50 Current Activity in the Boundary Element Method

Dr James Eastwood, *Culham Electromagnetics Ltd, UK*

10.10 Numerical Modelling of Moving Interfaces in Diffusion Problems

Igor Golosnoy, *University of Southampton, UK*

10.30 Perturbation Finite Element Method for Magnetic Circuits

Patrick Dular, *University of Liège, Belgium*

10.50 Interactive Presentations & Exhibition & Refreshments

Computation of Electromagnetic Fields in Dense Biological Cell Structures using Modified Subgridding of Quasi-Static FDTD Method

C H See, R A Abd-Alhameed, P S Excell, *University of Bradford, UK*

Evaluation of the Front-Fixing Method Capabilities for Numerical Modelling of Diffusion in Moving Systems

I O Golosnoy, J K Sykulski, *University of Southampton, UK*

A Discontinuous Galerkin Method to Solve Electromagnetic Problems

L Pebernet, X Ferrieres, F Rogier, *ONERA, France*, S Pernet, *CERFACS, France*, P Degond, *IMT, France*

Path Loss Estimation in 3D Environments using a Modified 2D Finite-Difference Time-Domain Technique

Y Wu, M Lin, I Wassell, *University of Cambridge, UK*

Three-Dimensional Parallel FDTD Simulation of Light-Emitting Diodes

I J Buss, M J Cryan, J G Rarity, *University of Bristol, UK*, G R Nash, *QinetiQ & University of Bristol, UK*

An Electrostatic Charging Model for Aircraft Fuel Tanks

N E Pegg, *BAE Systems Advanced Technology Centre, UK*

Calculation of Inducted Currents using Edge Elements and T-T₀ Formulation

A Demenko, R Wojciechowski, *Poznan University of Technology, Poland*, J K Sykulski, *University of Southampton, UK*

H- and A- Time-Domain Formulations for the Modeling of Thin Electromagnetic Shells

R V Sabariego, C Geuzaine, *University of Liège, Belgium*, P Dular, *Fonds de la Recherche Scientifique, Belgium*, J Gyselinck, *Université Libre de Bruxelles, Belgium*

Perturbation Finite Element Method for Magnetic Circuits

P Dular, *University of Liège, Belgium & Université de Lyon, France*, R V Sabariego, *University of Liège, Belgium*, L Krähenbühl, *Université de Lyon, France*

On Loops and the Low-Frequency Breakdown of MoM

G Morgan, *Culham Electromagnetics Ltd, UK*

Higher Order Basis Functions for MoM Calculations

J Eastwood, G Morgan, *Culham Electromagnetics Ltd, UK*

Thin Film Slot Models in Frequency Domain TLM (FD-TLM)

J J Kazik, *IDS Ingegneria Dei Sistemi Ltd, UK*

Sub-Cell Models in Unstructured 2D TLM

J G Wykes, P Sewell, C Christopoulos, T M Benson, D W P Thomas, A Vukovic, *University of Nottingham, UK*

Modelling Non-Linear Photonic Structures Using the Transmission Line Modelling Method

A Vukovic, P Sewell, C Styan, T M Benson, *University of Nottingham, UK*

A Robust and Efficient Algorithm to Solve the Scattering Problems with Impedance Condition

F Millot, S Pernet, *CERFACS, France*

12.30 Lunch & Exhibition

Session 5 – Coupled Problems and Hybrid Methods

Chairmen: Dr Luk Arnaut, *National Physical Laboratory, UK*

Professor Bill Trowbridge, *International Compumag Society, UK*

Introductory Lectures

13.45 Hybrid Discretisation Methods

Stephan Koch, *Technische Universitaet Darmstadt, Belgium*

14.05 Hybridisation of the FDTD Technique

Chris Railton, *University of Bristol, UK*

14.25 Interactive Presentations, Exhibition, Networking & Refreshments

Validation of Electromagnetic-Thermal Coupled Modelling of Levitation Melting

D Hectors, K Van Reusel, J Driesen, *Katholieke Universiteit Leuven, Belgium*

Perfect Matching Layer for HAAR Wavelet based Multi-Resolution Time-Domain Technique

X J Wang, Y Hao, C H Chu, *Queen Mary, University of London, UK*

Modelling Movement with Meshless Methods

S A Viana, *Universidade Federal do Ceara, Brazil*, H C Lai, D Rodger, *University of Bath, UK*

Modelling of a Microstrip Patch Antenna using a Hybrid FDTD/PEEC Method

C J Railton, *University of Bristol, UK*

Exploiting Partial Symmetries in 3D Magnetostatic Calculations Using a Scalar Potential Formulation

S Koch, T Weiland, *Technische Universität Darmstadt, Germany*, H De Gerssem, *Katholieke Universiteit Leuven, Belgium*

A 3D Simplified Model of the Synchronous Machine for External Field Computation

D Roger, E Napieralska-Juszczak, S Duchesne, F Perisse, *LSEE – Université d'Artois, France*

Imposing Boundary Conditions in the Meshless Local Petrov Galerkin Method

A R Fonseca, E J Silva, R C Mesquita, *Universidade Federal de Minas Gerais, Brazil*, S A Viana, *Universidade Federal do Ceará, Brazil*

Smoothed Particle Electromagnetics with Boundary Absorbing Condition using Perfectly Matched Layers

M L Mendes, L C A Pimenta, R C Mesquita, E J Silva, T C Sant'ana, *Universidade Federal de Minas Gerais, Brazil*

An Improved Physics-based Phase Variable Model of PM Synchronous Machines Obtained through Field Computation

Z Liu, O A Mohammed, S Liu, *Florida International University, USA*

16.00 Close of Session 5 and Exhibition

19.00 Pre-Dinner Drinks

19.30 Conference Dinner

Session 6:

Chairman: Professor Jan K Sykulski, *University of Southampton, UK*

09.15 Keynote Address:

Whither Computational Electromagnetics? A Practitioner's Look at the Crystal Ball

Professor Raj Mittra, *Pennsylvania State University, USA*

Session 7 - Applications

Chairmen: Dr Chris Riley, *Vector Fields, UK*

Dr Luk Arnaut, *National Physical Laboratory, UK*

Introductory Lectures

10.15 Electromagnetic Modelling for EMC

Alastair Ruddle, *MIRA Limited, UK*

10.35 Practical Problems in Modelling Electrical Machines

Oliver Drubel, *Siemens AG, Germany*

10.55 EM field Modelling in Biological Materials

Mauro Parise, *University Campus Bio-Medico of Rome, Italy*

11.15 Interactive Presentations, Exhibition & Refreshments

Design of Antenna for Wide Harmonic Suppression using Adaptive Meshing and Genetic Algorithms

D Zhou, R A Abd-Alhameed, P S Excell, *University of Bradford, UK*

Numerical Investigation on Compact Multimode Dielectric Resonator Antennas of Very High Permittivity

M Rotaru, J K Sykulski, *University of Southampton, UK*

Distortion of the Interference Field near Cables Carrying PIC Signals

R C Marshall, *Richard Marshall Limited, UK*

Validation of Simple Estimates for Average Field Strengths in Complex Cavities Against Detailed Results Obtained from a 3D Numerical Model of a Car

A R Ruddle, *MIRA Limited, UK*

Experimental Validation of Simulated 3D Field Distribution within a Vehicle Cabin

H Zhang, J Rigelsford, L Low, R J Langley, *University of Sheffield, UK*

Development of an Intermediate Level Cable Coupling Model

S P Watkins, R Hoad, *QinetiQ, UK*

Unbalanced Magnetic Pull of PMSM Induced by the EM Structure of the Motor

C Bi, *Data Storage Institute, Singapore*, T S Low, Republic Polytechnic of Singapore, Singapore

Basic Study of Optimal Design of Linear Motor for Rope-Less Elevator

N Takahashi, T Yamada, D Miyagi, *Okayama University, Japan*, S Markon, *Fujitec Co. Ltd., Japan*

The Influence of Cooling Ducts on the Leakage Inductances of Induction Machines

J Heidt, O Drubel, *Siemens AG, Germany*, F Henrotte, K Hameyer, *RWTH Aachen University, Germany*

Concepts and Designs of Life Support Systems

M Leßmann, T Finocchiaro, U Steinseifer, T Schmitz-Rode, K Hameyer, *RWTH Aachen*

University, Germany

Calculation of EM Power Deposition for Exposure to Shortwave Induction Diathermy

S Cristina, M Parise, *University Campus Bio-Medico of Rome, Italy*

Finite Difference Time Domain Modelling of Non-Ideal Facets in Mid Infrared Lasers

J R Pugh, M J Cryan, I J Buss, J G Rarity, *University of Bristol, UK*, G R Nash, *QinetiQ, UK* & *University of Bristol, UK*, T Ashley, *QinetiQ, UK*

Overloss Coefficient in Magnetic Laminations During PWM Supply Voltage

K A Zakrzewski, *Technical University of Lodz, Poland*

12.45 Emerald Young Researcher Award

12.55 Closing Address

Dr Liz Davenport, *BAE SYSTEMS, UK*

13.00 Lunch

14.00 Close of Conference & Exhibition