Fourth UHVnet Colloquium

January 18th – 19th 2011

Winchester, UK
Welcome to the fourth UHVnet colloquium hosted by the University of Southampton on the 18\textsuperscript{th} and 19\textsuperscript{th} January 2011. Previous UHVnet events have been held at Cardiff University, Glasgow Caledonian University and the University of Manchester. This meeting will take place at Winchester Guildhall and consist of a registration and poster session on the Tuesday evening to encourage a relaxed discussion of current work between early career researchers. The second day of the event will consist of oral presentations covering the following four topic areas; High Voltage Plant, Condition Monitoring, Materials and Theories, Methods and Models. Each topic will have an opening presentation by a leading researcher in the field followed by 5 oral presentations by early career researchers and postgraduates.

UHVnet is an informal grouping of universities and was set up in 2005 to further interests of high voltage research within the United Kingdom. The university members are Cardiff University, Glasgow Caledonian University, University of Liverpool, University of Leicester, University of Manchester, University of Southampton, University of Strathclyde and the University of Surrey. These universities are supported by a steering group which includes industrial representation from the Areva T&D Technology Centre, PPA Energy, National Grid and Narec.

Specific objectives of the group include raising awareness of the researcher capabilities of group members to UK high-voltage related industry, particularly manufacturers and electricity supply companies and lobbying research funding organisations for ear-marked high-voltage related programs.

We would be delighted to receive any feedback about this event as we are keen to further improve our communication with both UK and overseas stakeholders. Future events will be listed on our website and we hope to see you again.
Timetable

Tuesday 18th January 2011

1700 – 2000  Registration, Reception and Poster Session

Wednesday 19th January 2011

0800 – 0830  Registration
0830 – 0845  Welcome by Meeting Chair
0845 – 1015  Session 1: High Voltage Plant
1015 – 1045  Coffee break
1045 – 1215  Session 2: Condition Monitoring
1215 – 1330  Lunch and Poster Session
1330 – 1500  Session 3: Materials
1500 – 1515  Break
1515 – 1645  Session 4: Theory, Methods and Models
1645 – 1700  Closing Remarks
Technical Programme

Oral Session 1: High Voltage Plant

A1.1 Invited Lecture
Characterisation of Earth Electrodes Including Experimental Tests on Large-Scale Systems
H. Griffiths
Cardiff University

A1.2
The Variation in Tangential Electric Fields for Different Bushing Shed Profiles in a Polluted Environment
D. J. Smith, S. G. McMeekin, B. G. Stewart and P. A. Wallace
Glasgow Caledonian University

A1.3
Environmental Friendly Compact High Voltage Substations
M. Albano, A. Haddad, H. Griffiths, and P. Coventry
Cardiff University

A1.4
A Cascaded Flying Capacitor Multilevel Converter for HVDC and FACTS
I. B. Efika and L. Zhang
University of Leeds

A1.5
Thermal Performance of High Voltage Power Cables
J. A. Pilgrim, D. J. Swaffield, P. L. Lewin and D. Payne
University of Southampton

A1.6
Detection and Location of Underground Power Cable using Magnetic Field Technologies
P. Wang, K. F. Goddard, P. L. Lewin and S. Swingler
University of Southampton

Oral Session 2: Condition Monitoring

B1.1 Invited Lecture
Condition Monitoring for High Voltage Equipment
M. Judd
University of Strathclyde

B1.2
Automated Phase-agnostic Time Domain Analysis of RF Partial Discharge Pulse Data for Low-power Wireless Sensing Applications
P. C. Baker, A. J. Mair, M. D. Judd and S. D. J. McArthur
University of Strathclyde

B1.3
Partial Discharge Analysis of Defective Three-Phase Cable
J. A. Hunter, L. Hao, D. J. Swaffield, P. L. Lewin, N. Cornish, C. Walton and M. Michel
University of Southampton

B1.4
Study of Signal Processing Techniques used for Denoising Partial Discharge Signals in Cables
F. P. Mohamed, W. H. Siew, J. J. Soraghan and S. S. Strachan
University of Strathclyde

B1.5
Optimum Coil Design for Inductive Energy Harvesting in Substations
N. M. Roscoe and M. D. Judd
University of Strathclyde

B1.6
Instrumentation and Condition Monitoring of Composite Cross Arms
C. A. Veerappan, C. Zachariades, S. M. Rowland, I. Cotton, P. R. Green and F. Allison
University of Manchester
Oral Session 3: Materials

C1.1 Invited Lecture
Towards Recyclable Insulation Materials for High Voltage Cables
I. L. Hosier, A. S. Vaughan and S. G. Swingler
University of Southampton

C1.2
Five-Electrode Inclined-plane Tests of Textured Silicone Rubber Samples
P. Charalampidis, A. Haddad, R. T. Waters, H. Griffiths, N. Harid and P. Sarkar
Cardiff University

C1.3
A Raman Microprobe Study of Corona Ageing in a Controlled Atmosphere
N. A. Freebody and A. S. Vaughan
University of Southampton

C1.4
FTIR Spectrum of Layered PET Insulation with Artificial Voids Subjected to Electrical Stressing
D. Adhikari, D. M. Hepburn and B. G. Stewart
Glasgow Caledonian University

C1.5
Dielectric Behaviour of Alkyl Esters of Seed-based Oil
A. A. Abdelmalik, J. C. Fothergill and S. Dodd
University of Leicester

C1.6
The Influence of Spherical Cavity Surface Charge Distribution on PD Events
H. A. Illias, G. Chen and P. L. Lewin
University of Southampton

Oral Session 4: Theories, Methods and Models

D1.1 Invited Lecture
Stochastic and Deterministic Models for Electrical Tree Growth
S. Dodd
University of Leicester

D1.2
Model of Structural Damage to Carbon Fibre Composites due to Thermo-electric Effects of Lightning Strikes
R. D. Chippendale, I. O. Golosnoy, P. L. Lewin, G. S. Murugan and J. Lambert
University Southampton

D1.3
Switching Ferroresonant Transient Study using Finite Element Transformer Model
R. Zhang, H. Y. Li and Z. D. Wang
University of Manchester

D1.4
Transient Modelling of Offshore Wind Farm Connections
F. Moore, A. Haddad and H. Griffiths
Cardiff University

D1.5
Surface Gradient Calculation for Overhead Lines
Q. Li, S. M. Rowland and R. Shuttleworth
University of Manchester

D1.6
Modelling of Electroluminescence in Polymers using a Bipolar Charge Transport Model
J. Zhao, D. H. Mills, G. Chen and P. L. Lewin
University of Southampton

Posters: High Voltage Plant

A2.1
Power Transformer End-of-life Modelling: Incorporating Thermal Lifetime Analysis with Ordinary Statistical Analysis
D. Y. Feng, Z. D. Wang and P. Jarman
University of Manchester
Location of Partial Discharges within a Transformer Winding Using Principal Component Analysis
M. S. Abd Rahman, P. L. Lewin and L. Hao
University of Southampton

Frequency Response Analysis of Transformer Winding Deformation Based on Multi-conductor Transmission Line Model
University of Liverpool

Effect of Climatic Condition on Polymeric Insulators
A. S. Nekeb, N. Harid, A. Haddad
Cardiff University

Acoustic Noise Evaluation for Overhead Lines
Q. Li, G. Zhang, S. M. Rowland and R. Shuttleworth
University of Manchester

Transient Fault Location in Low Voltage Distribution Networks
Y. Tao, W.H.Siew and J. J. Soraghan
University of Strathclyde

A Survey on the Potential of CF<sub>3</sub>I Gas as an Alternative for SF<sub>6</sub>
M. S. Kamarudin, M. Albano, P. Coventry, N. Harid and A. Haddad
Cardiff University

A New Technique to Enhance the Earthing System by Increasing the Horizontal Earth Electrode Effective Length
A. Elmghairbi, N. Harid, H. Griffiths and A. Haddad
Cardiff University

A Novel Portable Testing Device for Surge Protective Systems
Glasgow Caledonian University

A Solar Powered Wireless Data Acquisition System for High Voltage Substations
A.C. Bogias, N. Harid, H. and M. Haddad
Cardiff University

The performance of Nanocoating on high voltage insulators
S. Braini and A. Haddad
Cardiff University

Performance of Tower Footings Resistance under High Impulse Current
M. Ahmeda, N. Harid, H. Griffiths and A. Haddad
Cardiff University

High Frequency Performance of a Vertical Rod Electrode
S. Mousa, N. Harid, H. Griffiths and A. Haddad
Cardiff University

Posters: Condition Monitoring

FDTD Modelling of Partial Discharge Detection in Power Distribution Cables using HFCTs
X. Hu, A. J. Reid, M. D. Judd and W. H. Siew
University of Strathclyde

Use of Hidden Markov Model for Partial Discharge-led Failure Development Modelling
D. Zhou, C.R.Li and Z. D. Wang
University of Manchester
Dynamically Weighted Ensemble of Neural Networks for classifying Partial discharge Patterns
A. Abubakar Mas’ud, B. G. Stewart, S. G. McMeekin and A. Nesbitt
Glasgow Caledonian University

A Successful On-site PD Testing Experience of 11kV EPR Cable Insulation Systems
X. Peng, C. Zhou, D. M. Hepburn, X. Song
Glasgow Caledonian University

Radiometric Arc Fault Detection
R. M. Harris, M. D. Judd and P. J. Moore
University of Strathclyde

Voltage Transducer for Transient Measurements on High Voltage Overhead Lines
M. F. Hussin, A. Haddad and N. Harid
Cardiff University

Fault Location using FPGAs and Power Line Communication
S. Robson, A. Haddad and H. Griffiths
Cardiff University

A New Method to Improve the Sensitivity of Leak Detection in Self-Contained Fluid-Filled Cables
L. Hao, P. L. Lewin, S. G. Swingler and C. Bradley
University of Southampton

Energy Harvesting from Electric Fields in Substations for Powering Autonomous Sensors
M. Zhu and M. D. Judd
University of Strathclyde

Ageing and Temperature Influence on Polarization/Depolarization Current Behaviour of Paper Immerged in Natural Ester
J. Hao, R. Liao, G. Chen
University of Southampton

An On-line Lightning Monitoring System for Transmission Lines
B. Sheng, W. Zhou, C. Zhou and J. Yui
Glasgow Caledonian University

Energy Harvesting in Substations for Wireless Sensors and a New Arc Capacitor Structure
J. Huang, Q. Li, M. D. Judd and W. H. Siew
University of Strathclyde

Posters: Materials

On the use of Raman and FTIR Spectroscopy for the Analysis of Silica-based Nanofillers
C. Yeung, G. Gherbaz and A. S. Vaughan
University of Southampton

Dielectric Breakdown Strength of Polyethylene Nanocomposites
K. Y. Lau, A. S. Vaughan and G. Chen
University of Southampton

Influence of Temperature and Moisture Absorbed on Electrical Degradation and Breakdown in Epoxy Resins
S.J. Dodd, N.M. Chalashkanov, L.A. Dissado, J.C. Fothergill
University of Leicester

Space Charge Behaviour in Oil-Paper Insulation with Different Aging Condition
J. Hao, G. Chen, R. Liao and W. Li
University of Southampton
Modelling the Non-equilibrium Electric Double Layer at Oil-pressboard Interface of High Voltage Transformers
H. Zainuddin, P. L. Lewin and P. M. Mitchinson
University of Southampton

Investigation of Impulsive Corona Discharges for Energisation of Electrostatic Precipitation Systems
University of Strathclyde

A Comparison of Polymeric Cable Insulation Properties following Lightning Impulse Ageing
N. L. Dao, P. L. Lewin, I. L. Hosier and S. G. Swingler
University of Southampton

Properties and Analysis of Thermally Aged Poly(ethylene oxide)
M. Reading and A. S. Vaughan
University of Southampton

Smart Materials as Intelligent Insulation
University of Southampton

AC Breakdown characteristics of LDPE in the presence of crosslinking byproducts
N. Hussin, and G. Chen
University of Southampton

DC Impulse Discharge Degradation of Mica
Glasgow Caledonian University

Posters: Theories, Methods and Models

Modelling of Partial Discharge Activity in Cavity within a Dielectric Insulation Material
T. Bai, D. J. Swaffield and P. L. Lewin
University of Southampton

Full Wave Modelling of Partial Discharge Phenomena in Power Transformers using FDTD Methods
A. M. Ishak, M. D. Judd and W. H. Siew
University of Strathclyde

Evaluation of an Iterative Method used for Partial Discharge RF Location Techniques
O. El Mountassir, B. G. Stewart, S. McMeekin and A. Ahmadinia
Glasgow Caledonian University

Numerical Modelling of Needle-Grid Electrodes Negative Surface Corona Charge System
Y. Zhuang, G. Chen and M. Rotaru
University of Southampton

Mathematical Modelling of End-of-Life of Power Transformers in Perspective of System Reliability
B. Patel, Z. D. Wang, J. V. Milanovic and P. Jarman
University of Manchester

A Comparison between Electroluminescence Models and Experimental Results
D. H. Mills, F. Baudoin, P. L. Lewin and G. Chen
University of Southampton
An Improved Pulsed Electroacoustic System for Space Charge Measurement under AC Conditions
Z. Xu, J. Zhao and G. Chen
University of Southampton