



2009 Electrical Insulation Conference

Final Technical Program

Sponsored by IEEE Dielectrics and Electrical Insulation Society

2009-05-11

Sunday, 31 May 2009

Reception and Poster Sessions 18:00 - 21:00 Fontaine A - B

Cables

Chair: Harry Orton, Orton Consulting Engineers International

- *Preliminary Investigation of Signal Processing and Feature Extraction Method for Partial Discharge in 1500V Subway DC cable*, Y. Qian, C.-J. Huang, L.-P. Yao, M.-Y. Gao, X.-C. Jiang, Shanghai Jiao Tong University, China
- *Conventional and Unconventional Partial Discharges Detection in Power Cables Using Different AC Voltages*, P. Cichecki, E. Gulski, J.J. Smit, Delft University of Technology, Netherlands, T. Hermans, R. Bodega, Prysmian, Netherlands, P.P. Seitz, Seitz Instruments AG, Switzerland
- *Electrical Tree Growing Properties of LDPE Influenced by Heat Treatment*, Yushun Zhao, Jian Li, Huazhong Zhang, Yong Liang, Chongqing University, China

Partial Discharge

Chair: Claude Hudon, IREQ

- *A Density Based Segmentation Algorithm for Interpreting Partial Discharge Data*, H. Al-Marzouqi, The Petroleum Institute, United Arab Emirates
- *Partial Discharge in 345-KV Power Transformer*, M.-K. Chen, C.-Y. Cheng, J.-M. Chen, W.-Y. Chang, St. John's University, Taiwan
- *Partial Discharge Inception Voltage of Water Drops on Insulating Surfaces Stressed by Electrical Field*, S. Feier-lova, V. Hinrichsen, Darmstadt University of Technology, Germany
- *Experimental Comparison of UHF Sensor Types for PD Location Applications*, T. Pinpart, M.D. Judd, University of Strathclyde, UK
- *Modelling of a Surface Discharge in a Concentric Circle System under Alternating Voltage*, S. Bouazabia, L. Hadjout, M. Boulahbal, University of Sciences and Technology Houari Boumediene, Algeria
- *Alternative Power Sources for Autonomous Sensors in High Voltage Plant*, M. Zhu, P.C. Baker, N.M. Roscoe, M.D. Judd, University of Strathclyde, UK, J. Fitch, National Grid, UK
- *Simulation on Time Delay Estimation of EM Waves Emitted from PD Using Constrained Interpolation Profile (CIP) Method and Cross-Correlation Method Based on In-Place Fast Haar Wavelet Transform*, M. Kawada, Tokushima University, Japan

- *Investigation of the Rogowski Coil for Efficiently Monitoring and Locating PD Faults in the High Voltage Apparatus*, H. Ahmadi, A.A. Shayegani Akmal, A. Mousavi, H. Mohseni, Technical University of Tehran, Iran
- *Influence of Different Voltage Waveforms on PD Formation in HV Insulation Systems*, B. Florkowska, J. Furgal, P. Zydron, AGH University of Science and Technology at Mickiewicza, Poland, M. Florkowski, ABB Corporate Research, Poland
- *Partial Discharge Modelling in a Spherical Cavity within a Dielectric Insulation Material as a Function of Frequency*, H.A. Illias, G. Chen, P.L. Lewin, University of Southampton, UK
- *Development of a Digital Acquisition System for Partial Discharge Measurement and Analyses*, A. Jambula, V. Nimbole, V. Lakdawala, Old Dominion University, P. Basappa, Norfolk State University, USA

Outdoor Insulation

Chair: Bill, McDermid, Manitoba Hydro

- *Detecting Damages in Outdoor Non-Ceramic Insulators using Near Field Microwave Non-Destructive Testing*, Nasser Qaddoumi, Ayman H. El-Hag, Mohamed Al Hosani, Ibrahim Al Mansouri, Hamad Al Ghufli, American University of Sharjah, United Arab Emirates
- *An Investigation into the Effect of Insulation Defect on Radiometric Partial Discharge Measurements*, S. Xiao, P.J. Moore, M.D. Judd, University of Strathclyde, I. Portugues, Elimpus Ltd., UK
- *The application of Ultrasonic and Radio Interference Detectors to Hot Inspection of Medium Voltage Gapped Surge Arrester*, H.R.P.M. Oliveira, AES Sul, M.L.B. Martinez, C. Lefort Borges, C. de Salles, Federal University of Itajuba, Brazil
- *Searching the Amplitude of the Short Duration Impulse Currents Discharged by Medium Voltage Surge Arresters*, H.R.P.M. Oliveira, E. Batista, AES Sul, M.L.B. Martinez, C. de Salles, Federal University of Itajuba, Brazil
- *Factors Improving the Electrical Performance of EPDM Rubber Outdoor High Voltage Insulators*, L.S. Nasrat, South Valley University, Egypt
- *Electric Field Calculations on a High Voltage Insulator under Wet Conditions*, Bhargavi Sarang, Vishnu Lakdawala, Old Dominion University, Prathap Basappa, Norfolk State University, USA

Rotating Machines

Chair: Ian Culbert, Iris Power

- *The Principles of Obtaining Stable Semiconducting Compositions and Reliable Anti-Corona Designs for High Voltage Windings*, R. Malamud, Consultant, USA, I. Cheremisov, G. Shumovskaya, T. Stepanova, State Enterprise "Electrotyazhmash", Kharkov, Ukraine
- *Application of Commercial Protective Relays for Monitoring the Insulation Condition of Stator Windings of AC Machines*, Mojtaba Khederzadeh, Water and Power University of Technology, Iran

Materials

Chair: **Éric David, École de Technologie Supérieure**

- *Properties of Impulse Creeping Discharge in Palm Fatty Acid Ester Oil / Pressboard Composite Insulation System*, S. Otsuka, R. Hanaoka, S. Takata, Kanazawa Institute of Technology, H. Yamamoto, Forensic Science Laboratory, H. Koide, AE Power Systems Corporation, Japan
- *Preparation and Characterization of Polyimide/SiO₂ Hollow Spheres Composites with Low Dielectric Constant*, H. Zhou, Y. Fan, Y.D. Song, H. Tang, X.X. Zhao, Harbin University of Science and Technology, China
- *The Emancipation of Polymer Concrete High Voltage Insulation in the USA*, M. Gunasekaran, Sekar Enterprises, USA

Switchgear

Chair: **Stefano Bomben, Ontario Power Generation**

- *Simulation of EM-Wave Modes exciting Characteristics of Partial Discharge in GIS*, J. Liu, Y. Qian, C. Huang, X. Jiang, Shanghai Jiaotong University, China
- *Very Fast Transient Oscillation Measurements at a 750 kV Substation*, G.M. Ma, C.R. Li, J.T. Quan, J. Jiang, North China Electric Power University, China

Transformers

Chair: **Rainer Patsch, University of Siegen**

- *Investigations on the Transformer High Frequency Transfer Function to interpretation of FRA Measurements*, H.Firoozi, M. Kharezi, IRAN TRANSFO Co, A. Farshidnia, Niro Research Institute, A. Akbari Azirani, K.NT University of Technology, Iran
- *Investigation of Core Effect on Frequency Response Analysis of Power Transformers*, H. Mohseni, Tehran University, Iran, S.A.Mousavi, H.R. Mirzaie, M. Eslamian, M. Kharezi, S.K. Miralikhane, IRAN Transfo Co., Iran
- *Transformer Insulation on the Threshold of New Era*, V. Mentlik, P. Trnka, J. Pihera, University of West Bohemia, Czech Republic
- *Effect of Oxygen on Oil Decay Products Formation*, A. Bouaïcha, I. Fofana, M. Farzaneh, Université du Québec à Chicoutimi, Canada
- *Electric Field Interaction in the Inter-Phase Region of Transformers*, P.M. Mitchinson, P.L. Lewin, University of Southampton, P.N. Jarman, National Grid, UK
- *Faults and Defects in Power Transformers: A Case Study*, C. de Jesus Ribeiro, D. Cascão Poli Souza, B. Pinheiro Alvarenga, R. Gonçalves Nogueira, Federal University of Goiás, A. Pereira Marques, C. Henrique Bezerra Azevedo, CELG Distribuição, Brazil

Monday, 1 June 2009

Opening Remarks 08:00 - 08:15

Oral Sessions

Plenary Session 08:15 - 09:00 Outremont

Chair: Bill McDermid, Manitoba Hydro

- *Design Challenges of Wind Generators*, George Gao, William Chen
TECO-Westinghouse Motor Company, USA

Coffee Break 09:00 - 09:15

Switchgear 09:15 - 11:15 Verdun

Chair: Masoud Farzaneh, Université du Québec à Chicoutimi

- *Advantage of On-Line Partial Discharge Continuous Monitoring of Medium Voltage Substation*, Igor Blokhintsev, Armin H. Loesch, Calvin L. Patterson, Eaton Corp., Brian J. Cassidy, Bayer Material Science, USA
- *A Novel Approach to High Voltage Substation Surveillance using Radio Frequency Interference Measurement*, A. Nesbitt, B.G. Stewart, S.G. McMeekin, S. Conner, J.C. Gamio, Glasgow Caledonian Univ., UK, K. Liebech-Lien, H. Kristiansen, S. Kråkenes, Doble TransiNor, Norway
- *Triangulation and 3D Location Estimation of RFI and Partial Discharge Sources Within a 400kV Substation*, B.G. Stewart, A. Nesbitt, Glasgow Caledonian University, UK, L. Hall, Doble Power Test Ltd., UK
- *Use of True PD producing Defects for Calibration and Sensitivity Check of UWB PD Sensors*, V.R. Garcia-Colon, Instituto de Investigaciones Eléctricas, México

Transelec Info Session 11:15 - 11:30 Verdun

Power Cable Injection – Rejuvenation of Power Cables,
Jean Dionne, Transelec/Common Inc.

Rotating Machines 1 09:15 - 11:15 Lachine

Chair: Ramtim Omranipour, GE Canada

- *Vibration Detection Instrumentation for Turbine-Generator Stator Endwindings*, C. Maughan, P.E Emeritus, Maughan Engineering Consultants, USA
- *Case Study – High Ozone Concentration in Hydrogenerators*, C. Millet, D.N. Nguyen, Hydro-Québec, L. Lépine, M. Bélec, D. Lessard-Déziel, C. Guddemi, IREQ, Canada
- *Acoustic Monitoring of Insulation Delaminations during Thermal Cycling Tests on a Stator Bar*, H. Zhu, D. Kung, Powertech Labs, Canada
- *Partial Discharge Testing of Random Wound Stators During Short Risetime Voltage Surges*, G.C. Stone, I. Culbert, Iris Power, Canada

Von Roll Info Session 11:15 - 11:30 Lachine

New Insulation Materials and Systems,
Dr. Nancy Frost, Technical Marketing Manager, Americas, Von Roll USA, Inc.

Transformer Diagnostics 1 09:15 - 11:15 Lasalle

Chair: Jitka Fuhr, BKW FMB Energie AG

- *Experience with 15-500 kV Instrument Transformers and Bushings*, W. McDermid, Manitoba Hydro, Canada
- *Predicting Transformers Oil Parameters*, K. Shaban, Qatar University, Qatar, A.H. El-Hag, American Univ. of Sharjah, United Arab Emirates , A. Matveev, University of Waterloo, Canada
- *Partial Discharge Location in High Voltage Transformers*, R. Mohamed, P.L. Lewin, University of Southampton, UK
- *Temperature Dependence of the Dielectric Properties of the Insulation System of Power Transformers*, R. Patsch, J. Menzel, University of Siegen, Germany

QPS Photonics Info Session 11:15 - 11:30 Lasalle

Next Generation Stator End Winding Monitoring Solution

Peter Kung, President of QPS Photonics Inc.

Lunch in Exhibits 11:30 - 14:00 Fontaine C - H

Cable Diagnostics 14:00 - 17:00 Verdun

Chair: John Densley, Arborlec Solutions

- *On Line Partial Discharge Diagnosis of Power Cables*, G.C. Montanari, University of Bologna, Italy **(Keynote)**
- *Dielectric Losses Diagnosis of Serviced Aged Oil Impregnated Paper Insulation of HV Power Cables*, P. Cichecki, E. Gulski, J.J. Smit, P. Van Nes, A.G. Ejigu, Delft University of Technology, F. e Vries, Liandon Alliander, Netherlands
- *Application of Partial Discharge Measurement on Laboratory Aged Low Voltage Cables*, Z.A. Tamus, R. Cselkó, I. Berta, Budapest University of Technology and Economics, Hungary
- *Use of Finite Element Analysis to Obtain Thermal Ratings for High Voltage Cable Joint Bays*, J.A. Pilgrim, D.J. Swaffield, P.L. Lewin, University of Southampton, S.T. Larsen, Southampton Dielectric Consultants, D. Payne, National Grid, UK
- *Dependence of the Dielectric Properties of Polyethylene Insulation Subject to Water Ingress with and without Electrical Aging*, J.-L. Parpal, D. Jean, D. Lalancette IREQ, S. Bernier, E. David, École de Technologie Supérieure, Canada

Rotating Machines 2 14:00 - 17:00 Lachine

Chair: Stefano Bomben, Ontario Power Generation

- *Innovative Web System for Condition-Based Maintenance of Generators*, C. Hudon, M. Bélec, IREQ, D.N. Nguyen, Hydro-Québec, Canada **(Keynote)**
- *PD Activity of Directly Water-Cooled Generator-Bar after Water-Penetration inside the Groundwall Insulation*, M.R. Naghashan, M.H. Motaharian, Power and Water University of Technology, Iran
- *Critical Cavity Size Producing Internal Discharges in Stator Bar Ground Wall Insulation*, A. Turgeon, C. Hudon, D.N. Nguyen, IREQ, Canada

- *New Insights and Complications in Determining Generator Stator Insulation Absorption Current Exponents and Constants from Polarization Index Test Data*, B. Milano, E. Eastment, B. Weeks, U.S. Bureau of Reclamation, USA
- *Life Tests of a Conventional Enamel Varying the Environmental Conditions*, F. Guastavino, A. Ratto, E. Torello, University of Genova, Italy

Transformer Diagnostics 2 14:00 - 17:00 Lasalle

Chair: Bernard Noirhomme, IREQ

- *Benefits and Limits of Advanced Methods Used for Transformer Diagnostics*, J. Fuhr, BKW FMB Energie AG, Switzerland **(Keynote)**
- *Development of an Integrated Low-Power RF Partial Discharge Detector*, P.C. Baker, B. Stephen, M.D. Judd, S.D.J. Mc Arthur, University of Strathclyde, UK
- *On-line Monitoring Transformer via Measuring of Transfer Function*, A. Setayeshmehr, H. Borsi, E. Gockenbach, Leibniz Universität Hannover, Germany, I. Fofana, University of Quebec at Chicoutimi
- *Condition Assessment of Oil-Paper Insulated Bushings*, B.K Gupta, AOK Technologies, J. Densley, ArborLec Solutions, A. Narang, Kinectrics, Canada
- *Development of Integrated Condition Monitoring and Diagnosis System for Power Transformers*, Xu Zhao, Yonghong Cheng, Yongpeng Meng, Kai Wu, Xi'an Jiaotong University, Hong Zhao, Jun Li, Qinghai Electric Power Corporation, China

Tuesday, 2 June 2009

Materials 08:00 - 11:00 Verdun

Chair: Laurent Lamarre, IREQ

- *Dielectric Breakdown of Polymeric Insulation Films Under AC, DC and Pulsed Voltages*, W. Yin, GE Global Research Center, USA, D. Schweickart, Air Force Research Laboratory, USA **(Keynote)**
- *Electronic Component Protection Using Solvent-Free, One Component Polyurethanes*, N. Cuminetti, ELANTAS PPG Inc. & ELANTAS Camattini, K.W. Lienert, ELANTAS Beck
- *Toughness improvement in epoxy/anhydride formulations for electrical insulation*, L. Valette, D. Ji, Y.J. Li, Dow Chemical (China) Investment Co. Ltd., China
- *High Energy Density Capacitors*, J.R. MacDonald, M.A. Schneider, J.B. Ennis, F.W. MacDougall, X.H. Yang, General Atomics Electronic Systems Inc., USA
- *Evaluation of the Performance of the Impregnating Resin of High Voltage Electrical Machine when Exposed to Raw Natural Gas*, V. Sihvo, J. Pyrhönen, Lappeenranta University of Technology, Finland, L. Brenne, StatoilHydro, Norway

Elantas PDG Info Session 11:00 - 11:15 Verdun

ELANTAS PDG - A Heritage of Innovation since 1919,
 Stephen Tuckwell, Vice President and Business Line Manager - SI
 Dave Reed, Area Manager

Rotating Machines 3 08:00 - 11:00 Lachine

Chair: David Malec, Université Paul Sabatier

- *Reduction Techniques of Partial Discharge, Dissipation Factor, and External Corona for High Voltage Stator Windings*, F.T. Emery, Siemens Energy Inc., USA **(Keynote)**
- *General Concepts Related to Turbine Generator Insulation Materials Used in Rotor Windings*, M.L. Miller, Siemens Energy Inc., USA
- *Anisotropic Dielectric Properties of Stress Grading Materials used in Medium Voltage Form-Wound Motor Coils to Study Thermal Effects of Repetitive Fast Pulses*, E. Sharifi, E.A. Cherney, S.H. Jayaram, University of Waterloo, Canada
- *Suppression of Partial Discharges in High-Voltage Rotating Machines*, M. Chapman, Von Roll Holding Ltd., R. Bruetsch, Von Roll Switzerland Ltd., Switzerland
- *Study on the Effect of Humidity on Dielectric Response and Partial Discharges Activity of Machine Insulation Materials*, R. Soltani, É. David, École de Technologie Supérieure, L. Lamarre, IREQ, Canada

EA Technology Info Session 11:00 - 11:15 Lachine

Non-Intrusive partial discharge detection system for HV switchgear assets,
Alan Roberts, Business Development Manager

Transformer Materials 1 08:00 - 11:00 Lasalle

Chair: Bal Gupta, A.O.K. Technologies

- *Insulation Systems for Liquid-Immersed Transformers – New Materials Require New Methods for Evaluation*, Roger C. Wicks, DuPont, USA **(Keynote)**
- *Forensic Analysis of a Silicone Oil Filled Mobile Transformer*, H.W. Penrose, Success by Design, USA
- *Review of Recent Changes to Insulating Oil Specifications*, S. Krawiec, Petro-Canada, Canada
- *Low Temperature and Moisture Effects on Oil-Paper Insulation Dielectric Response in Frequency Domain*, I. Fofana, H. Hemmatjou, F. Meghnefi, M. Farzaneh, Université du Québec à Chicoutimi, Canada, A. Setayeshmehr, H. Borsi, E. Gockenbach, University of Hanover, Germany
- *Condition Monitoring of Power Transformers using DGA and Fuzzy Logic*, B. Németh, I. Kiss, Budapest University of Technology and Economics, S. Laboncz, Ovit Zrt., Hungary

Megger Info Session 11:00 - 11:15 Lasalle

*DFR - Dielectric Frequency Response -
A new and reliable method to assess moisture in paper insulation*,
Mats Karlstrom, Business Development Manager Pax and Programma Products

Lunch in Exhibits 11:15 - 14:00 Fontaine C - H

Nano Materials 1 14:00 - 17:00 Verdun

Chair: Michel Fréchet, IREQ

- *Investigations on Dielectric Properties of Enameled Wires with Nanofilled Varnish for Rotating Machines fed by Inverters*, M.Q. Nguyen, D. Malec, D. Mary, Paul Sabatier University, France, P. Werynski, B. Gornicka, Electrotechnical Institute Warsaw and Wroclaw, Poland, L. Therese, Ph. Guillot, J.F. Champollion University, Albi, France
- *Electrical treeing in EVA-Bohemite and EVA-Montmorillonite Nanocomposites*, F. Guastavino, A. Dardano, University of Genova, G.C. Montanari, University of Bologna, L. Testa, University of Palermo, F. Bellucci, Center for the Culture of Plastic Materials Engineering, Italy
- *Extraction of Aging Markers for Nanostructured Epoxy Resin Aged under Surface Discharges*, D. Fabiani, A. Cavallini, G.C. Montanari, University of Bologna, L. Testa, Techimp Spa, Italy
- *Effect of Filler Materials and Pre-processing Techniques on Conduction Processes in Epoxy-based Nanodielectrics*, R.R. Patel, B. Kishorekumar, N. Gupta, Indian Institute of Technology
- *Preparation and Dielectric Properties of Epoxy – BN and epoxy - AlN Nanocomposites*, R. Kochetov, T. Andritsch, U. Lafont, P.H.F. Morshuis, S.J. Picken, J.J. Smit, Delft University of Technology, Netherlands
- *Nanomaterials in Liquid Electrical Insulation for Use in Inverter Duty Applications*, M. Winkeler, R.W. Goetter, ELANTAS PDG, Inc., USA

Rotating Machines 4 14:00 - 17:00 Lachine

Chair: Greg Stone, Iris Power

- *Searching for Partial Discharge Patterns for the Identification of Defects of Insulation Systems in AC Rotating Machines*, A. Contin, DEEI University of Trieste, Italy, H. Al-Marzouqi, The Petroleum Institute, UAE
- *Stator Winding Hipot (High Potential) Testing*, B.K. Gupta, AOK Technologies, G.C. Stone, Iris Power, Canada, J. Stein, EPRI, USA
- *Effect of Stress Grading Systems and Guarding Techniques on Measured Power Factor and Power Factor Tip-Up of Electric Machinery Stator Windings*, Ramtin Omranipour, Saeed Ul Haq, General Electric Canada Inc., Canada
- *Off-line and On-line PD Measurements on Induction Motors Fed by Power Electronics Impulses*, M. Tozzi, G.C. Montanari, D. Fabiani, A. Cavallini, University of Bologna, Italy, G. Gao, TECO-Westinghouse Motor Company, USA
- *Form Wound Stator Insulation System under Different Voltage Waveform Stresses*, Y.T. Yu, S.H. Jayaram, University of Waterloo, Canada

Cable Materials 1 14:00 - 17:00 Lasalle

Chair: Jan-Ove Boström, Borealis

- *Evolution of Medium Voltage Extruded Cable Technology in North America*, A. Mendelsohn, B. Richardson, Dow Chemical, USA
- *Cable Life Predictions from Breakdown and Accelerated Aging Tests: Influence of Frequency and High Fields*, J.-P. Crine, Consultant, Canada

- *Fire Accidents of the Power Cable Line in Tunnel and Preventive Methods*, J. Luo, State Grid Electric Power Research Institute, L. Zhang, Shanghai Electrical Power Corporation, Z. Zhou, Beijing Electrical Power Corporation, M. Luo, Huazhong University of Science and Technology, China
- *Application of Voltage Response Measurement on Low Voltage Cables*, Z.Á. Tamus, I. Berta, Budapest University of Technology and Economics, Hungary

Wednesday, 3 June 2009

Rotating Machines 5 08:00 - 11:00 Verdun

Chair: Remi Tremblay, Hydro-Québec

- *A New Approach Towards Surge Suppression and Insulation Monitoring for Medium Voltage Motors and Generators*, R.E. Pretorius, Strike Technologies, South Africa, C. Kane, A. Golubev Electrical Diagnostic Innovations LLC., USA
- *Field Experience in Insulation Diagnosis of Industrial High Voltage Motors using Dielectric Response Technique*, S.A. Bhumiwat, Consultant, New Zealand
- *Measurements of Slot Partial Discharges with an Antenna during Accelerated Aging*, C. Hudon, M. Bélec, IREQ, M. Lévesque, É. David, École de Technologie Supérieure, Canada
- *Experience With Field Coil Interconnection Failures on Large Hydro Generators Part I*, S. Bomben, J-B. LeBlanc, Ontario Power Generation, Canada
- *Comparison of DC Ramp and DC Step test results on Hydro Generator Stators*, Laurent Lamarre, IREQ, Éric David, Abdelkader Nair, École de Technologie Supérieure, Canada

Transformer Materials 2 08:00 - 11:00 Lachine

Chair: Paul Lewin, University of Southampton

- *Effect of Aging on the Dielectric Properties of Insulation Paper of Power Transformers*, B. Noirhomme, IREQ, H. Provencher, É. David, École de Technologie Supérieure, Canada
- *Oil with Presence of Corrosive Sulphur: Mitigation and Collateral Effects*, F. Scatiggio, Terna, Italy, M. Pompili, University of Roma, Italy, R. Bartnikas, IREQ, Canada
- *On the Stability of Mineral Insulating Oils under Electrical Stress*, I. Fofana, A. Bouaïcha, M. Farzaneh, C. Volat, Université du Québec à Chicoutimi, J. Sabau, InsOil Canada Ltd., Canada
- *Quantification of Reactive Sulphur in Transformer Oil*, D.H. Grant, Manitoba Hydro, Canada
- *Improvement of the Test Method for Dielectric Breakdown Voltage of Insulating Oils*, Werner Lick, Michael Muhr, Georg Pukel, Graz University of Technology, Austria, M. Baur, BAUR Test and Measuring Technique Ltd., Austria

Cable Materials 2 08:00 - 11:00 Lasalle

Chair: John Tanaka, University of Connecticut

- *Evolution and Future of Extra High Voltage Cables*, J.-O. Boström, Borealis, Sweden **(Keynote)**
- *Chemical Treatment of URD Cables*, W. Chatterton, UtilX Corp., USA, Jean Dionne, Transelec Common, Canada
- *Numerical Investigation of Temperature and Electric Field Dynamics in Polymer Insulation at HVDC*, C.O. Olsson, ABB, Sweden
- *Failure Modes and Condition Assessment of High Voltage Oil Filled XLPE Terminations*, K.B. Liland, S. Hvidsten, H. Faremo, SINTEF Energy Research, Norway, A. Kornberg Bjørke, Norwegian University of Science, E. Bjerkan, Nortroll, Norway

Nano Materials 2 13:00 - 16:00 Verdun

Chair: Davide Fabiani, University of Bologna

- *Innovation in Dielectric Materials: from Macro to Nanoscales*, M. F. Fréchet, IREQ, Canada **(Keynote)**
- *Thermal Behaviour of Epoxy Resin Filled with High Thermal Conductivity Nanopowders*, R. Kochetov, T. Andritsch, U. Lafond, P.H.F. Morshuis, S.J. Picken, J.J. Smit, Delft University of Technology, Netherlands
- *Breakdown and Electrical Aging Tests on Different Nanocomposite Materials*, F. Guastavino, A. Dardano, S. Squarcia, University of Genova, Italy, P. Tiemblo, J. Guzman, E. Benito, N. Garcia, Institute of Polymer Science and Technology, Spain
- *Preparation, Morphology and Dielectric Spectra of Polyimide/Alumina Nanocomposite Films*, H. Zhou, Y. Fan, G.Y. Wen, Harbin University of Science and Technology, China
- *Electrical Ageing Test on Conventional and Nanocomposite Enamels: PD Patterns Analysis*, Francesco Guastavino, G. Coletti, A. Ratto, E. Torello, University of Genova, Italy

Outdoor Insulation 13:00 - 16:00 Lachine

Chair: Ed Cherney, Each Engineering

- *Outdoor Insulators: Overview of In-Service Experience, Inspection Practice and Future Challenges*, M. Farzaneh, Université du Québec à Chicoutimi, Canada **(Keynote)**
- *Condition Monitoring of Post Insulators and Surge Arresters*, A.P. Vitols, ABB, USA, J. Stead, AltaLink Management Ltd., Canada
- *Experimental Evaluation of Liquid 'Glass-like' Coatings to Improve Tracking and Erosion Resistance of Insulators for Outdoor Applications*, B. Singh, ABB Corporate Research, Switzerland, H.D. Le, ABB, USA, P. Mahonen, ABB, Finland
- *Benefits of Higher Order Elements for Electrostatic Simulations of Large-Scale 3D Insulator Structures*, D. Weida, Thorsten Steinmetz, Markus Clemens, Helmut-

Schmidt-Universität, Daniele Stefanini, Jens-Martin Seifert, Lapp Insulator GmbH & Co.KG, Germany

**Reports on IEEE Standards for Rotating Machine Insulation 14:00 - 16:00 Lasalle
Chair: Chuck Wilson, Insulation Integrity Inc. / Siemens Energy & Automation**

- *P43 Insulation Resistance of Rotating Machinery*
Ian Culbert, Iris Power LP
- *P56 Insulation Maintenance of Electric Machines*
Doug Conley, Siemens Power Generation
- *P117 Test Procedure for Insulation Systems of Random-Wound AC Machines*
Nancy Frost, Von Roll USA
- *Std 522 Testing Turn Insulation of Form-Wound Stator Coils*
Chuck Wilson, Insulation Integrity Inc.
- *P1310 Thermal Cycle Testing of Form-Wound Stator Bars and Coils*
Greg Stone, Iris Power LP
- *P1665 Guide for Rewind of Synchronous Generators*
William H. Bartley, Hartford Steam Boiler
- *P1719 Guide for Evaluating Stator Cores*
Glenn Mottershead, Devine Tarbell & Associates
- *Std 1776 Thermal Evaluation of Unsealed or Sealed Insulation Systems*
Chuck Wilson, Insulation Integrity Inc.
- *P1798 Adoption of IEC 60034-18-41 (Effects of Drive Systems)*
Meredith Stranges, General Electric Canada
- *P1799 Quality Control Tests for External Discharges on Form-Wound Coils and Bars, VPI Generators and Fully Assembled Stators*
Remi Tremblay, Hydro-Québec

Note: The order in which the papers are presented may be changed.