

2022 IEEE Conference on Electrical Insulation and Dielectric Phenomena (CEIDP)

Outdoor Insulation: Service Experience and Advances in Materials, Testing and Condition Monitoring

Workshop Organized by the Outdoor Insulation Technical Committee of the IEEE Dielectrics and Electrical Insulation Society

Date and Time: Sunday Oct. 30th, 2022 – 7:00 am-1:30 pm (UTC-6)

In-Person Venue: Wazee Room, Hilton Garden Inn Denver Union Station, 1999 Chestnut Place, Denver, CO, USA

Virtual Venue: Zoom

Presentation Time: 30 minutes (includes 5 minutes for questions)

Workshop Program and Speakers

Hours in Mountain Daylight Saving Time (UTC-6)

Time	Activity/ Presentation Title	Speakers
07:00-08:00 am Breakfast in Wynkoop Room		
8:00-8:05 am	Welcome and Overview	Workshop Organizer, Dr. Refat Ghunem, NRC Canada
Theme I: Service Experience		
8:05-08:35 am	Service experience of 10 mln. line composite insulators: lessons to learn	Dr. Igot Gutman, Independent Insulation Group, Sweden
Theme II: Materials		
08:35-09:05 am	Housing Material Performance of Composite Insulators in High-Voltage Outdoor Application	Dr. Christiane Bär, PFISTERER Switzerland, Switzerland
09:05-09:35 am	Polymeric Insulators - Bonding Quality Aspects	Dr. Jan Lachman, EGU-HV Laboratory, Czech Republic
09:35-10:05 am	Viability of Fillers in Silicone Rubber Outdoor Insulation Composites under DC voltages	Dr. Refat Ghunem, NRC Canada
10:05-10:15 am Break		
10:15-10:45 am	Evaluation of Hydrophobicity retention, recovery and transfer	Prof. Dr. Stefan Kornhuber University of Applied Sciences Zittau/Görlitz, Germany
Theme III: Testing and Condition Monitoring		
10:45-11:15 am	Title: DC Tracking and Erosion Testing – Recent Activities in Cigre	Stefan Kühnel University of Applied Sciences Zittau/Görlitz, Germany
11:15-11:45 am	Application of Machine Learning in Outdoor Insulators Diagnostics: Current Practice and Future Trend	Prof. Dr. Ayman El-Hag, University of Waterloo, Canada
11:45-12:15 am	Partial Discharge Characteristics of Silicone Rubber Degradation in Inclined Plane Test	Valeria Pevtsov ^{1,2} and Prof. Dr. Behzad Kordi, ¹ University of Manitoba; ² Manitoba Hydro, Canada

12:15 am-12:20 pm	Closing Remarks	Dr. Refat Ghunem, NRC Canada
12:20-1:00 pm Lunch		

Speakers' Bios:



Refat Atef Ghunem (Senior Member, IEEE) received the B.Sc. and M.Sc. degrees from the American University of Sharjah, Sharjah, United Arab Emirates, in 2008 and 2010, respectively, and the Ph.D. degree from the University of Waterloo, Waterloo, ON, Canada, in 2014. He is currently the Team Leader of electrical power measurements at the Metrology Research Center, National Research Council Canada. He is also a Professeur Associé with the École de Technologie Supérieure, Montreal, QC, Canada. His research interests include outdoor insulation, application of novel measurement techniques in the study of polymeric insulating materials, and high-accuracy electrical power measurements. Dr. Ghunem is an Associate Editor of the IEEE Transactions on Dielectrics and Electrical Insulation, the Chair of the IEEE Outdoor Insulation Technical Committee, and a member of the Education Committee of the IEEE Dielectrics and Electrical Insulation Society. He is also a Professeur Associé at the Ecole de Technologie Supérieure and a Registered Professional Engineer in the Province of Ontario.



Dr. Igor Gutman has more than 40 years of professional experience in electrical power engineering. His main fields of interest has been optimal selection; dimensioning and maintenance of outdoor insulation intended to operate in clean and polluted (iced) environments; ageing characteristics of composite insulators and diagnostic techniques for outdoor insulation. Since October 2017 he is Marketing Director of Independent Insulation Group in Sweden.

He has published more than 250 conference and magazine technical papers. He is a Senior Member of IEEE, Distinguished Member of CIGRE, member of Swedish IEC TC 36 "Insulators", and has served as a Convener and member of several IEEE, IEC and CIGRE WG (SC A3, B2, C4 and D1).



Dr. Christiane Baer is Head of Research and Development Overhead Line division of the PFISTERER Group, a member of the Technical Management in the PFISTERER Group in Winterbach, Germany, and a member of the Division Management of PFISTERER Switzerland AG in Kuessnacht, Switzerland. She studied electrical engineering at the University of Applied Sciences Zittau/Goerlitz from 2005 to 2010 with professional education and training at the utility network operator enviaM (Germany). From 2010 to 2015, she worked as a research assistant at this university and received her PhD in 2016 from the Technical University of Munich in the field of polymeric insulating materials for high-voltage outdoor applications. Since November 2015, she has been working as a development engineer for composite insulators and insulator strings at PFISTERER SEFAG AG in Malters, Switzerland, now PFISTERER Switzerland AG. She is an active member of various national and international working groups in IEC, Cigre, study committees B2 and D1, in VDE, DKE AK451.02 as well as the Swiss TK15 and TK36.



Dr. Jan Lachman works as a Managing Director at EGU HV Laboratory. He received his Ph.D. degree from the Czech Technical University in Prague, Faculty of Electrical Engineering in 2001 dealing with Transients detection and evaluation using mathematical transformations. He worked at different position within EGU HV Laboratory. He has a working experience as a Design and Test Engineer at Tyco Electronics, Ireland. He deals with expert work concerning insulators and overhead lines. He is a member of several IEC and CIGRE working groups and has published several papers and delivered presentations at different power engineering expert events.



Stefan Kornhuber (SM'18) studied Electrical Power Engineering at the Graz University of Technology. In 2005 he received his Diploma Degree and in 2007 his doctoral degree with the main research topic on Temperature Measurement and Uprating of OHTLs. Till 2006 he was with Test Institute for High Voltage Engineering Graz GmbH with the main research topics in High Voltage Testing, Simulation and Investigation of Stresses of Transients in Electrical Power Networks. From 2006 to 2013 he was with Lemke Diagnostics GmbH and Doble Lemke GmbH in different positions also including responsibility for production, development and sales. In February 2013, he joined ABB AG Power Transformers - Engineering Solutions in Halle, Germany, as Head of Condition Management for Power Transformers and in March 2014 he got the responsibility for on-site and local High Voltage Test Field and Systems. In October 2014, he got the professorship in High Voltage Engineering and Theoretical Electrical Engineering at the University of Applied Science Zittau/Görlitz. The main research topics are outer and inner electrical interfaces of polymeric materials, test and measuring methods and methods for technical diagnostics. He is member of different working groups at CIGRE, IEC and DKE and is convenor of CIGRE D1.58 and IEC TC 112 WG3. In 2021 he received the CIGRE Technical Council SC D1 Award and in 2022 the IEC 1906 Award.



Cigre, IEC or DKE.

Stefan Kühnel received his graduate engineer (FH) in electrical power engineering from the University of Applied Sciences Zittau/Görlitz in 2012. Since then, he is working as a research assistant in the Department of High Voltage Technology / Materials of Electrical Engineering / Theoretical Electrical Engineering at University of Applied Sciences Zittau/Görlitz. His research focuses on the interfacial behaviour of insulating materials under contaminated conditions, i.e. medium and high voltage applications under outdoor conditions. This includes, for example, the pollution flashover behaviour of insulators, tracking and erosion and the hydrophobic properties of insulating materials. Since 2016, he has been working on his doctorate in cooperation with TU Dresden on the topic of erosion and tracking resistance of insulating materials under DC voltage stress. He is active in several international and national committees, such as



Ayman H. El-Hag (S'99-M'03-SM'08) received his B.S. and M.S. degree from King Fahd University of Petroleum and Minerals and his PhD from the University of Waterloo in 1993, 1998 and 2003 respectively. He joined the Saudi Transformer Co. as a Quality Control Engineer from 1993 till 1999. From January till June 2004, Dr. El Hag worked as a Postdoctoral fellow at the University of Waterloo then he joined the University of Toronto as an NSERC Postdoctoral fellow from July 2004 till July 2006. In 2006, Dr. El-Hag joined the electrical engineering department at the American University of Sharjah. He was promoted to associate and then to professor in 2011 and 2016 respectively. Currently, he is a lecturer at the electrical and computer engineering department at the University of Waterloo. Dr. El-Hag current main areas of interest are condition monitoring and diagnostics of electrical insulation and application of machine learning in power engineering. Dr. El-Hag was the middle east editor for the IEEE Insulation magazine from 2016-2018. Currently, he is an associate editor for the IEEE Transactions on Dielectric and Electrical Insulation Transaction and a member of the IEEE outdoor insulation committee. He was a member in the IEEE Std 1523 (IEEE Guide for the Application, Maintenance, and Evaluation of Room Temperature Vulcanizing (RTV) Silicone Rubber Coatings for Outdoor Insulation Applications) and IEEE Standard 2652, I IEEE Guide for DC Inclined Plane Tracking and Erosion Test for Outdoor Insulation Applications”.

Valeria Pevtsov received the B.Sc. and M.Sc. degrees in electrical engineering from the University of Manitoba, Winnipeg, Canada, in 2014 and 2021, respectively. She is an insulation systems test engineer at the Manitoba Hydro High Voltage Test Facility. She has six years of experience related to high-voltage testing and evaluation of electrical

insulation systems. Valeria is a registered professional engineer in the Province of Manitoba and is an active participant in the IEEE PES EMC Material's Subcommittee.



Behzad Kordi received the B.Sc. (with distinction), M.Sc., and Ph.D. degrees all in electrical engineering from Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran, in 1992, 1995, and 2000, respectively. During 1998 and 1999, he was with the Lightning Studies Group at the University of Toronto, Canada. In 2002, he joined the Electrical and Computer Engineering Department, University of Manitoba, Canada where he is currently a professor and the director of McMath High Voltage Laboratory. His research interests include high voltage engineering, electromagnetic compatibility, simulation models of transmission lines, and condition monitoring of high voltage apparatus. Dr. Kordi was the chair of URSI Canada Commission E in 2012-13. He is a member of a number of Cigré working groups. Dr. Kordi is a registered professional engineer in the province of Manitoba and was the recipient of 2012 IEEE EMC Richard B. Schulz best transactions paper award.