4th IEEE International Conference on Dielectrics

Technical Program

Palermo, Italy, July 3-7, 2022

Sponsored by
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Conference Committee
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Pietro Romano — Conference Chair — University of Palermo, Italy
Antonino Imburgia — Vice-Chair — University of Palermo, Italy
Giuseppe Rizzo — Treasurer — University of Palermo, Italy
Jérôme Castellon — Technical Program Committee Chair — University of Montpellier, France

Executive Committee ICD 2022
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Conference locations

Botanical Garden
On July 3rd, all events will take place in the Botanical Garden located in Via Lincoln 2, 90133 Palermo.
The Botanical Garden of the University of Palermo is one of the most important academic institutions in Italy. Considered a huge open-air museum, it boasts over two hundred years of activity that allowed it to be studied in Sicily, Europe and across the Mediterranean Sea, of countless plant species, many of which originate in tropical and subtropical regions. The peculiarity of this Garden is today represented by the great richness of host species that make it a very rich place of different flora expressions. It is part of the Museum System Services Centre of the University of Palermo.
Starting from 14:30, in the Botanical Garden the reception desk for the check-in and registration will be open until 19:00.
The Workshop will take place in the “Sala Lanza” of the Botanical Garden. After that, the Welcome Cocktail will be offered to the participants.

Mondello
Gala Dinner will be held at the ancient bathing establishment “Alle Terrazze” located in the Mondello beach.

Cefalù
The social event includes a visit to the seaside small town of Cefalù and its Norman Duomo.
Campus of the University of Palermo

From 4th to 7th July, all events will take place in the University Campus located in Viale delle Scienze, 90128 Palermo. The main conference room is the Aula Vincenzo Li Donni, where the Opening Session, Oral Sessions, E. O. Forster Memorial Lecture and the Dakin Award Lecture will take place. Further rooms are located in Section A of Building 19, where the reception desk for the check-in and registration as well as the workstation for poster sessions are present. Coffee break and lunch will take place in the same Section A of Building 19.
Check-in and registration

The reception desk for the check-in and registration will be open on Sunday 3rd at the Botanical Garden from 14:30 to 19:00. On Monday 4th the reception desk will be open at the Building 19 from 7:00 to 14:00. The other days it will always be possible to register from 8:00 to 14:00 at the Building 19 desk.

General information

Oral (plenary) presentations:
The plenary oral sessions will all take place in the Aula Vincenzo Li Donni and live-streamed via Zoom.

Presenters: Each author has 20 minutes available, maximum 15 minutes for the presentation and 5 for the questions. Presenters can use the house style of their institution for slides and provide either a PPT or PDF file. Presentation files for attendees that take part via remote attendance need to be uploaded as PPT or PDF copy by June 26, 2022. This is to enable the session chairs to show the presentation slides via Zoom, in case there are technical issues preventing any authors to do so themselves. Only session chairs and co-chairs will have access to presentation files, and the files will be deleted after the conference. Sessions will typically open 15-30 minutes before the start to allow session chairs to add to the computer the presentations of in person presenters and to verify microphones and/or camera are working for remote presenters and the ability to share their screen.

Participants: In order to save bandwidth and to allow for smooth proceedings, remote participants will be muted and not be able to share their video-feed when logging in. After logging in, please confirm that you are muted and that your camera is disabled. If you have a question to a presenter, please use the chat functionality to bring attention to yourself. Session chairs will then address you and enable you to use your microphone to ask a question. Please start your question by stating your name and affiliation. In case you have no functioning microphone, you can also ask questions in the chat, which will then read out by the session chair. Questions can be written in the chat during the presentation, you do not need to wait for the presentation to end.

Poster presentations (Gather App):
All participants, in person and virtual, attend the poster sessions on Gather App (https://www.gather.town). Moving with personal avatar on the virtual map you can participate in the poster sessions in the same way as the “real” poster sessions, but without the need to print the poster. Each poster session, which will be held in real time as scheduled, has a dedicated virtual room and each author has a virtual poster panel in which their poster is displayed as an A0 size image for a time of 1 hour and 40 minutes. The authors who present the poster have a position assigned and indicated with a coloured circle at the bottom left of each poster. The other participants will be able to access the rooms and, approaching the posters, view them and interact with the author via video camera and computer audio. Papers will be published in the conference proceedings only if at least one of the authors is present near the poster for the entire time of the session. It will be up to the session chairs to verify the presence of the authors.

The link to the IEEE ICD 2022 Gather environment will be provided to all registered conference attendees. All authors of a poster presentation have to send the poster as an A0 png or jpeg image (width: 841mm height: 1189 mm), with a resolution not less than 60 pixel/cm and maximum size of 5 Mb, via ConfTool by June 26, 2022.

Attendees in person will have some classrooms dedicated to poster sessions where they can connect their personal computer to the electricity network and to the Wi-Fi network. These classrooms are equipped with Schuko CEE 7/4 electrical sockets and Italian bipasso
sockets. Please be careful if you need to bring an adapter. Usb-type headphones with microphone will be provided by the organization but do not forget to bring your own too. Further details will be provided on the Conference website.

All conference times are Central European Time (CET). Please use a time-zone converter to establish what local time the sessions start for you.

**Gather virtual UNIPA Campus**

The ICD Gather app environment replicate the real map of the Paleramo University Campus and the buildings where the Conference will take place live.

![ICD 2022 Gather map of the Palermo University Campus](image)

Poster sessions take place in the virtual building 19 where you can find as many rooms as poster sessions.

![Internal map of the building 19 with poster session rooms](image)
Wi-Fi Connection

All the facilities of the University of Palermo are equipped with eduroam wi-fi connection. As an alternative, you can connect with the local wi-fi, wifi-unipa-wpa, following this simple procedure:

Connect to the link:
https://acube.unipa.it/ospiti/registrazione
This screen will appear and you will need to fill out the form.

After clicking on the green registration button, you will receive by email (for Italian only by sms) a temporary username and password to access to the local wifi-unipa-wpa. Before the departure from your country check that the eduroam connection is working well or register to obtain the credentials to access the local network.

Important note:
In person attendees, remember to bring your laptop to attend the poster sessions.
# Conference Agenda

<table>
<thead>
<tr>
<th>JULY</th>
<th>3</th>
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<tbody>
<tr>
<td></td>
<td>Sunday</td>
<td>Monday</td>
<td>Tuesday</td>
<td>Wednesday</td>
<td>Thursday</td>
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<tr>
<td>06:40</td>
<td>07:00 - 14:00</td>
<td>06:40 - 07:40</td>
<td>Street Art Tour</td>
<td>07:45 - 08:00 Breakfast for SA Tour</td>
<td>08:00 - 10:00</td>
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<tr>
<td>07:00</td>
<td>Registration</td>
<td>08:00 - 09:00</td>
<td>2020 Dakin Award Lecture</td>
<td>08:00 - 10:00</td>
<td>Oral session 4: Space Charges</td>
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<tr>
<td>08:00</td>
<td>08:20 - 09:30</td>
<td>09:00 - 10:00</td>
<td>Oral session 2: Theories and Models</td>
<td>08:10 - 10:20 Coffee Break</td>
<td>08:00 - 10:00</td>
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<tr>
<td>09:00</td>
<td>E.G. Forster Memorial Lecture</td>
<td>10:00 - 10:20 Coffee Break</td>
<td>09:00 - 10:00</td>
<td>Oral session 5: Advanced and Functional Materials</td>
<td>08:00 - 10:00</td>
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<tr>
<td>10:00</td>
<td>09:40 - 12:00</td>
<td>10:00 - 10:20 Coffee Break</td>
<td>Oral session 3: Materials and Insulation Systems</td>
<td>10:00 - 10:30 Coffee Break</td>
<td>Oral session 5: Partial Discharges</td>
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<tr>
<td>10:00</td>
<td>Oral session 1: Gold Session</td>
<td>10:00 - 10:30 Coffee Break</td>
<td>10:20 - 12:00</td>
<td>10:30 - 12:00</td>
<td>Oral session 7: Conduction and Breakdown</td>
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<tr>
<td>10:30</td>
<td>12:00 - 12:20 Coffee Break</td>
<td>10:45 - 12:20 Coffee Break</td>
<td>12:20 - 14:00</td>
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<tr>
<td>12:00</td>
<td>12:20 - 14:00</td>
<td>12:20 - 12:45</td>
<td>Poster session 3a - Materials and Insulation Systems, 2b - Space Charges</td>
<td>12:00 - 12:45</td>
<td>Oral session 8: Aging</td>
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<tr>
<td>12:30</td>
<td>Poster session 1: Theories and Models, 1b: Advanced and Functional Materials, 1c: Partial Discharges</td>
<td>12:20 - 14:00</td>
<td>12:20 - 14:40</td>
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<td>14:00</td>
<td>14:00 - 15:00</td>
<td>14:00 - 15:00</td>
<td>Lunch</td>
<td>14:00 - 16:00 International Advisory Committee Meeting</td>
<td>Closing of 2022 ICO</td>
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<tr>
<td>14:30</td>
<td>Lunch</td>
<td>14:00 - 15:00</td>
<td>Social Event (Cafàlù)</td>
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<td>Breakfast for SA Tour</td>
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<tr>
<td>15:00</td>
<td>Registration</td>
<td>15:00 - 19:30</td>
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<td>14:00 - 15:00 Lunch</td>
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<tr>
<td>15:30</td>
<td>Workshop: Challenges and Opportunities in Transport Electrification (Botanical Garden - Sala Lanza)</td>
<td>15:00 - 19:30</td>
<td>Social Event (Cafàlù)</td>
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<td>14:00 - 16:00 International Advisory Committee Meeting</td>
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<td>16:00</td>
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<td>14:00 - 15:00 Lunch</td>
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## IEEE ICD 2022 Conference Schedule

### Date: Sunday, 03/July/2022

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</table>
| 15:30pm - 18:00pm | Workshop: Challenges and Opportunities in Transport Electrification – Aula Lanza  
Thierry Lebey - Ian Cotton - Andrea Cavallini - Alberto Rumi - Thomas Andritsch |

### Date: Monday, 04/July/2022

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</thead>
<tbody>
<tr>
<td>8:00am - 8:20am</td>
<td>Opening Session</td>
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</tbody>
</table>
| 8:20am - 9:20am | E.O. Forster Lecture: E.O. Forster Memorial Lecture by Professor Jan van Turnhout – Aula Vincenzo Li Donni  
Chair: Peter Morshuis |
| 9:40am - 12:00pm | Oral Session 1: Gold Session – Aula Vincenzo Li Donni  
Chair: Thomas Andritsch |
| 12:20pm - 2:00pm | Poster Session 1a: Theories and Models - Gather room 1a  
Chair: Paolo Seri  
Poster Session 1b: Advanced and Functional Materials – Gather room 1b  
Chair: Davide Fabiani  
Poster Session 1c: Partial Discharges - Gather room 1c  
Chair: Detlef Wald |

### Date: Tuesday, 05/July/2022

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</table>
| 8:00am - 9:00am | 2020 Dakin Award Lecture by Professor Gary Stevens - Kinectrics UK – Aula Vincenzo Li Donni  
Chair: Davide Fabiani |
| 9:00am - 12:00pm | Oral Session 2: Theories and Models – Aula Vincenzo Li Donni  
Chair: Severine Le Roy  
Chair: Giuseppe Rizzo  
Oral Session 3: Materials and Insulation Systems – Aula Vincenzo Li Donni  
Chair: Antonios Tzimas  
Chair: Mikael Unge  
Poster Session 2a: Materials and Insulation Systems - Gather room 2a  
Chair: Orestis Vryonis  
Poster Session 2b: Space Charges - Gather room 2b  
Chair: Gilbert Teyssedre |
| 10:20am - 12:00pm | Oral Session 4: Space Charges – Aula Vincenzo Li Donni  
Chair: Naohiro Hozumi  
Chair: Kai Wu |
| 10:20am - 12:00pm | Oral Session 5: Advanced and Functional Materials – Aula Vincenzo Li Donni  
Chair: Sombel Diaham  
Chair: Ioana Preda  
Poster Session 3a: Treeing - Gather room 3a  
Chair: George Chen  
Poster Session 3b: Breakdown - Gather room 3b  
Chair: June-Ho Lee  
Poster Session 3c: Ageing - Gather room 3c  
Chair: Ludovic Boyer |
| 12:20pm - 2:00pm | Oral Session 6: Partial Discharges – Aula Vincenzo Li Donni  
Chair: Andrea Cavallini  
Chair: Juan M. Martinez-Tarifa  
Oral Session 7: Conduction and Breakdown – Aula Vincenzo Li Donni  
Chair: Antonino Imburgia  
Chair: Hucheng Liang  
Oral Session 8: Ageing – Aula Vincenzo Li Donni  
Chair: Erling Ildstad  
Chair: Eric David   |
Program
Monday 04/July/2022

E. O. Forster Memorial Lecture

**Time:** Monday, 04/July/2022: 8:20am - 09:20pm  
**Session Chair:** Peter Morshuis

In Eric Forster’s spirit, in pursuit of highly charged electret fibers for filter-media like face masks and open-cell electret foam for energy harvesting.
Professor Jan van Turnhout  
Delft University of Technology, the Netherlands.

Oral Session 1: Gold Session

**Time:** Monday, 04/July/2022: 9:40am - 12:00pm  
**Session Chair:** Peter Morshuis  
**Session Chair:** Thomas Andritsch

1-1 Effect of Polycyclic Aromatic Compounds Content on Electrical Tree and Partial Discharge of XLPE  
1School of Electrical and Information Engineering, Tianjin University, Nankai District, Tianjin 300072, China; 2State Grid Jiangsu Electric Power Co., LTD. Nanjing Power Supply Company, Nanjing 210019, Jiangsu Province, China;

1-2 Investigation of Thermal Conductivity and Breakdown Strength in Polypropylene/Ultra-High Molecular Weight Polyethylene Blends  
*Phichet Ketsamee*, Thomas *Andritsch*, Alun *Vaughan*  
University of Southampton, United Kingdom;

1-3 Performances of a PCB-based Loop Antenna Inductive Sensor for Partial Discharges Detection  
1University of Monastir, Tunisia; 2Faculty of Sciences of Monastir, Tunisia; 3L.E.PR.E. H.V. Laboratory, Department of Engineering, University of Palermo, Italy; 4SMALL Group, ICTEAM Institute, University catholique of Louvain, Belgium;

1-4 Calculation of Electric Field Profile within HVDC Cable Insulation in the Presence of Voltage Polarity Reversals  
*Bassel Diban*, Giovanni *Mazzanti*, Massimo *Marzinotto*, Antonio *Battaglia*  
1University of Bologna, Italy; 2TERNA, Roma, Italy;

1-5 Surface Charge Measurement of Insulating Spacer Simulating Temperature Gradient Environment in DC-GIS  
*Hajime Shimakawa*, Masahiro *Sato*, Akiko *Kumada*, Kunihiko *Hidaka*, Takanori *Yasuoka*, Yoshikazu *Hoshina*, Motoharu *Shiiki*  
1The University of Tokyo, Japan; 2Toshiba Energy Systems & Solutions Corporation;

1-6 Effect of mechanical loading history on the electrical breakdown strength of dielectric elastomers  
*Emmanuel Taine*, Thomas *Andritsch*, Istebreq A. *Saeedi*, Peter H. F. *Morshuis*  
1The Tony Davies High Voltage Laboratory, University of Southampton, UK; 2SBM Offshore R&D Laboratory, France; 3Solid Dielectric Solutions, The Netherlands;

1-7 Partial Discharge Charge Estimation In Gas-Insulated Substations Using Electric and Magnetic Antennas  
*Christian Mier Escurra*, Armando Rodrigo *Mor*  
1Delft University of Technology; 2Universidad Politecnica de Valencia;
1a-1 Towards the plasma-polymer simulation in treeing branches
Andrea Barbareschi Villa¹, Roger Schurch², Luca Barbieri¹, Giacomo Buccella³, Roberto Malgesini¹, Daniele Palladini¹
¹Ricerca Sul Sistema Energetico – RSE, Via Rubattino 54, Milan, Italy; ²Università Tecnica Federico Santa Maria, Avenida Espana 1680, Valparaíso, Chile; ³CMIC Department ‘Giulio Natta’, Politecnico di Milano, Piazza Leonardo da Vinci 32, 20133, Milan, Italy;

1a-2 Analysis of Small Reactance overload Faults in a 750kV Strongly Coupled Parallel Single Circuit Erection Line
Shan Li¹, Yadi Xie¹, Rui Dang², Fenglei Mu², Xiunan Chu³
¹State Grid Xinjiang Electric Power Research Institute, Xinjiang, Urumqi, 830011, China; ²State Grid Xinjiang Electric Power Company, Xinjiang, Urumqi, 830011, China; ³State Grid Xinjiang Maintenance Company, Xinjiang, Urumqi, 830011, China;

1a-3 Suppressing Metal Particle Lifting in GIS/GIL by Surface Fluorinated Epoxy Spacer
Yuhuai Wang¹, Jin Li¹, Wenbo Zhu², Jin He³, Chi Zhang², Hao Chen², Cheng Zhang²
¹School of Electrical and Information Engineering, Tianjin University; ²Electric Power Research Institute, China Southern Power Grid; ³State Grid Tianjin Electric Power Research Institute; ⁴Extra High Voltage Branch Company, State Grid Jiangsu Electric Power Co., Ltd.;

1a-4 Modelling and Characterization of Partial Discharge Activity versus Applied Voltage, Test Frequency and Temperature
Erling Ildstad¹, Torstein Aakre²
¹NTNU, Norway; ²SINTEF Energy Research, Norway;

1a-5 Effect of Insulating Binders on the Performance of Supercapacitors
Kingshuk Chatterjee, Nandini Gupta
IIT Kanpur, India;

1a-6 The Effect of Surface Traps on The Interfacial Charge Dynamics in Layered Dielectrics
Balaji Sriram¹, Nandini Gupta²
¹Indian Institute of Technology Kanpur (IITK), India; ²Indian Institute of Technology Kanpur (IITK), India;

1a-7 Unsupervised Machine Learning for Blind Separation of Multiple PD Sources
Mauro Palo¹, Benjamin Schubert¹, Jianguo Wei¹, Weilin Liu¹, Marcello Polenghi², Emanuele Giovanni Carlo Ogliari²
¹Global Energy Interconnection Research Institute Europe GmbH, Germany; ²Politecnico di Milano, Italy;

1a-8 Diffusion Characteristics of Solid Repair Medium in Cable Buffer Layer
Pengxian Song¹, Xiaohui Zhu¹, Xu Li³, Jing Fang¹, Zhanpeng Wei¹, Longji Li¹, Hao Liu², Qi Li², Xiaoxiao Kong², Boxue Du²
¹State Grid Tianjin Electric Power Research Institute, Tianjin 300072, China; ²School of Electrical and Information Engineering, Tianjin University, China;

1a-9 Focusing on the Effects of Longitudinal Heat Exchange on Electric Field and Temperature Distribution in HVDC Cable
Andrea Cristofolini, Bassel Diban, Giovanni Mazzanti, Giacomo Pierotti, Arturo Popoli
University of Bologna, Italy;

1a-10 Electron traps in polyethylene due to water
Mikael Unge¹,², Sarath Kumara¹, Anh Hoang³, Amirhossein Abbasi³, Claire Pitois¹
¹NKT HV Cables AB, Technology Consulting, SE-722 26 Västerås, Sweden; ²Department of Fibre and Polymer Technology, School of Engineering Sciences in Chemistry, Biotechnology and Health, KTH Royal Institute of Technology, SE-100 44, Stockholm, Sweden; ³NKT HV Cables AB, R&D, SE-371 23 Karlskrona, Sweden;

1a-11 Simulation of electric fields in insulation of a DC model cable under temperature gradient
Anh Hoang¹, Sarath Kumara², Amirhossein Abbasi¹, Mikael Unge², Claire Pitois²
¹NKT HV Cables AB, R&D, SE-371 23 Karlskrona, Sweden; ²NKT HV Cables AB, Technology Consulting, SE-722 26 Västerås, Sweden;
1a-12 Simulation of ionic contribution on space charge characteristics of XLPE insulations
Sarath Kumara1, Anh Hoang2, Mikael Unge1, Amirhossein Abbasi2, Claire Pitois1
1NKT HV Cables AB, Technology Consulting, SE-722 26 Västerås, Sweden; 2NKT HV Cables AB, R&D, SE-371 23 Karlskrona, Sweden;

1a-13 Impact of nanometric processes linked to charge generation on the macroscopic behaviour in polyethylene
Quyen Mai Hoang1, Severine Le Roy2
1Faculty of Electrical Engineering, Hanoi University of Industry, Hanoi, Vietnam; 2LAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France;

1a-14 A Townsend's secondary ionization coefficient estimation method for partial discharge inception voltage prediction for insulating polymers
Youcef Kemari1,2, Cyril Van De Steen1, Guillaume Belijar1, Lionel Laudebat2, Sombel Diahm2, Zarel Valdez-Nava2, Cédric Abadie1
1IRT Antoine de Saint Exupery, Toulouse, France; 2Laboratoire Plasma et Conversion d’Energie (LAPLACE), Toulouse, France;

1a-15 Comparison between modelling and measurements of PDIV on electrical machines for aeronautics
Benjamin Daguse, Hélène Gressinger, Thierry Lebey, Robin Acheen, Sabrina Ayat
SAFRA SA, France;

1a-16 Study and Numerical Simulation of a Duct-type ESP with Wavy Collecting Electrodes and Different Circular Corona Electrodes Radius
Angel Asipuela Gonzalez, Mo’ath Bani Fayyad, Ivánocy Tamás
Budapest University of Technology and Economics, Hungary;

1a-17 Cable Degradation Positioning Algorithm Based on Broadband Impedance Spectrum
Yufei Yao1, Tao Han1, Qiang Li1, Youcong Huang2, Zhongnan Zheng2
1School of Electrical and Information Engineering, Tianjin University,Tianjin 300072, China; 2Electric Power Research Institute of Fujian Power Co.Ltd. Fuzhou 350000, China;

1a-18 High-precision Estimation of Dielectric Elastomer Generator Output Considering Leakage Charge
Yu Hisada1, Muneaki Kurimoto1, Shinichi Mitsumoto2, Yasuo Suzuki3
1Nagoya University, Japan; 2National Institute of Technology Toyota College, Japan; 3Aichi Institute of Technology, Japan;

1a-19 A Novel UHF Antenna for Partial Discharge Detection Based on Fractal Theory
Boxue Du, Yanqi Zhao, Xiaoxiao Kong, Yun Chen, Qi Li, Yifang Wang, Lu Wang, Rundong Xue
Tianjin University, China, People's Republic of;

1a-20 An Improved Vivaldi Antenna for the UHF Partial Discharge Detection
Xiaoxiao Kong1, Yanqi Zhao1, Qi Li1, Boxue Du1, Wenbo Zhu2, Jing Mu3
1Tianjin University, Tianjin, China; 2China Southern Power Grid Electric Power Research Institute, Guangzhou, China; 3State Grid Jibeil Electric Power Company Limited Management Training Center, Beijing, China;

1a-21 Research on the Residual Stress Detection of Epoxy Resin Based on Acoustoelastic Effect
Rundong Xue1, Yun Chen1,2, Xiancai Han3, Boyuan Cui2, Yifang Wang1, Xiaoxiao Kong1, Boxue Du1
1Tianjin University, Tianjin, China; 2China Electric Power Research Institute, Beijing, China; 3UHV Construction Department of State Grid Corporation of China, Beijing, China;

Poster Session 1b: Advanced and Functional Materials

Time: Monday, 04/July/2022: 12:20pm - 2:00pm
Session Chair: Davide Fabiani

1b-1 Prediction of Lifetime in Surge Resistant Enamel Twisted Pair by Partial Discharge Degradation under Repetitive Impulse Voltage Application
Masahiro Kozako1, Yuki Zenda1, Shota Kodama1, Masayuki Hikita1, Noriyuki Hayashizaka2, Nobutaka Fujimoto2, Hideyuki Kikuchi3
1Kyushu Institute of Technology, Japan; 2Sumitomo Seika Chemicals Co., Ltd, Japan; 3Hide Technology LLC., Japan;
1b-2 Defects caused by degradation – A stumbling block for nanocomposites in thin film capacitors
Siegfried Werner, Joachim Kaschta, Dirk W. Schubert
Friedrich-Alexander-University Erlangen-Nuremberg, Germany;

1b-3 Non-Linear Dielectric Spectroscopy of P(VDF-TrFE-CFE) Films for Non-Volatile Memory Applications
Thulasinath Raman Venkatesan1,2, David Smykalla3, Bernd Ploss3, Michael Wübbenhorst2, Reimund Gerhardt1
1University of Potsdam, Germany; 2KU Leuven, Belgium; 3University of Applied Sciences Jena, Germany;

1b-4 Study of the Electrical Properties of Thin Silica Layers with a Single Plane of AgNPs Embedded Near the Surface
Charles Rigoudy, Kremena Makasheva, Christina Villeneuve-Faure, Gilbert Teyssedre, Laurent Boudou
LAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France;

1b-5 Dielectric Analysis and Thermal Stability of Polyaryletherketone (PAEK)/Sr2TiMnO6 (STMO) Composites
A Ashokbabu, P Thomas
Central Power Research Institute, Bangalore 560080, India;

1b-6 Metal-organic Framework/ Polypropylene films with enhanced High-temperature Breakdown Strength
Ke Chen, Boxue Du, Meng Xiao, Jianhang Zhang
Tianjin University, People’s Republic of China;

1b-7 Effect of Interface Thickness on Tuning Dielectric Properties of PVDF-TiO2 Nanodielectrics
Florin Ciuprina1, Laura Andrei1, Stefania Bádiilă2, Denis Panaitescu2
1University Politehnica of Bucharest, Romania; 2ICECHIM Bucharest, Romania;

1b-8 Effect of nanofillers in HVDC insulations on surface partial discharge activity
Paolo Seri1, Gabriele Neretti1, Christoph Diendorfer2
1University of Bologna, Italy; 2University of Applied Sciences Upper Austria, Austria;

1b-9 Dielectrophoretic Chain Assembly of BaTiO3 Particles in Silicone Gel Composites
Trong Trung Le, Zarel Valdez-Nava, Sombel Diaham
LAPLACE, Université de Toulouse, France;

1b-10 Study on the influence of electrospinning coating on polypropylene surface on the electrical property
Jianhong Song1, Zepeng Lv1, Haipeng Li1, Kai Wu1, Zhiquiang Chen2, Jia Wei2, Fan Guo2
1X’an Jiaotong University, China; People’s Republic of China; 2State Key Laboratory of Intense Pulsed Radiation Simulation and Effect, Northwest Institute of Nuclear Technology, X’ian, China;

1b-11 The Effect of Agglomeration on the Electrical Percolation of Polyimide/Graphene Nanocomposites
Imadeddine benfridia1,2,3, Sombel Diaham3,4, Bernard Stenson4, Baoxing Chen5, Tadhg Kennedy1,2
1Department of Chemical Sciences, University of Limerick, Limerick, Ireland; 2Bernal Institute, University of Limerick, Limerick, Ireland; 3University of Oxford, LAPLACE Institute, UPS, Toulouse, France; 4Analog Devices International, Limerick, Ireland; 5Analog Devices Incorporation, Wilmington, MA, USA;

1b-12 Comparison of TixSi1-xO2 mixed oxide and TiO2 in SiO2 nanocomposite dielectric properties at nanoscale
Villeneuve-Faure Christina1, Mitronika Maria2, Bououdou Laurent1, Ravisy William2, Besland Marie-Paule2, Richard-Ploquet Mireille2, Goulet Antoine2
1LAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France; 2Université de Nantes, CNRS, Institut des Matériaux Jean Rouxel, IMN, Nantes, France;

1b-13 Impact of fabrication process of polyethylene / boron nitride nanocomposite on morphology and dielectric properties
Villeneuve-Faure Christina1, Lahoud-Dignat Nadine1, Lantin Benoit1, Arinero Richard2, Ramonda Michel2, Semsanlar Mona3, Bechelany Mikhail3, Le Roy Severine1, Castellon Jerome2
1LAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France; 2IES, Université de Montpellier, Montpellier, France; 3EM –UMR 5635, Univ Montpellier, ENSCM, CNRS, Montpellier, France;
1b-14 Compliant Electrode Self-clearing in Electroactive Polymer Actuators

Zhang Xu1, Zepeng Lv1, Chen Zhang1, Kai Wu1, Peter Morshuis2, Aurore Claverie3
1School of Electrical & Electronic Engineering, Xi’an Jiaotong University, Xi’an, China; 2Solid Dielectric Solutions, Leiden, the Netherlands; 3SBM Offshore, Carros, France;

1b-15 Charge Regulation and Flashover Suppression by Surface Nonlinear Conductivity Spacer

Ji'an Dong1, Boxue Du1, Hang Yao1, Hucheng Liang1, Chi Zhang2
1School of Electrical and Information Engineering, Tianjin University, Tianjin, China; 2Extra-high Voltage Branch Company, State Grid Jiangsu Electric Power Co., Ltd, Jiangsu, China;

1b-16 Thermo-electrical aging of 3D printed PLA conductive composites: Dependence on printing orientation.

J. Crespo-Miguel, Juan M. Martínez-Tarifa, G. Robles, D. Garcia-Gonzalez, A. Arias
Universidad Carlos III de Madrid, Spain;

1b-17 Electric Field Control by Bulk Permittivity and Surface Conductivity Gradient Material for HVDC GIL Spacer

Hang Yao1, Boxue Du1, Hucheng Liang1, Jianan Dong1, Zehua Wang2
1School of Electrical and Information Engineering, Tianjin University, Tianjin, China; 2State Grid Tianjin Power Chengnan Power Supply Branch, Tianjin, China;

1b-18 Electric Field Regulation by Multi-dimensional Functional Materials for DC-GIS Spacer

Jianan Dong, Boxue Du, Hucheng Liang, Hang Yao
天津大学, China, People's Republic of;

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Poster Session 1c: Partial Discharges

Time: Monday, 04/July/2022: 12:20pm - 2:00pm
Session Chair: Detlef Wald

1c-1 Vacuum Degree Prediction Technology of Vacuum Interrupter through ACDC partial discharge Measurement

Seungmin Bang, Hyun-Woo Lee, Bang-Wook Lee
Hanyang university, Korea, Republic of (South Korea);

1c-2 Temperature effect on conservative PDIV prediction models based on Paschen’s Law

Manuel Gomez de la Calle2, Yan Vania Cleaz1, Angel M. Gómez1, Guillermo Robles1, Juan M. Martínez-Tarifa1
1Universidad Carlos III de Madrid, Spain; 2Comillas Pontificial University; Airbus Defense and Space;

1c-3 Partial Discharge Pulse Clustering Analysis using Wavelet Decomposition in Power Cables

Geonhyuk Park, Sungho Yoon, Beom An, Sanggoon Lee, Jeongtae Kim
DAEJIN UNIVERSITY, Republic of Korea, Korea, Republic of (South Korea);

1c-4 Statistical analysis techniques for Partial Discharges measurement under DC voltage

Alessio Di Fatta1, Pietro Romano1, Antonino Imburgia1, Giuseppe Rizzo2, Vincenzo Li Vigni2, Marco Albertini3, Stefano Franchi Bononi1
1University of Palermo, Italy; 2Prismatic Electronics, Palermo, Italy; 3Prismatic Group, Milan, Italy;

1c-5 DC Surface Discharge Characteristics for Effecting Icicle Growth of HVDC Outdoor Insulators

Chao Li1, Yong Liu1, Han Zhang1, B. X. Du1, Masoud Farzaneh2, Qiran Li2
1Tianjin University, China, People's Republic of; 2Université du Québec à Chicoutimi, Canada; 3State Grid Tangshan Power Supply Company, China, People's Republic of;

1c-6 The combined effect of a corona discharge and moisture on hydrophobicity of silicone rubber

Karina Poluektova, Sergey Vasilkov, Michail Tiuterev
Saint-Petersburg State University, Russian Federation;

1c-7 Temperature Gradient Affecting Electrical Tree Growth in EPDM for HVDC Cable Accessories

Fan Li, Boxue Du, Xiaoxiao Kong, Ying Zhang, Yifang Wang, Qi Li, Rundong Xue
School of Electrical and Information Engineering, Tianjin University, China, People's Republic of;
1c-8 Partial discharge defect recognition tool for MV/HV DC equipment
Matthieu Dalstein¹, Marc Medlock¹, Guy Clerc¹,², Emmanuel Boutleux¹,², François Wallart¹, Cong-Thanh Vu¹, Frank Jacquier¹, Alain Girodet¹
¹SuperGrid Institute, France; ²Laboratoire Ampère, France;

1c-9 Combined Electrical and Thermal Stress on Twisted Pairs: Study of the Variation over Time of the Partial Discharges Inception Voltage
Francesco Guastavino, Eugenia Torello
University of Genova, Italy;

1c-10 Investigation of discharge activity between rolling drops on an inclined plane
Anastasiya Slesarenko, Sergei Vasilikov, Karina Poluektova
Saint Petersburg State University, Russian Federation;

1c-11 The Impact of Partial Discharges on Their Inception Voltage on the Surface of Silicone Rubber
Sergei Vasilikov, Anton Trofimuk
St. Petersburg State University, Russian Federation;

1c-12 Study of Trapping Process in BOPP by Coupled Space Charge and Photo-stimulated Discharge Techniques
Duvan Mendoza Lopez, Gilbert Teyssedre, Laurent Berquez, Laurent Boudou
LAPLACE Laboratory, University of Toulouse, UPS and CNRS;

1c-13 Characterization of defects in aluminum nitride substrates through partial discharge measurements
Ivan Semenov¹, Ingrid Gunheim Folkestad¹, Kaveh Niayesh¹, Lars Lundgaard²
¹NTNU, Norway; ²SINTEF, Norway;

1c-14 Influence of Water Content Level on Partial Discharge Inception Voltage for Capacitively Graded Oil-Paper Insulation
Ivan Novko¹, Tomislav Župan¹, Igor Žiger²
¹Končar – Electrical Engineering Institute Ltd., Croatia; ²Končar – Instrument Transformers Inc., Croatia;

1c-15 Dielectric Characterization of Impregnating Varnishes for Inverter-Fed Motors
Alberto Rumi, Jacopo Gabriele Marinelli, Andrea Cavallini
University of Bologna, Italy;

Tuesday 05/July/2022

2020 Dakin Award Lecture

Time: Tuesday, 05/July/2022: 8:00am - 09:00pm
Session Chair: Davide Fabiani

Living Dielectrics?
Professor Gary Stevens
Kinectrics, United Kingdom

Oral Session 2: Theories and Models

Time: Tuesday, 05/July/2022: 9:00am - 10:00am
Session Chair: Severine LE ROY
Session Chair: Giuseppe RIZZO

2-1 Critical Analysis of a Bipolar Charge Transport Model Using Mathematical Tools for Solving Inverse Problems
khaled haliak¹, Fulbert Baudoin¹, Virginie Griseri¹, Florian Bugarin², Stéphane Segonds²
¹LAPLACE, University of Toulouse, CNRS, INPT, UPS, France.; ²ICA, University of Toulouse, UPS, INSA, ISAE, France;
2-2 Band alignment at Pt/PTFE interface: XPS experiment and first-principles calculation
Rurika Yoshinaga, Haruto Suzuki, Ryo Okano, Masaki Kobayashi, Akiko Kumada, Masahiro Sato
The University of Tokyo, Japan;

2-3 Molecular Dynamics Simulation of DBEGA/MHHPA System with Different Curing Degree
Pengxiao Guo, Jin Li, Xiaoxiao Kong, Yifang Wang, Fan Li, Boxue Du
School of Electrical and Information Engineering, Tianjin University;

Oral Session 3: Materials and Insulation Systems

Time: Tuesday, 05/July/2022: 10:20am - 12:00pm
Session Chair: Antonios Tzimas
Session Chair: Mikael Unge

3-1 Dry-type High Voltage Capacitors
Amanda Velazquez-Salazar¹, Olatoundji George Gnonhoue¹, Eric David¹, Ioana Preda²
¹Ecole de Technologie Supérieure, Montreal, Canada; ²University of Applied Sciences of Western Switzerland, Fribourg, Switzerland;

3-2 Effect of crystalline morphology on electric and thermal properties of β-polypropylene for HVDC cable insulation
Jianmei Cao¹-², Kui Li¹, Yungu Xing¹, Hao Zhang², Zhibin Fan², Jiwei Zhang³
¹Key Laboratory of Reliability and Intelligence of Electrical Equipment, Hebei University of Technology, Tianjin 300130, China; ²Electric Power Research Institute of State Grid Shandong electric power company, Jinan 250002, China; ³State Grid Jinan power supply company, Jinan 250012, China;

3-3 Partial Discharge Characteristic of Hairpin Windings for Inverter-Fed Motors
Chuxuan He¹, Michael Beltle¹, Stefan Tenbohlen¹, Thomas Hubert², Stefan Schmidt², Jörg Schneider²
¹University of Stuttgart, Germany; ²Dr. Ing. h.c. F. Porsche AG, Germany;

3-4 Targeted Thermal and Electrical Properties of Rubber Materials for HVDC Cable Accessories
Thi Thu Ngai Vu¹, Séverine Le Roy², Gilbert Teyssedre²
¹Electric Power university, Hanoi, Vietnam; ²Laplace, University of Toulouse - CNRS, France;

3-5 Inkjet printing: a new technique for manufacturing solid insulation systems
Ioana Preda¹, Dominique Rolle², Sebastian Filliger¹, Natalia Carrie¹, Gilbert Gugler¹
¹iPrint / HES-SO / HEIA Fribourg, Switzerland; ²Energy / HES-SO / HEIA Fribourg, Switzerland;

Poster Session 2a: Materials and Insulation Systems

Time: Tuesday, 05/July/2022: 12:20pm - 2:00pm
Session Chair: Orestis Vryonis

2a-1 On the Dielectric Relaxation Characteristics of Epoxy Resin Cured by Co-anhydride Hardener
Yifang Wang, Boxue Du, Xiaoxiao Kong, Yun Chen, Qi Li, Fan Li, Rundong Xue
Tianjin University, China, People's Republic of;

2a-2 Adaptation of the impregnation conditions of insulating transformer solids to the use of natural esters
Sandra Tresgallo¹, Jaime Sanz¹, Cristian Olmo¹, Cristina Méndez¹, Pedro Quintanilla¹, Diego F. García², Carlos Vila³
¹University of Cantabria, Spain; ²Universidad del Valle, Colombia; ³Iberdrola, Spain;

2a-3 Effect of Biaxial Orientation Process on Dielectric Properties of Polypropylene for Film Capacitor
B. X. Du, Yongping Hou, Meng Xiao, Haoliang Liu, Z. Y. Ran
Tianjin University, China, People's Republic of;
2a-4 Study on the Influence of Cross-linked Network Modifiers on the Dielectric Properties of Epoxy Resin
Fan Li, Boxue Du, Xiaokiao Kong, Yun Chen, Yifang Wang, Rundong Xue, Qi Li
School of Electrical and Information Engineering, Tianjin University, China, People’s Republic of;

2a-5 Evaluation of TSCC method on polypropylene films: deviations from isothermal method
Marco Michelazzi, Davide Fabiani, Paolo Seri
DEI, University of Bologna, Italy;

2a-6 Effect of Icing Thickness on Insulating Properties of 10 kV Insulated Overhead Lines during the Line Galloping
Zhihui Wang¹, Yong Liu¹, Hao Wang¹, B. X. Du¹, Hongbao Zong², Qiran Li³
¹Tianjin University, China, People’s Republic of; ²Power Cable Company of State Grid Tianjin Electric Power Corporation, China, People’s Republic of; ³State Grid Tangshan Power Supply Company, China, People’s Republic of;

2a-7 Defect Detection and Recognition of Insulation Pull Rod Based on the Ultrasonic Method
Rundong Xue¹, Yun Chen¹,², Xiancai Han², Boyuan Cui², Xiaokiao Kong¹, Boxue Du¹
¹Tianjin University, Tianjin, China; ²China Electric Power Research Institute, Beijing, China; ³UHV Construction Department of State Grid Corporation of China, Beijing, China;

2a-8 Impact of Dielectric Material and Contact Region on Internal Resistance of Metallized Film Capacitors
Avnish Kumar Upadhyay¹, Sarath Kumara¹,², Yuriy V. Serdyuk¹
¹Chalmers University of Technology, Sweden; ²NKT HV Cables, Sweden;

2a-9 Comparison of Frequency Dependent and Pi Section HVDC Cable Models in the Presence of Harmonics
Arshad Arshad, Brian G. Stewart
University of Strathclyde, United Kingdom;

2a-10 Dielectric and Mechanical Properties of Silicone Rubber for Cable Termination at Low Temperature
Qi Li¹, Xiaokiao Kong¹, Boxue Du¹, Pengxian Song², Qinghua Tang², Longji Li³, Dewen Zhang³
¹School of Electrical and Information Engineering, Tianjin University, China; ²State Grid Tianjin Electric Power Research Institute, Tianjin, China; ³State Grid Heilongjiang Electric Power Company, Harbin, China;

2a-11 Investigation of the Loss Tangent and Permittivity of Solid Insulation Materials at Medium Frequency
Jan Vocke, Albert Moser
RWTH Aachen University, Germany;

2a-12 Multiscale properties of polymeric insulating materials: from microscale polarizability to macroscale permittivity
Simone Vincenzo Suraci, Davide Fabiani
LIMES (Laboratory of Innovative Materials for Electrical Systems) – DEI University of Bologna, Bologna, Italy.;

2a-13 Effect of Thermal Treatment on the Dielectric Performance of a Silicone Rubber
Orestis Vryonis¹, Thomas Andritsch¹, Alun S. Vaughan¹, Peter Morshuis², Aureole Claverie³
¹The Tony Davies High Voltage Laboratory, University of Southampton, Southampton, UK; ²Solid Dielectric Solutions, Leiden, the Netherlands; ³Single Buoy Moorings Inc., Marly, Switzerland;

2a-14 The Influence of Temperature on the Dielectric Losses of Epoxy Resin Under Harmonic Distorted Voltages
Thomas Linde¹, Karsten Backhaus¹, Stephan Schlegel¹, Jun Ting Loh², Stefan Kornhuber²
¹Institute of Electrical Power Systems and High Voltage Engineering, Technische Universität Dresden; ²Department of High Voltage Engineering/Materials/Electromagnetic Theory, University of Applied Sciences Zittau/Görlitz;

2a-15 Interference of Stray Gases in the Diagnosis of Low temperature Faults in Soybean-Based Natural Esters
Matias Meira¹, Raúl Álvarez², Carlos Verucchi¹, Leonardo Catalano²
¹INTELYMEC (UNCPBA) and CIFICEN (UNCPBA-CICPBA-CONICET), Olavarría, Argentine Republic; ²IITREE-LAT-FI-UNLP, La Plata, Argentine Republic;
2a-16 Influence of Plasticizers on the Properties of Ethylene-Propylene-Diene Monomer (EPDM) for High Voltage Cable Accessories
Bo Qiao, Wenpeng Li, Xin Chen, Chong Zhang, Xiaoning Shi
State Key Laboratory of Advanced Power Transmission Technology (State Grid Smart Grid Research Institute co.LTD);

2a-17 Polyimide-based Integrated Transformers and Capacitors for High Voltage Galvanic Isolation
Marco Salina¹, Fabrizio Cerini², Linda Montagna³, Silvia Adorno², Dario Paci², Donata Asnaghi¹
¹STMicroelectronics, Agrate Brianza, Italy; ²STMicroelectronics, Comaredo, Italy;

2a-18 Electrical properties of XLPE insulation obtained by the new LSHC® production process
Álvaro Pérez¹, Denis Labbé², Jerome Castellon³
¹REPSOL, Spain; ²P&M Cable Consulting; ³Univ Montpellier, CNRS;

2a-19 Dielectric Properties of Bisphenol-A Epoxy Resin Cured with Mixed Anhydride
Songtao Liu¹, Jin Li², Pengxiang Guo², Guanfei Zhao², Xiaoxiao Kong¹, Boxue Du¹
¹School of Electrical and Information Engineering, Tianjin University; ²Weihai Company of State Grid Shandong Electric Power Company;

2a-20 Effects of Curing Degree on the Dielectric Properties of Anhydride Cured Epoxy Resin
Pengxiang Guo¹, Jin Li, Xiaoxiao Kong, Yifang Wang, Fan Li, Boxue Du¹
School of Electrical and Information Engineering, Tianjin University;

2a-21 Investigating the I-V characteristics of an HTV silicone rubber for MVDC electrical insulation
Igor Silva¹,², François Gentils², Pascal Rain¹
¹Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, F-38000 Grenoble, France; ²Schneider Electric, Rue Henri Tarze, 38000 Grenoble, France;

2a-22 Relative Permittivity and Dielectric Dissipation Factor of Palm Fatty Acid Ester with Different Nitrogen Fine Bubbles Generation Times
Norimitsu Takamura, Nobutaka Araoka, Masahiro Fujimura, Masahiro Hanai
Fukuoka University, Japan;

2a-23 Dielectric Performance of Physicochemical Treated Metallized Film Under Electro-Thermal Stresses
Haider M. Umran¹,², FEIPENG WANG¹
¹CQU, China, People's Republic of China; ²University of Karbala, Karbala 1125, Iraq;

2a-24 Improved Flashover Characteristics of Surface Modified Epoxy by Ion Beam Treatment
Inzamam Ul Haq¹, Feipeng Wang¹, Shakeel Akram², Yuyang Yan¹
¹Chongqing University, China, People's Republic of; ²College of Electrical Engineering, Sichuan University, Chengdu 610065, China;

2a-25 Hazard, Label, and Volatile Organic Compound Free Impregnation Resin for Rotating Machines
Keiza Ann Fernandes, Simon Rost
Elantas Europe GmbH, Germany;

2a-26 Comparison of Thermal Degradation between Soft and Hard Epoxy Resins
Yoshimichi Ohki, Hiroyuki Ishii, Naoshi Hirai
Waseda University, Japan;

2a-27 Corona resistant enamels developed in Elantas Europe: an opportunity for sustainability
Giovanna Biondi
ELANTAS EUROPE Srl., Italy;

Poster Session 2b: Space Charges

Time: Tuesday, 05/July/2022: 12:20pm - 2:00pm
Session Chair: Gilbert Teyssedre

2b-1 Set-Up for Space Charge Measurement with LIPP-Method During Aging of Polymeric Insulating Materials Under High DC Voltage
Henry Hirte¹, Sebastian Braun², Stefan Kornhuber¹, Peter Werle²
¹University of Applied Sciences Zittau / Görlitz, Germany; ²Leibniz University Hannover, Germany;
2b-2 Effect of Humidity on Charge Accumulation on Polymer-Air Interfaces under DC Stress
Daniel Svensson, Olof Hjortstam, Sarath Kumara, Yuriy Serdyuk
1Hitachi Energy Research, Sweden; 2Chalmers University of Technology;

2b-3 Space Charge Measurement of Thick Insulating Materials
Xiaoxin Li, Masaki Utagawa, YEONG-GUK AN, Tomohiro Kawashima, Yoshinobu Murakami, Naohiro Hozumi
Toyoashi University of Technology, Japan;

2b-4 Space Charge Behavior under Different Electric Fields in Acrylic Elastomer
Chen Zhang, Zepeng Lv, Zihang Xu, Kai Wu, Peter Morshuis, Aurore Claverie
1School of Electrical & Electronic Engineering, Xi’an Jiaotong University, Xi’an, 710049, China; 2Solid Dielectric Solutions, Leiden, the Netherlands; 3SBM Offshore, Carros, France;

2b-5 Measurement of Electric Field Distribution in Thick Polymer Film
Yuxiao Yang, Feihu Zheng, Yewen Zhang
Tongji University, China, People’s Republic of;

2b-6 Investigation on Charge Transport Model Considering the Influence of Ionized Charges
Yifei He, Kai Wu, Yang Wu, Chunyang Zhang, Zepeng Lv
State Key Lab. of Electrical Insulation and Power Equipment, Xi’an Jiaotong University, China, People’s Republic of;

2b-7 Measurement of Electric Field Distribution in Thin Polyimide Film
Qian Wei, Feihu Zheng, Yewen Zhang
Tongji University, China, People’s Republic of;

2b-8 Equivalent charge distribution in PVDF films using Electro-Acoustic-Reflectometry (EAR)
Étienne Maréchal, Emmanuel Géron, Stéphane Holé
CNRS/ESPCI/SU, France;

2b-9 Space charge measurement under very low voltage for assessing interface effects due to measurement conditions
Lin Zheng, Stéphane Holé
SU/ESPCI/CNRS, France;

2b-10 Coupled Temperature/Space Charge Measurements in Dielectrics using a Thermal Step applied by a Coolant Liquid
Abdellah OUKMS, Petru NOTINGHER, Serge AGNEL
IES, Université de Montpellier, CNRS, Montpellier, France;

2b-11 Space Charge Characteristics of Epoxy/BN nanocomposites by using Surface Modification
Leiyu Hu, Weiwang Wang, Qihang Jiang, Shixin Yu, Yong Feng
Xi’an Jiaotong University, China, People’s Republic of;

2b-12 The Influence of Additives on the Space Charge and Conduction Characteristics of the Thermoplastic Insulators for the HVDC Cables
Chul-Ho Kim, JUNE-HO LEE
Hoseo University, Korea, Republic of (South Korea);

2b-13 Effect of Structural Morphology on Space Charge Characteristics of Epoxy/paper Composites
Jingxin Wang, Zongliang Xie, Peng Liu, Zongren Peng
State Key Laboratory of Electrical Insulation and Power Equipment, Xi’an Jiaotong University;

2b-14 Uncertainties of the Pulsed Electroacoustic Method: Peak Positions of Embedded Charge Distributions
Zachary Gibson, JR Dennison
Utah State University, United States of America;

2b-15 Pockels Effect based diagnostic for live surface charging studies: Principles, practice and challenges
Anne Limburg, Lars Mentink, Tom Oosterholt, Stein van Eden, Jeroen Raaymakers, Sander Nijdam
1Department of Applied Physics, Eindhoven University of Technology, PO box 513, 5600 MB Eindhoven, The Netherlands; 2ASML Netherlands B.V., De Run 6501, 5504 DR Veldhoven, The Netherlands;
2b-16 Crystallization Effects on Space Charge Accumulation in Polypropylene under DC Voltage

Luming Zhou, George Chen
University of Southampton, United Kingdom;

2b-17 Effect of Gamma-Irradiation on Creation and Dynamic of Space Charge in PTFE

Ali Mezouar1, Virginie Griseri2, Nadia Saidi-Amroun3, Gilbert Teyssedre2, Mohamed SaidiAIDI1
1University of Sciences and Technology Houari Boumediène (USTHB), Algeria; 2LAPLACE, Université de Toulouse and CNRS, 118 Route de Narbonne, 31062 Toulouse Cedex 9, France;

2b-18 Simulation of AC Space Charge in XLPE under Needle-Plate Electrode

Qiang Li, Xin Zhao, Yufei Yao, Tao Han
School of Electrical and Information Engineering, Tianjin University, Tianjin 300072, China;

2b-19 Effects of Pre-crosslinking on the Aggregate Structure and Space Charge Properties of XLPE

You Wu1, Boxue Du1, Zhonglei Li1, Yuming Dong1, Heyu Wang1, Hao Liu1, Zhenpeng Zhang2, Chao Fu2, Shaoxin Meng2, Chao Peng2
1Key Laboratory of Smart Grid of Education Ministry, School of Electrical and Information Engineering, Tianjin University, Tianjin 300072, China; 2State Key Laboratory of Power Grid Environmental Protection, China Electric Power Research Institute, Wuhan 430073, China;

2b-20 Electret Properties of Layered Structures Based on Low Density Polyethylene Films

Andrey Rychkov1, Alexey Kuznetsov1, Anna Guliakova1, Dmitry Rychkov2
1Herzen State Pedagogical University, Russia; 2Deggendorf Institute of Technology, Germany;

2b-21 Observation of Dipole Polarization in Epoxy Resin using PEA Method at High Temperature under High DC Stress

Kosuke Sato, Naho Saito, Hiroaki Miyake, Yasuhiro Tanaka
Tokyo city university, Japan;

2b-22 Polarization Charge Measurement under DC/AC Voltage Using the Improved PEA Method

Kazuki Endo, Kaisei Enoki, Hiroaki Miyake, Yasuhiro Tanaka
Tokyo City University, Japan;

2b-23 Effect of Electrode Material Type on Space Charge Characteristics in Polymers

Tianwei Ren, jingxin Wang, Zongliang Xie, Tianlei Xu, Xi Pang, Peng Liu, Zongren Peng
Xian jiaotong University, China, People's Republic of;

2b-24 Influence of Hardener Stoichiometry in Epoxy Resin on Space Charge Accumulation Characteristics at High Temperature Under High Electric Field

Naho Saito, Tatsuya Iwasaki, Kosuke Sato, Hiroaki Miyake, Yasuhiro Tanaka
Tokyo city university, Japan;

2b-25 Space Charge Accumulation Behavior on Fluorinated Polymer Irradiated with Protons at Different Fluxes

Kaisei Enoki, Kazuki Endo, Hiroaki Miyake, Yasuhiro Tanaka
Tokyo City University, Japan;

Wednesday 06/July/2022

Oral Session 4: Space Charges

Time: Wednesday, 06/July/2022: 8:00am - 10:00am
Session Chair: Naohiro Hozumi
Session Chair: Kai Wu

4-1 Impact of additives and fillers on space charge behavior of polyethylene insulation: investigation and modeling

Daniele Mariani, Simone Vincenzo Suraci, Davide Fabiani
LIMES (Laboratory of Innovative Materials for Electrical Systems) – DEI University of Bologna, Bologna, Italy., Italy;
4-2 Study of the electrical properties of HVDC XLPE cable after type test

Maya MOURAD, Servane HALLER, Priscillia DANIEL, Sophie IGLESIAS, Ludovic BOYER, Martin HENRIKSEN
Supergrid Institute, France;

4-3 Effect of Antioxidants on Mechanical, Electrical, and Thermal Oxidative Properties of Polypropylene-based Semiconducting Screen

Xintong Ren¹, George Chen¹, Mingyu Zhou², Haitian Wang², Yi Luo²
¹Tony Davies High Voltage Laboratory, University of Southampton, Southampton, United Kingdom; ²Global Energy Interconnection Research Institute Europe, Berlin, Germany;

4-4 Two-dimensional Space Charge Measurement of Scaled Cable Joint Model

Shafira Zahra¹, Masaki Utagawa¹, Tomohiro Kawashima¹, Yoshinobu Murakami¹, Naohiro Hozumi¹, Peter Morshuis², Young-il Cho³, Yoon-hyoun Kim³
¹Toyohashi University of Technology, Japan; ²LS Cable & System Ltd., Korea; ³LS Cable & System, Korea, Republic of (South Korea);

4-5 Space Charge Measurement on Full-sized HVDC Joint with Voltage Class up to 150 kV

Yoonhyoung Kim¹, Youngil Cho¹, Sunkak Kim¹, Wookyoung Lee¹, Naohiro Hozumi², Peter Morshuis³
¹LS Cable & System, Korea, Republic of (South Korea); ²Toyohashi University of Technology, Japan; ³Solid Dielectric Solutions, the Netherlands;

4-6 Experimental considerations on the effect of space charge accumulation on partial discharges activity for alternative and commercially available wire insulations

Hadi Naderiallaf¹, Paolo Giangrande², Michael Galea³
¹University of Nottingham, United Kingdom; ²University of Malta, Malta; ³University of Malta, Malta;

Oral Session 5: Advanced and Functional Materials

Time: Wednesday, 06/July/2022: 10:20am - 12:00pm
Session Chair: Sombel Diaham
Session Chair: Ioana Preda

5-1 Dynamic Mechanical Response in Epoxy Nanocomposites Incorporating Various Nano-Silica Architectures

Sunny Chaudhary¹, Orestis Vryonis¹, Michael Feuchter², Alun Vaughan¹, Thomas Andritsch¹
¹University of Southampton, United Kingdom; ²University of Leoben, Austria;

5-2 Comparison between AC and DC polarization methods of piezoelectric nanofibrous layers

Giacomo Selleri, Leonardo Gasperini, Lorenzo Piddiu, Davide Fabiani
Università di Bologna, Italy;

5-3 Engineered Interfaces in Extruded Polyphenylsulfone-Boron Nitride Composite Insulation

Tiffany Williams¹, Baochau Nguyen², Andrew Woodworth¹, Marisabel Kelly¹
¹NASA John H. Glenn Research Center, United States of America; ²University Space Research Association;

5-4 Study on Partial Arc Discharge Propagation Characteristics of SR/SiO2 Nanocomposites

Hao Wang¹, Yong Liu¹, Zhihui Wang¹, B.X. Du¹, Sheng Gao², Xianghuan Kong³
¹School of Electrical and Information Engineering, Tianjin University, Tianjin 300072, China; ²Binhai District Power Supply Company of State Grid Tianjin Electric Power Company, Tianjin, China; ³Xuzhou Power Supply Branch State Grid Jiangsu Electric Power Limited Corporation, Xuzhou, China;

5-5 Impact of the interphase dielectric properties on the electric field distribution in LDPE/BN nanocomposites

C. Villeneuve-Faure¹, N. Lahoud Dignat¹, B. Lantin¹, R. Arinero², M. Ramonda², M. Semsarlar³, M. Bechelany³, S. Le Roy¹, J. Castellon²
¹LAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France; ²INES, Université de Montpellier, Montpellier, France; ³IEM –UMR 5635, Université de Montpellier, ENSCM, CNRS, Montpellier, France;
Poster Session 3a: Treeing

Time: Wednesday, 06/July/2022: 12:20pm - 2:00pm
Session Chair: George Chen

3a-1 Relationship Between Electrical Treeing Degradation and DCIC-Q(t) Characteristics of XLPE Insulation
Heyu Wang1, Zhonglei Li1, Shuofan Zhou1, Mingsheng Fan1, You Wu1, Boxue Du1, Zhuoran Yang2
1School of Electrical and Information Engineering, Tianjin University, Nankai District, Tianjin 300072, China; 2State Grid Jiangsu Electric Power Co., LTD. Nanjing Power Supply Company, Nanjing 210019, Jiangsu Province, China;

3a-2 Electrical Tree Growth Characteristics of Fiber Reinforced Epoxy Resin under Tensile Stress
Lu Wang1, Yun Chen1,2, Xiancai Han3, Boyuan Cui2, Rundong Xue1, Xiaoxiao Kong1, Boxue Du1
1Tianjin University, Tianjin, China; 2China Electric Power Research Institute, Beijing, China; 3UHV Construction Department of State Grid Corporation of China, Beijing, China;

3a-3 Effect of Assistant Crosslinker (TAIC) on Improving Water Tree Resistance of Crosslinked Polyethylene
Qiang Li1, Yufei Yao1, Xin Zhao1, Tao Han1
School of Electrical and Information Engineering, Tianjin University Tianjin 300072, China;

3a-4 Effect of Water Tree on Broadband Impedance Spectrum of 10 kV cable
Yufei Yao1, Tao Han1, Qiang Li1, Youcong Huang2, Zhongnan Zheng2
1School of Electrical and Information Engineering, Tianjin University, Tianjin 300072, China; 2Electric Power Research Institute of Fujian Power Co. Ltd, Fuzhou 350000, China;

3a-5 Electrical Tree Growth under Square Wave Voltages with DC Bias
Faisal Mohammed Aldawsari1, Harry McDonald1, Simon Rowland1
University of Manchester, United Kingdom;

3a-6 Effects of Mechanical Stress on Electrical Tree Growth in Epoxy Resin at High Temperature
Fan Li1, Boxue Du1, Yun Chen1, Lu Wang1, Ying Zhang1, Yifang Wang1, Xiaoxiao Kong1
School of Electrical and Information Engineering, Tianjin University, Tianjin 300072, China;

3a-7 Simulating electrical trees propagation using a kinetic model and cellular automata
Nicolas Pinto1, Roger Schurch1, Alejandro Angulo1, Andrea Villa2
1Universidad Tecnica Federico Santa Maria, Chile; 2Ricerca sul Sistema Energetico (RSE), Italy;

3a-8 Electrical Treeing of Epoxy Resin under Tensile and Compressive Stresses
Bo Xue Du1, Wen Jin Zhang1, Hu Cheng Liang1, Liu Cheng Hao2, Duan Peng Yuan2, Ya Xiang Wang2, Bo Yuan Cui1, Yun Chen1
1School of Electrical and Information Engineering, Tianjin University, Tianjin 300072, China; 2China Electric Power Research Institute, Beijing 100085, China;

3a-9 Investigation of PRPD during electrical tree initiation and growth in a needle-free void geometry
Juliana Beca, Simon Rowland, Harry McDonald
University of Manchester, United Kingdom;

3a-10 A Three-Dimensional Stochastic Model for the Study of Treeing in Epoxy and its Nanocomposites
Moon Moon Bordeori1, Nandini Gupta1
1Indian Institute of Technology Kanpur, India;

3a-11 Effect of Grounded Needles on Electrical Treeing in XLPE Cable Specimens under AC Stress
Frances Hu1, Christopher Emersic, Harry McDonald, LuJia Chen, Simon Rowland, Richard Gardner
The University of Manchester, United Kingdom;

3a-12 Electrical Tree Structures in Negative DC Fields Superimposed with AC Ripples
Fang Liu1, Simon M. Rowland1, Qiance Zhang2, Harry McDonald1
1Department of Electrical and Electronic Engineering, The University of Manchester, United Kingdom; 2Henry Royce Institute, The University of Manchester, United Kingdom;
3a-13 Enhancement of Electrical Tree Resistance of Epoxy Insulation under Bipolar Square Wave Voltage by Micro-SiO2 Doping
Xiaopeng Zha1,2, Zhaoliang Xing1, Shaowei Guo1, Huize Cui1, Chuang Zhang2, Yiwei Long2, Dongxu An2, Jianying Li2
1State Key Laboratory of Advanced Power Transmission Technology, Global Energy Interconnection Research Institute Co., Ltd., Beijing 102200, China; 2State Key Laboratory of Electrical Insulation and Power Equipment, Xi’an Jiaotong University, Xi’an 710049, China;

3a-14 Electrical Treeing Characteristics in Glass Fiber Reinforced Epoxy Resin
Renyong Zhao1, Jin Li1, Yun Chen2, Boyuan Cui2, Yun Teng3, Xiaoxiao Kong1, Boxue Du1
1Key Laboratory of Smart Grid of the Ministry of Education, School of Electrical and Information Engineering, Tianjin University; 2China Electric Power Research Institute; 3State Grid Jiangsu Electric Power Co., Ltd., Research Institute;

Poster Session 3b: Breakdown

Time: Wednesday, 06/July/2022: 12:20pm - 2:00pm
Session Chair: June-Ho Lee

3b-1 Effect of Cellulose Contamination on the Breakdown Voltage and Thermal Generated in PFAE under Lightning Impulse with DC Voltage Superimposed
Sarizan Bin Saaidon1, M. A. Talib2, M.N.K.H. Rohani3, N. A. Muhamad4, M. Kamarol5
1UNIVERSITI SA仁S MALAYSIA, & CIAT Malaysia; 2TNB Research Sdn. Bhd. Research Institution Area, Kajang Selangor, Malaysia; 3School of Electrical System Engineering, Universiti Malaysia Perlis, Arau Perlis; 4School of Faculty of Engineering, Universiti Teknologi Brunei, Gadong, Brunei; 5School of Electrical and Electronic Engineering, Universiti Sains Malaysia, Penang, Malaysia;

3b-2 AC and Negative Lightning Impulse Breakdown Voltages of Palm Fatty Acid Ester with Different Nitrogen Bubbles Generation Times
Masahiro Fujimura, Norimitsu Takamura, Nobutaka Araoka, Masahiro Hanai
Fukuoka University, Japan;

3b-3 Effects of Nitrogen Fine Bubbles Generating Time and Standing Time on Resistivity and Negative Lightning Impulse Breakdown Voltage of Pure Water in Nitrogen or Air Atmosphere
Kazuki Tsuchiya1, Norimitsu Takamura2, Nobutaka Araoka3, Douyan Wang4, Takao Namihira5, Masahiro Hanai1
1Fukuoka University, Japan; 2Kumamoto University, Japan; 3School of Electrical System Engineering, Universiti Malaysia Perlis, Arau Perlis;

3b-4 Improved Breakdown Strength of Polypropylene Capacitor Film Based on Surface Grafting
Haoliang Liu, B. X. Du, Meng Xiao, Z. Y. Ran
Tianjin University, China, People's Republic of;

3b-5 Parylene Deposition Improving Dielectric Properties of Biaxially Oriented Polypropylene Capacitor Film
Haoliang Liu, B. X. Du, Meng Xiao, Z. Y. Ran
Tianjin University, China, People's Republic of;

3b-6 Multilayer Constructed Polypropylene Film Improving Breakdown Strength Based on Parylene Blending
Haoliang Liu, B. X. Du, Meng Xiao, Z. Y. Ran
Tianjin University, China, People's Republic of;

3b-7 Lightning Impulse and AC Breakdown Characteristics of SF6 and its Alternatives
Prem Ranjan1, Qinghua Han1, Faisal O. Bahdad1, Abir Alabani1, Lujia Chen1, Ibrahim Idrissu2, Luke van der Zel3
1Department of Electrical and Electronic Engineering, The University of Manchester, Manchester, M13 9PL, UK; 2National Grid Electricity Transmission plc, 1-3 Strand, London, WC2N 5EH, UK; 3Power Delivery and Utilization, Electric Power Research Institute, NC, 28262-7097, USA;

3b-8 Improved breakdown performances of PP films based on molecular chain and aggregate structure design
Zhaoyu Ran, Boxue Du, HaoLiang Liu, Xiao Meng, Jiwen Xing
Tianjin university, China, People's Republic of;

3b-9 Breakdown characteristics of epoxy dielectric film under high frequency square wave voltage
Shixin Yu, Weiwang Wang, Qihang Jiang, Leiyu Hu, Jiefeng He
Xi’an Jiaotong University, China, People’s Republic of,
3b-10 Effect of Acetophenone on Dielectric Properties of Low-density Polyethylene

Kai Shang¹, Mingru Li¹, Dekang Wen², Huan Niu¹, Yang Feng¹, Shihang Wang¹, Shengtao Li¹, Zhi Xu²
¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi’an Jiaotong University, Xi’an, China; ²State Grid Shanghai Municipal Electric Power Company, Shanghai, China;

3b-11 Pre-breakdown leakage current of tangential dielectric interfaces with different coupling pressures

Antonio Settembre¹, Roberto Candela², Andrea Cavallini¹, Paolo Seri¹
¹University of Bologna, Italy; ²Prysmian Electronics, Italy;

3b-12 Dielectric Strength Measurement for Different Materials During Dry Arcing Band and Flashover

Adeel Ahmad¹, Azam Nekahi¹, Arshad Khan²
¹University of Strathclyde, United Kingdom; ²University of Strathclyde, United Kingdom;

3b-13 Effect of antioxidants on pre-crosslinking and DC breakdown characteristics of XLPE cable insulation

Zhicheng Si¹, Jiacai Li¹, Jialiang Yuan², Shihang Wang¹, Shengtao Li¹, Tiecheng Lou²
¹Xi’an Jiaotong University, State Key Laboratory of Electrical Insulation and Power Equipment; ²State Grid Shanghai Municipal Electric Power Company;

3b-14 High-temperature Breakdown Property of P(VDF-TrFE) Composite for Film Capacitor

Boxue Du, Jianhang Zhang, Meng Xiao, Jiwen Xing, Zhaoyu Ran, Haoliang Liu
Tianjin University, China, People’s Republic of;

3b-15 The Effect of Pulse Voltage Application on the Threshold Electric Field Strength of the Transition from Coalescence to Non-Coalescence

Vladimir Chirkov, Bogdan Chernykh, Grigorii Utiugov
St. Petersburg State University, Russian Federation;

3b-16 Effect of Gamma Radiation on the High-temperature Breakdown Strength of Polypropylene Films for Capacitors

Meng Xiao, Yuning Song, Boxue Du
Tianjin University, China, People’s Republic of;

3b-17 Thickness Dependence of Epoxy-Based Composites with BaTiO3 Particles on AC Electrical Breakdown Strength

Arnaud Escriva¹,², Sombel Diaham¹, Vincent Bley¹, Zarel Valdez-Nava¹, Trung Trong Le¹, Ton Youssef², Rabih Khazaka², Stéphane Azzopardi²
¹LAPLACE, Université de Toulouse, France; ²SAFRAN TECH, France;

3b-18 High-temperature Breakdown Performance Improvement of Polypropylene Films Based on Furfuryl Sulfide Graft Modification

Yishuo Zhao, Meng Xiao, Boxue Du
Key Laboratory of Smart Grid of Education Ministry, School of Electrical and Information Engineering, Tianjin University, Tianjin 300072, China;

3b-19 Effect of Gamma Radiation Modification on Crystallization and Breakdown Properties of Polypropylene

Yuning Song, Meng Xiao, Boxue Du
Tianjin University, China, People’s Republic of;

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**Poster Session 3c: Ageing**

*Time:* Wednesday, 06/July/2022: 12:20pm - 2:00pm  
*Session Chair:* Ludovic Boyer

3c-1 Dielectric Properties of Metal Deactivator/PP Composite Films for Capacitors After Thermal Aging

Boxue Du, Jianhang Zhang, Meng Xiao, Ke Chen
Tianjin University, China, People’s Republic of;
3c-2 Diagnosis Method for Thermal Aging and Water Tree Aging of XLPE Cable Based on Lissajous Figure and Current Harmonic Characteristic Quantity
Yuan Xia, Zhen Qin, Lijun Yang, Wei Li
State Key Laboratory of Power Transmission Equipment & System Security and New Technology, Chongqing University, Chongqing, China;

3c-3 Potential of Metal Passivators in Improving the Insulation Performance of Polypropylene Films for Capacitors
Boxue Du, Jianhang Zhang, Meng Xiao, Jiwen Xing, Zhaoyu Ran, Haoliang Liu
Tianjin University, China, People's Republic of;

3c-4 Thermal aging of enameled wire: dielectric markers and structural properties drift correlation
Louiza Fetouhi1,2, Marie Sabatou1, Mateusz Szczepanski1,2, Samuel Pin1, Cécilien Thomas1, Guillaume Belijar1
1IRT Saint-Exupéry, France; 2Nidec-Leroy Somer (Angoulême-France), France;

3c-5 Electrical ageing and temperature cycling of XLPE insulation saturated with water
Torbjørn Andersen Ve1, Cédric Lesaint1, Hans Helmer Sæternes1, Sverre Hvidsten1, Athanasios Mermigkas1, Håvard Baeru1, Øystein Hestad1, Amar Abideen2, Frank Mauseth2
1SINTEF Energy Research, Norway; 2Norwegian University of Science and Technology (NTNU), Norway;

3c-6 Insulation Properties of Twisted-pair of Polyvinyl Formal Wires with Artificial Pinhole and Thermal Stress in Mineral Oil
Yuki Zenda1, Shota Kodama1, Masahiro Kozako1, Masayuki Hikita1, Yusuke Okubo2, Kosuke Shimomura2, Takeshi Tanaka2
1Kyushu Institute of Technology, Japan; 2DAIHEN Corporation, Japan;

3c-7 Degradation Diagnosis of 110 kV XLPE Cable Joint Based on Magnetic Field Characteristic Analysis
Han Zhang1, Yong Liu1, Hao Wang1, Chao Li1, B.X. Du1, Xuejia Dong2, Xingwang Huang3
1School of Electrical and Information Engineering, Tianjin University, Tianjin 300072, China; 2Shijiazhuang Power Supply Branch of State Grid Hebei Electric Power Limited Corporation, China; 3State Grid Hebei Electric Power Research Institute, Shijiazhuang, China;

3c-8 Relationship Between Typical Defects of Power Cable Systems and the Harmonic Characteristics of Grounding Currents
Hao Wang1, Yong Liu1, Zhihui Wang1, B.X. Du1, Zehua Pan2, Hongjing Liu2, Hongbao Zong3
1School of Electrical and Information Engineering, Tianjin University, Tianjin 300072, China; 2State Grid Beijing Electric Power Research Institute, Beijing, China; 3Power Cable Branch, State Grid Tianjin Electric Power Company, Tianjin, China;

3c-9 Research on Damp Aging Evolution of Cable Joints based on PDC method
Shiyu Ma1, Kai Zhou2, Guangya Zhu2, Aiqing Li3
1College of Electrical Engineering, Sichuan University, China; 2College of Electrical Engineering, Sichuan University, China; 3College of Electrical Engineering, Sichuan University, China;

3c-10 Research on Damp Aging Evolution of Cables Joints Using PDC Method and Dynamic Bayes
Pengcheng Sha1, Kai Zhou2, Guangya Zhu2, Aiqing Li3
1College of Electrical Engineering, Sichuan University, China; 2College of Electrical Engineering, Sichuan University, China; 3College of Electrical Engineering, Sichuan University, China;

3c-11 Advanced TCAD Simulation of Tunnel Oxide Degradation for EEPROM Applications
Franck Matteo1,2, Roberto Simola1, Jérémy Postel-Pellerin2, karine Coulïé2
1STMicroelectronics Rousset; 2Aix-Marseille University, CNRS, IM2NP;

3c-12 Study of new ecological magnet wires performances during thermal aging tests
Giovana Pereira dos Santos Lima1, Sonia Ait-Amar1, Gabriel Veli1, Philippe Frezel2
1Univ. Artois, UR 4025, Laboratoire Systèmes Electrotechniques et Environnement (LSEE), F-62400 Béthune, France; 2Green Isolight International, 62113 Labourse;

3c-13 Numerical Analysis of Breakdown Phenomena for Polymeric Insulators After Thermal Aging Process
Minhee Kim, Su-Hun Kim, Hyeong-Jun Kim, Se-Hee Lee
Kyungpook national university, Korea, Republic of (South Korea);
3c-14 Electrical Resistance Tomography (ERT) applied to Epoxy composites
Nandini Gupta¹, P K Agnihotri², Rishab Phartiyal¹
¹I I T Kanpur; ²I I T Ropar;

3c-15 Comparison of dissipation factor behaviour at lower temperatures for new and pre-aged MV PILC cables
Ann-Catrin Uhr-Müller, Christian Weindl
Coburg University of Applied Sciences and Arts, Germany;

3c-16 Improved anti-aging performances based on doping of organic additives of PP films for capacitors
Zhaoyu Ran, Boxue Du, HaoLiang Liu, Xiao Meng, Jiwen Xing
Tianjin university, China, People's Republic of;

3c-17 The Influence of Thermal-Oxidative Ageing on Electrical Properties of Polypropylene
Xiwen Wu, Thomas Andritsch, George Chen
University of Southampton, United Kingdom;

3c-18 Algorithm for single interpretation of dissolved gas analysis
Matias Meira¹, Raúl Álvarez², Carlos Verucchi¹, Leonardo Catalano²
¹INTELYMEC (UNCIPBA) and CIFICEN (UNCIPBA-CICPBA-CONICET), Olavarria, Argentine Republic; ²ITREETE-FL-UNLP, La Plata, Argentine Republic;

3c-19 An Investigation on Discharge Fault of Outdoor Oil-Filled Cable Terminal at Low Temperature
Qi Li, Xiaoxiao Kong, Yifang Wang, Fan Li, Rundong Xue, Boxue Du
Tianjin University, China;

3c-20 Surface Charging and Flashover Behaviors of Polished Epoxy Spacers under AC Voltage
Yuhuai Wang¹, Jin Li¹, Tianhui Li², Chi Dong², Jin He³, Rong Chen³, Qinghua Tang³, Chun He³
¹School of Electrical and Information Engineering, Tianjin University; ²State Grid Hebei Electric Power Research Institute; ³State Grid Tianjin Electric Power Research Institute;

3c-21 Initiation and Development of Mechanical Crack in Tri-post Insulator of GIL
Songtao Liu¹, Jin Li¹, Hucheng Liang¹, Yaxiang Wang², Duangpeng Yuan², Liucheng Hao², Boxue Du¹
¹Key Laboratory of Smart Grid of the Ministry of Education, School of Electrical and Information Engineering, Tianjin University; ²Pinggao Group Co., Ltd;

3c-22 Numerical and experimental evaluation of dielectric properties of thermally aged insulating paper used in power transformers
Mónica Díaz¹, Cristina Méndez¹, Cristian Olmo¹, Carlos Vila², Fernando Delgado¹
¹Electrical and Energy Engineering Department, University of Cantabria, Spain; ²Department of Standardization and Maintenance of Transformers, Iberdrola;

3c-23 A modification of the Norris failure criterion for the prediction of the mechanical failure of the aged paper insulation in the windings of a power transformer
Carmela Oría¹, Diego Ferreño², Isidro Carrascal², Alfredo Ortiz¹, Inmaculada Fernández¹
¹Electrical and Energy Engineering Department, Universidad de Cantabria, Spain; ²Laboratory of Science and Engineering of Materials, Universidad de Cantabria, Spain;

Thursday 07/July/2022

Oral Session 6: Partial Discharges

Time: Thursday, 07/July/2022: 8:00am - 10:00am
Session Chair: Andrea Cavallini
Session Chair: Juan M. Martínez-Tarifa

6-1 Predictability of PD inception in defects included in HVDC cables by conductivity models calibrated through experiments
Giuseppe Rizzo¹, Vincenzo Li Vigni¹, Antonino Imburchia², Pietro Romano², Roberto Candela¹, Guido Ala²
¹Prysmian Electronics, Prysmian Group, Palermo, Italy; ²L.E.PR.E. H.V. Laboratory, Department of Engineering, University of Palermo, Italy;
6-2 Breakdown Properties of Epoxy and Ceramic Substrates Embedded in Liquids at High Temperature
Joko Muslim1,2, Olivier Lesaint1, Rachelle Hanna1, Ngapuli Sinisuka3
1G2Elab, CNRS and Grenoble University, France; 2PLN Indonesia, Jakarta 12160, Indonesia; 3Institut Teknologi Bandung (ITB), Bandung 40132 Indonesia;

6-3 Simulation analysis of partial discharge in random wounding insulation systems in aeronautical conditions
Cyril Van de Steen, Cédric Abadie, Guillaume Belijar
IRT Saint Exupery, France;

6-4 High-Field and High-Frequency Dependencies of Intrinsic Dielectric Properties and Lifetime in Polyimide at Sub-PDIV
Sombel Diaham1,2, Gavin Sheehan2, Keith Bennett3, Paul Lambkin2, Matt Canty2, Baoxing Chen3
1LAPLACE, University of Toulouse, France; 2Analog Devices Int., Limerick, Ireland; 3Analog Devices Inc., Wilmington, MA, USA;

6-5 Surface Charge Inducing Flashover on Basin-type Spacer under DC Stress
Hang Yao1, Boxue Du1, Jia'nan Dong1, Hucheng Liang1, Cheng Zhang2
1School of Electrical and Information Engineering, Tianjin University, Tianjin, China; 2Extra-high Voltage Branch Company, State Grid Jiangsu Electric Power Co., Ltd, Jiangsu, China;

6-6 Effects of Transient Voltages on Discharge Inception of Tri-post Insulator in DC-GIL
Jianan Dong, Boxue Du, Hucheng Liang, Hang Yao
天津大学, China, People's Republic of;

Oral Session 7: Conduction and Breakdown

Time: Thursday, 07/July/2022: 10:20am - 12:00pm
Session Chair: Antonino Imburgia
Session Chair: Hucheng Liang

7-1 Comparative study on ionic conduction of polar and nonpolar polymers using molecular dynamics simulations
Haruto Suzuki, Akiko Kumada, Masahiro Sato
The University of Tokyo, Tokyo, Japan;

7-2 Modeling of the Electric Field in High Voltage Direct Current Gas Insulated Transmission Lines
Christoph Jörgens, Hendrik Hensel, Markus Clemens
University of Wuppertal, Germany;

7-3 Insulating materials characterization for the development of MV/HV DC equipment
Caterina Toigo, Antoine Perez, Thanh Vu-Cong, Sophie Iglesias, Maya Mourad, Servane Haller, Frank Jacquier, Alain Girodet
SuperGrid Institute, France;

7-4 Coordinating Analysis of Leakage Current and Arc Development for Icing Flashover Prediction of HVDC Outdoor Insulators
Chao Li1, Yong Liu1, Han Zhang1, B. X. Du1, Masoud Farzaneh2, Di Zhang3
1Tianjin University, China, People's Republic of; 2Université du Québec à Chicoutimi, Canada; 3State Grid Hubei Electric Power Company, China, People's Republic of;

7-5 Effect of Long-Chain Branched Structures on Breakdown Strength of Polypropylene Films at High Temperatures
Meng Xiao, Mengdie Zhang, Boxue Du, Zhaoyu Ran, Haoliang Liu
Tianjin University, China, People's Republic of;
Oral Session 8: Ageing

**Time:** Thursday, 07/July/2022: 12:20pm - 2:00pm  
**Session Chair:** Erling Ildstad  
**Session Chair:** Eric David

8-1 Current measurements on HVDC XLPE model cable during type test  
Ludovic Boyer, Priscillia L. Daniel, Martin Henriksen, Xavier FESTAZ  
Super Grid Institute, France;

8-2 DC Electrical Trees in Polymer Insulation Inflicted by Rapidly Decreasing Short Circuit Voltage Flanks  
Thomas John Hammarstroem, Sarath Kumara, Xiangdong Xu, Amir Pourrahimi, Christian Müller, Yuriy Serdyuk  
Chalmers University of Technology, Sweden;

8-3 The role of thermal relaxations and semicrystalline microstructure in charging currents of XLPE  
Amir Masoud Pourrahimi, Sung-Woo Cho, Saleem Anwar, Mohsin Saleemi, Claire Pitois, Amirhossein Abbasi  
NKT HV cables AB, Sweden;

8-4 Coupling Effect of Electrical and Mechanical Stresses on Bursting Breakdown of Tri-post Insulator  
Bo Xue Du¹, Zhi Jun Guo¹, Hu Cheng Liang¹, Liu Cheng Hao², Duan Peng Yuan², Ya Xiang Wang², Bo Yuan Cui³,  
Yun Chen³  
¹School of Electrical and Information Engineering, Tianjin University, Tianjin 300072, China; ²Pinggao Group Co., Ltd, Pingdingshan 467000, China; ³China Electric Power Research Institute, Beijing 100085, China;

8-5 Comparative Study on Different Outer Corona Protection Materials for High-Voltage Rotating Machines  
Lena Elspaß¹, Karsten Backhaus¹, Jürgen Stahl², Schlegel Stephan¹  
¹Institute of Electrical Power Systems and High Voltage Engineering, Technische Universität Dresden, Germany; ²VEM Sachsenwerk GmbH;
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Chapters:
Dielectrics and Electrical Insulation (DEI) Chapter
Electromagnetic Compatibility (EMC) Chapter
Electron Devices (ED) Chapter
Reliability (RL) Chapter