4th IEEE International Conference on Dielectrics

Technical Program

Palermo, Italy, July 3-7, 2022

Sponsored by
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Conference Committee

Conference Officers ICD 2022

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

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
Raji Sundararajan — Publication Chair — Purdue University, USA
Fabio Viola — Registration Chair and Conference Secretary — University of Palermo, Italy
Guido Ala, Gaetano Rizzo — Publicity Committee Co-Chairs — University of Palermo, Italy
Massimo Caruso — Visa Assistance — University of Palermo, Italy
Frank Hegeler — IEEE DEIS Meetings Committee Chair — Naval Research Laboratory, USA
Peter Morshuis — Executive Board Committee Chair — Solid Dielectric Solutions, the Netherlands

International Advisory Committee

Peter Morshuis, Solid Dielectric Solutions, the Netherlands – Chairman
Andrea Cavallini, University of Bologna, Italy
Frank Hegeler, Naval Research Laboratory, USA – DEIS Meetings Chair
John Fothergill, Emeritus City University London, United Kingdom
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Gilbert Teyssèdre, Université Paul Sabatier, Toulouse, France
Paul Lewin, University of Southampton, United Kingdom
Shengtao Li, Xi’an Jiaotong University, Xi’an, China
Rongsheng Liu, ABB, Västeras, Sweden
Yoshimichi Ohki, Waseda University, Tokyo, Japan
Greg Stone, Consultant, Canada
Toshikatsu Tanaka, Waseda University, Tokyo, Japan
Yasuhiro Tanaka, Tokyo City University, Japan
Jérôme Castellon, University of Montpellier, Montpellier, France

Local Organizing Committee

Ghulam Akbar, Guido Ala, Vincenzo Castiglia, Francesca Cusenza, Alessio Di Fatta, Antonino Imburgia, Sinda Kaziz, Claudio Nevoloso, Giuseppe Rizzo, Pietro Romano, Giuseppe Schettino, Giuseppe Sciumè, Fabio Viola - University of Palermo, Italy.
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 3\textsuperscript{rd} at the Botanical Garden from 14:30 to 19:00. On Monday 4\textsuperscript{th} 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 Paleromo University Campus and the buildings where the Conference will take place live.

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

### JULY

<table>
<thead>
<tr>
<th>Day</th>
<th>3 Sunday</th>
<th>4 Monday</th>
<th>5 Tuesday</th>
<th>6 Wednesday</th>
<th>7 Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td>07:00 - 14:00</td>
<td>Registration</td>
<td>06:40 - 07:40</td>
<td>Street Art Tour (20 people maximum)</td>
<td>07:40 - 08:00</td>
<td>Breakfast for SA Tour</td>
</tr>
<tr>
<td>08:00 - 08:20</td>
<td>Opening Session</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>
</tr>
<tr>
<td>09:00 - 09:30</td>
<td>E.G. Forster Memorial Lecture</td>
<td>09:00 - 10:00</td>
<td>Oral session 2: Theories and Models</td>
<td>08:00 - 10:00</td>
<td>Oral session 5: Partial Discharges</td>
</tr>
<tr>
<td>09:40 - 12:00</td>
<td>Coffee Break</td>
<td>10:00 - 10:20</td>
<td>Coffee Break</td>
<td>10:00 - 10:20</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>10:00 - 10:20</td>
<td>Oral session 1: Gold Session</td>
<td>10:00 - 10:20</td>
<td>Oral session 3: Materials and Insulation Systems</td>
<td>10:00 - 10:20</td>
<td>Oral session 7: Conduction and Breakdown</td>
</tr>
<tr>
<td>10:20 - 12:00</td>
<td>Coffee Break</td>
<td>10:20 - 12:00</td>
<td>Coffee Break</td>
<td>10:20 - 12:00</td>
<td>Coffee Break</td>
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<tr>
<td>12:00 - 12:20</td>
<td>Coffee Break</td>
<td>12:00 - 12:20</td>
<td>Coffee Break</td>
<td>12:00 - 12:20</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>12:20 - 14:00</td>
<td>Poster session 1a: Theories and Models, 1b: Advanced and Functional Materials, 2a - Partial Discharges</td>
<td>12:20 - 14:00</td>
<td>Poster session 2a - Materials and Insulation Systems, 2b - Space Charges</td>
<td>12:20 - 14:00</td>
<td>Poster session 3a - Treating, 3b - Breakdown, 3c - Ageing</td>
</tr>
<tr>
<td>12:20 - 14:00</td>
<td>Poster session 1a - Theories and Models, 1b - Advanced and Functional Materials, 2a - Partial Discharges</td>
<td>12:20 - 14:00</td>
<td>Poster session 2a - Materials and Insulation Systems, 2b - Space Charges</td>
<td>12:20 - 14:00</td>
<td>Poster session 3a - Treating, 3b - Breakdown, 3c - Ageing</td>
</tr>
<tr>
<td>14:00 - 15:00</td>
<td>Lunch</td>
<td>14:00 - 15:00</td>
<td>Lunch</td>
<td>14:00 - 15:00</td>
<td>Lunch</td>
</tr>
<tr>
<td>14:30 - 18:00</td>
<td>Workshop Challenges and Opportunities in Transport Electrification (Botanical Garden - Sala Lanza)</td>
<td>14:00 - 16:00</td>
<td>International Advisory Committee Meeting</td>
<td>14:00 - 15:00</td>
<td>Lunch</td>
</tr>
<tr>
<td>18:00 - 21:00</td>
<td>Welcome Cocktail (Botanical Garden)</td>
<td>19:00 - 22:00</td>
<td>Gala Dinner (Mondello)</td>
<td>14:00 - 15:00</td>
<td>Lunch</td>
</tr>
<tr>
<td>19:30 - 22:18</td>
<td>Gala Dinner (Mondello)</td>
<td>19:00 - 22:00</td>
<td>Gala Dinner (Mondello)</td>
<td>14:00 - 15:00</td>
<td>Lunch</td>
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</tbody>
</table>

### Special Notes:
- Social Event (Gafà)
# IEEE ICD 2022 Conference Schedule

## Date: Sunday, 03/July/2022

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

## Date: Monday, 04/July/2022

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

## Date: Tuesday, 05/July/2022

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00am</td>
<td>2020 Dakin Award Lecture by Professor Gary Stevens - Kinectrics UK – Aula Vincenzo Li Donni</td>
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<td></td>
<td>Chair: Davide Fabiani</td>
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<tr>
<td>9:00am</td>
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<tr>
<td>9:00am</td>
<td>Oral Session 2: Theories and Models – Aula Vincenzo Li Donni</td>
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<tr>
<td></td>
<td>Chair: Severine Le Roy</td>
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<td>Chair: Giuseppe Rizzo</td>
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<tr>
<td>10:00am</td>
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<tr>
<td>10:00am</td>
<td>Oral Session 3: Materials and Insulation Systems – Aula Vincenzo Li Donni</td>
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<tr>
<td></td>
<td>Chair: Antonios Tsimas</td>
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<tr>
<td></td>
<td>Chair: Mikael Unge</td>
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<tr>
<td>12:20pm</td>
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<tr>
<td>12:20pm</td>
<td>Poster Session 2a: Materials and Insulation Systems - Gather room 2a</td>
</tr>
<tr>
<td></td>
<td>Chair: Orestis Vryonis</td>
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<tr>
<td>12:20pm</td>
<td>Poster Session 2b: Space Charges - Gather room 2b</td>
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<td>Chair: Gilbert Teyssedre</td>
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</table>

## Date: Wednesday, 06/July/2022

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:00am</td>
<td>Oral Session 4: Space Charges – Aula Vincenzo Li Donni</td>
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<tr>
<td></td>
<td>Chair: Naohiro Hozumi</td>
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<td>Chair: Kai Wu</td>
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<tr>
<td>10:00am</td>
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<tr>
<td>10:00am</td>
<td>Oral Session 5: Advanced and Functional Materials – Aula Vincenzo Li Donni</td>
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<td>Chair: Sombel Diaham</td>
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<td>Chair: Ioana Preda</td>
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<tr>
<td>12:00pm</td>
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<tr>
<td>12:20pm</td>
<td>Poster Session 3a: Treeing - Gather room 3a</td>
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<tr>
<td></td>
<td>Chair: George Chen</td>
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<tr>
<td>12:20pm</td>
<td>Poster Session 3b: Breakdown - Gather room 3b</td>
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<td></td>
<td>Chair: June-Ho Lee</td>
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<tr>
<td>12:20pm</td>
<td>Poster Session 3c: Ageing - Gather room 3c</td>
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<td>Chair: Ludovic Boyer</td>
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## Date: Thursday, 07/July/2022

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:00am</td>
<td>Oral Session 6: Partial Discharges – Aula Vincenzo Li Donni</td>
</tr>
<tr>
<td></td>
<td>Chair: Andrea Cavallini</td>
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<td>Chair: Juan M. Martinez-Tarifa</td>
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<tr>
<td>10:00am</td>
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<tr>
<td>10:00am</td>
<td>Oral Session 7: Conduction and Breakdown – Aula Vincenzo Li Donni</td>
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<td>Chair: Antonino Imburgia</td>
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<td>Chair: Hucheng Liang</td>
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<tr>
<td>12:00pm</td>
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<tr>
<td>12:20pm</td>
<td>Oral Session 8: Ageing – Aula Vincenzo Li Donni</td>
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<td>Chair: Erling Ildstad</td>
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<td>Chair: Eric David</td>
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</table>
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

Heyu Wang¹, Zhonglei Li¹, Mingsheng Fan¹, Shuofan Zhou¹, 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;

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

Sinda Kaziz¹,², Antonino Imburgia³, Denis Flandre⁴, Giuseppe Rizzo⁴, Pietro Romano⁴, Fabio Viola³, Guido Ala³, Fares Toussi⁴

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 Diban¹, Giovanni Mazzanti¹, Massimo Marzinotto², Antonio Battaglia²

¹University of Bologna, Italy; ²TERNA, Roma, Italy;

1-5 Surface Charge Measurement of Insulating Spacer Simulating Temperature Gradient Environment in DC-GIS

Hajime Shimakawa¹, Masahiro Sato¹, Akiko Kumada¹, Kunihiko Hidaka¹, Takanori Yatsuoka², Yoshikazu Hoshina², Motoharu Shiiki²

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 Taine¹,², Thomas Andritsch², Istebreq A. Saeedi³, Peter H. F. Morshuis³

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 Escurra¹, Armando Rodrigo Mor²

¹Delft University of Technology; ²Universidad Politonica de Valencia;
Poster Session 1a: Theories and Models

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

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 Zhang⁴, Hao Chen⁴, Cheng Zhang⁴
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; ²SIINTEF 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 Wei², Weilin Liu², 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 Li¹, Jing Fang¹, Zhanpeng Wei¹, Longji Li¹, Hao Liu², Qi Li², Xiaoxiao Kong³, 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 Beljar1, Lionel Laudebat2, Sombel Diahm2, Zarel Valdez-Nava2, Cédric Abadie1
1IRT Antoine de Saint Exupery, Toulouse, France; 2Laboratoire Plasma et Conversion d'Énergie (LAPLACE), Toulouse, France;

1a-15 Comparison between modelling and measurements of PDIV on electrical machines for aeronautics
Benjamin Daguse, Hélène Dressinger, Thierry Lebey, Robin Acheen, Sabrina Ayat
SAFRAN 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 Gonzalez1, Mo’ath Bani Fayyad, Iváncsy 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 Suzuki2
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 Zhao1, 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 Jibe 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 Gerhard1
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 Rigouy, 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 Bădilă2, Denis Panaitescu1
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
1Xian Jiaotong University, China; People's Republic of; 2State Key Laboratory of Intense Pulsed Radiation Simulation and Effect, Northwest Institute of Nuclear Technology, Xi'an, China;

1b-11 The Effect of Agglomeration on the Electrical Percolation of Polyimide/Graphene Nanocomposites
Imadeddine benfridja1,2,3, 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 Toulouse, 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, Boudu Laurent1, Ravisy William2, Besland Marie-Paule2, Richard-Piouet 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

1 School of Electrical & Electronic Engineering, Xi’an Jiaotong University, Xi’an, China; 2 Solid Dielectric Solutions, Leiden, the Netherlands; 3 SBM Offshore, Carros, France;

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

Jia’nan Dong1, Boxue Du1, Hang Yao1, Hucheng Liang1, Chi Zhang2

1 School of Electrical and Information Engineering, Tianjin University, Tianjin, China; 2 Extra-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

1 School of Electrical and Information Engineering, Tianjin University, Tianjin, China; 2 State 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

1 Universidad Carlos III de Madrid, Spain; 2 Comillas Pontificia 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 Franch Bononi1

1 University of Palermo, Italy; 2 Prysmian Electronics, Palermo, Italy; 3 Prysmian 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

1 Tianjin University, China, People's Republic of; 2 Université du Québec à Chicoutimi, Canada; 3 State 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 Girotet¹
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 Vasilkov, 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 Vasilkov, 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; ²SIINTEF, 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 UK

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 hallak¹, 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, Yungui 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 256002, 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 Nga 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, Xiaokai 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. Du2, 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, Xiaonan Han1, Boyuan Cui1, Xiaokai 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, Xiaokai 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, Aurore 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), Olavarria, Argentine Republic; 2ITREE-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 Adorno4, 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 Li1, 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 Gentils3, 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 / Götitz, 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
Toyohashi 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 Space Charge 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-Amroun1, 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 Cho2, Yoon-hyoung Kim2
1Toyoashi University of Technology, Japan; 2Solid Dielectric Solutions, the Netherlands; 3LS Cable & System Ltd., Korea;

4-5 Space Charge Measurement on Full-sized HVDC Joint with Voltage Class up to 150 kV
Yoonhyoung Kim1, Youngil Cho1, Sunkak Kim1, Wookeyong Lee1, Naohiro Hozumi2, Peter Morshuis3
1LS Cable & System, Korea, Republic of (South Korea); 2Toyoashi 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 Giangrande1, Michael Galea2
1University of Nottingham, United Kingdom; 2University 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 Pidddiu, Davide Fabiani
Università di Bologna, Italy;

5-3 Engineered Interfaces in Extruded Polyphenylsulfone-Boron Nitride Composite Insulation
Tiffany Williams1, Baochau Nguyen2,1, 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. Semsarlar2, M. Bechelany3, S. Le Roy1, J. Castellon2
1LAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France; 2IES, 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 Wang, Zhonglei Li, Shuofan Zhou, Mingsheng Fan, You Wu, Boxue Du, Zhuoran Yang  
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 Wang, Yun Chen, Xiancai Han, Boyuan Cui, Rundong Xue, Xiaoxiao Kong, Boxue Du  
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 Li, Yufei Yao, Xin Zhao, Tao Han  
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 Yao, Tao Han, Qiang Li, Youcong Huang, Zhongnan Zheng  
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 Aldawsari, Harry McDonald, Simon Rowland  
University of Manchester, United Kingdom;

3a-6  **Effects of Mechanical Stress on Electrical Tree Growth in Epoxy Resin at High Temperature**  
Fan Li, Boxue Du, Yun Chen, Lu Wang, Ying Zhang, Yifang Wang, Xiaoxiao Kong  
School of Electrical and Information Engineering, Tianjin University, People's Republic of China;

3a-7  **Simulating electrical trees propagation using a kinetic model and cellular automata**  
Nicolas Pinto, Roger Schurch, Alejandro Angulo, Andrea Villa  
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 Du, Wen Jin Zhang, Hu Cheng Liang, Liu Cheng Hao, Duan Peng Yuan, Ya Xiang Wang, Bo Yuan Cui, Yun Chen  
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 Bordeori, Nandini Gupta  
Indian Institute of Technology Kanpur, India;

3a-11  **Effect of Grounded Needles on Electrical Treeing in XLPE Cable Specimens under AC Stress**  
Frances Hu, Christopher Emerisc, 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 Lu, Simon M. Rowland, Qiance Zhang, Harry McDonald  
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;

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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 SAINS MALAYSIA, & CIAST 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 Fine 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 Takamura1, Nobutaka Araoka1, Douyan Wang2, Takao Namihiro2, Masahiro Hanai1
1Fukuoka University, Japan; 2Kumamoto University, Japan;

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 Iddrissu2, 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, Wei wang 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
¹Glasgow Caledonian University, 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, Grigori 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, Toni 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;

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
1IRTA Saint-Exupery, 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 Bærug1, Øystein Hestad1,2, 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 Thechnology, 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 Du1, 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 Li2
1College of Electrical Engineering, Sichuan University, China; 2College of Electrical Engineering, Sichuan University, China;

3c-10 Research on Damp Aging Evolution of Cables Joints Using PDC Method and Dynamic Bayes
Pengcheng Sha1,2, Kai Zhou2, Guangya Zhu2, Aiqing Li2
1College of Electrical Engineering, Sichuan University, China; 2College 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 Coulié2
1STMicroelectronics Roussillon; 2Aix-Marseille University, CNRS, IM2NP;

3c-12 Study of new ecological magnet wires performances during thermal aging tests
Giovan Pereira dos Santos Lima1, Sonia Ait-Amar1, Gabriel Velu1, Philippe Frezel2
1Univ. Artois, UR 4025, Laboratoire Systèmes Electrotechniques et Environnement (LSEE), F-62400 Béthune, France, 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 (UNCPBA) and CIFICEN (UNCPBA-CICPBA-CONICET), Olavarría, Argentine Republic; 2ITREET-LAT-FI-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, Duanpeng 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 Oria1, 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 Imburbiga2, 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 Muslim, Olivier Lesaint, Rachelle Hanna, Ngapuli Sinisuka
G2Elab, 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 Diaham, Gavin Sheehan, Keith Bennett, Paul Lambkin, Matt Canty, Baoxing Chen
LAPLACE, 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 Yao, Boxue Du, Jia’nan Dong, Hucheng Liang, Cheng Zhang
School 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
Tianjin University, 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, 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 Li, Yong Liu, Han Zhang, B. X. Du, Masoud Farzaneh, Di Zhang
Tianjin 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
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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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