ICD 2024

5th IEEE International Conference on Dielectrics

Technical Program

Université Toulouse III - Paul Sabatier

Toulouse, France

June 30th - July 4th, 2024

IEEE Conference N° 59037X
Website: https://ieee-icd.org/
June, 20th 2024

Sponsored by DEIS IEEE

Welcome to IEEE-ICD 2024

The 5th edition of ICD, the **International Conference of Dielectrics**, fully sponsored by the IEEE Dielectrics and Electrical Insulation Society, is taking place in Toulouse, France, **from Sunday 30th June 2024 until Thursday 4th July 2024**. Issued from the International Conference on Conduction and Breakdown in Solid Dielectrics (ICSD), ICD was initiated in Montpellier in 2016 with opening the door to liquid and gaseous dielectrics.

ICD is an interdisciplinary forum that provides a unique opportunity for researchers from industry, academia and research centers to come together to review their research activities. It covers researches in the field of insulating materials and dielectric phenomena, and on the behavior and properties of the electrical insulation in devices, under operational stresses. Topics of power devices as well as all systems involving insulations and dielectrics are covered. ICD fits into the current necessity to develop the electricity sector in the energy field and responds to the aspirations of lifestyles more respectful of our environment.

This 5th Edition of ICD comes after two Editions at the age of the Covid pandemic which made these editions tricky and stressful to organize. The 3rd Edition (Valencia, 2020) was the first conference fully online, with a format to imagine at the last minute. For the 4th edition (Palermo, 2022), a hybrid format was used due to uncertainties in the crisis. We are grateful to the organizers for having maintained a high standard to ICD under these circumstances and we hope that this edition, which is back to a fully in-presence attendance, will be the occasion to meeting again and develop friendship.

This conference series has a special relation with Toulouse, notably Laplace laboratory: it was created in Toulouse in 1983 under the name of International Conference on Conduction and Breakdown in Solid Dielectrics, and an edition returned to Toulouse in July 2004, on the occasion of its 20th anniversary. The venue to Toulouse for this 5th edition of ICD (and 16th edition combining ICD and ICSD) is on the grounds of the 40th anniversary of the series.

Toulouse is a major European City in the field of Aeronautics and Space, with Airbus headquarters. Toulouse, nicknamed 'Pink City', due to the color of the predominant bricks, also has a marked southern European feel and charm. It can be easily reached with 26 airline companies and 69 international destinations in 2023.

We hope that you will enjoy your time in Toulouse, that you will appreciate our rich program, that fruitful discussions will come and that this 5th Edition of ICD will be plainly successful.

Gilbert Teyssèdre

General Chair of ICD 2024

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CONFERENCE PLACE

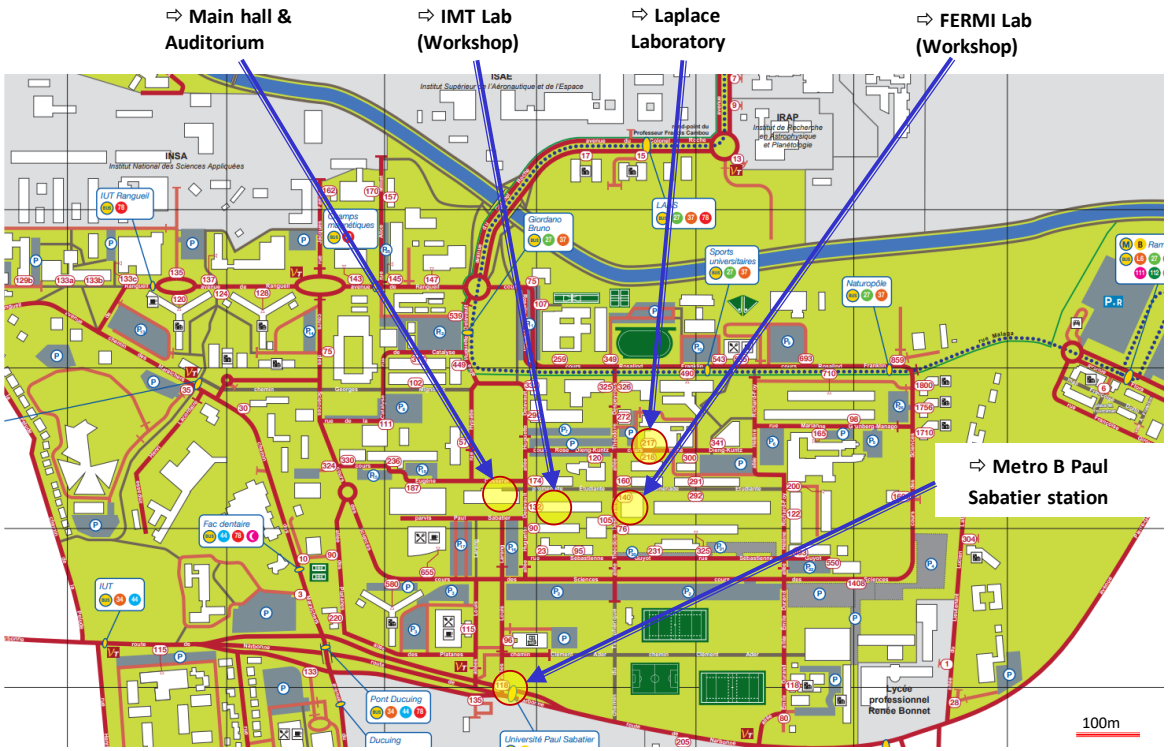
Conference Location

ICD 2024 is organized in the main hall of Université Toulouse III - Paul Sabatier, 118 route de Narbonne, 31400 Toulouse, France. A map of the campus is given below with reference to the Metro Station.

Plenary lectures will be given at the **Auditorium Marthe Condat**, which is situated in the main building of Université Toulouse III - Paul Sabatier. Breaks, lunches and Poster sessions are organized in spaces of the building Hall attached to the Auditorium. Workshops and Tutorial are organized on sites of the campus nearby the main Hall, respectively at IMT Lab, Fermi Lab and Laplace Lab.

Main University Hall and pictures of 500 seats - Marthe Condat Auditorium

All spaces are at walking distance from Paul Sabatier Station of metro B.



Venue and Accommodation

By Air: Toulouse-Blagnac Airport is situated at about 15km from the Conference Centre. It can be easily reached from abroad with 26 airline companies offering 69 international destinations in 2023. Major international hubs as Paris Charles de Gaulle, London Heathrow, Amsterdam, Munich, Frankfort… can be reached in less than 2h time.

Bus shuttles are available every 20min to reach Toulouse from the airport. It reaches metro line B – Compans Cafarelli station in about 20min.
https://www.toulouse.aeroport.fr/en/transports/public-transport

By Train: Direct trains from Lyon, Marseille, Bordeaux, Paris, etc. are available to reach Toulouse. From Paris Montparnasse 1 & 2 to Toulouse Matabiau, services depart five times a day, and operate every day. The journey takes approximately 4h20 min.

Toulouse Matabiau railway station is deserved by metro line A. Connection to metro line B is at Jean Jaures station (which is also at walking distance from the railway station)

By Metro: The Conference is organized at 300m from Paul Sabatier station of metro line B. There are two metro lines in Toulouse (Lines A and B – see map).

Hotels: Any hotel situated near metro line B is convenient to join the conference.

About Toulouse

A city that combines heritage, innovation and lifestyle

Toulouse stands midway between France's Atlantic and Mediterranean coasts, not far north of the Pyrenean foothills. Capital of the Occitanie Region, the fourth largest town in France is an unmissable place.

Nicknamed *The Pink City*, due to the colour of the predominant bricks, Toulouse has a marked southern European feel and charm.

Visitors can enjoy exploring the city's historic streets on foot or by bike and discovering the place's many architectural treasures. These include: the mighty town hall, Le Capitole, overseeing a huge café-lined square marked by an Occitan cross, Saint Sernin Basilica and Les Jacobins, a profoundly significant former monastery now home to cultural events.

The Garonne's riverbanks, the Canal de Brienne and, of course, the Canal du Midi, offer visitors particularly lovely green routes through the city.

Excursions

On Wednesday, July 3rd in the afternoon, time is managed to let you discover our city. A lunchbox will be served to allow easy dispatching of the groups according to the activities chosen. Below is a short description of these activities.

Aeroscopia Museum, Blagnac

A circuit to get to know the museum and discover through the collection the roots of the history of Toulouse aeronautics. The visit is punctuated by stops around the historic fresco, the 3 emblematic planes of the museum but also under the planes, for more technical points such as the operation of the engines, flight controls...

Halle de la Machine

On the Piste des Géants, in the Montaudran district of Toulouse, the Halle de La Machine has opened its doors and presents the show machines of the Compagnie La Machine and François Delaroziere. The Halle de La Machine houses the Minotaur, created especially for Toulouse. On a daily basis, this monumental and singular machine takes the public on its back for unique journeys.

Guided visit of Toulouse downtown

Your guide-lecturer will reveal the secrets and traditions of the city, taking you from alleys to alleys, and from squares to squares, without ever neglecting the heritage, architectural and gastronomic elements: churches, remains, lines of buildings, anecdotes and culinary specialties. Outstanding places as Capitole Place, Assezat Hotel, Garonne river, etc will be presented to you.

Technical visit – EDF Bazacle

In the city centre of Toulouse, discover the EDF Bazacle spaces, this unusual 2000 m² place dedicated to the hydroelectric industry, historical heritage, local culture and also the biodiversity of the Garonne. A hydraulic power station in operation since 1888, the EDF Bazacle spaces offer you a diversified offer: a self-guided tour around energies, biodiversity, and permanent and temporary exhibitions... As highlight, the large panoramic terrace overlooking the Garonne with a breath-taking view of the city of Toulouse. Bonus: the Bazacle fish pass & its observation port to see, with a little luck, the migratory fish of the Garonne!

CONFERENCE COMMITTEES

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Gilbert Teyssèdre — *CNRS-Laplace, Toulouse, France*

Christina Villeneuve-Faure — *University of Toulouse, France*

Local organizing committee

The Executive Commitee along with:

Jean-Louis Augé

Christine Monnereau

Christina Sara

Antonella Hugo

Gabriela Uribe

Léo Provost

PARTICIPATION AND CONTRIBUTION TO ICD2024

Registration

Every registration opens to the participation to all the conference activities and includes lunches from Monday, July 1st to Thursday, July 4th, welcome cocktail on Sunday, June 30th evening, conference diner and excursion scheduled on Wednesday, July 3rd afternoon. Every registration includes also the presentation and submission of up to two papers having run through the reviewing procedure. Optional items concern participation to workshops and extra-page / extra-paper fees.

Companion persons can be registered, providing them access to the reception cocktail, the conference diner and the excursion on Wednesday, July 3rd afternoon. Participants are invited to choose their preferred meal for the banquet and to mention Dietary constrains at the registration step.

Registration through Conftool offers different ways of payment (Credit Card, AliPay, Bank transfer). The fees, given below, have been maintained as low as possible to permit access to the conference as broad as possible. Early bird registration is available up to June 1st, 2024.

Type	Early bird registration (€)	Late registration (€)
IEEE DEIS Member	480	530
IEEE Member	500	550
Non-Members	580	630
Student Attendee - IEEE Member	380	430
Student Attendee - Non-Member	430	480
IEEE Life Member	380	430
Workshop registration	80	80
Companion persons	150	150
Extra-paper fees	150	150
Extra-page	100	100

Practical aspects for participants

In an objective to limit the environmental fingerprint, we have managed to avoid transportation needs as much as possible and favored local production in our choice of meals, goods and services.

Welcome Desk and Access

The welcome desk, installed in the main building Hall, will be opened from 5:00 pm to 8:00 pm on Sunday, June 30th and from 8:00 am and on the following days (7:30 am on Monday, July 1st) for getting the conference kit and check in. Please be advised that, in order to comply with current rules, a **security check** is performed at the entrance of all buildings, mainly for bag contents.

Free transportation tickets available for all public transportation means as buses, metro and tram will be included with the conference kit and will be active up to Friday, July 5th. Thus, participants will have to reach the desk by their own means but don't need to anticipate transportation tickets for the duration of the conference.

Food and beverage

A welcome cocktail will be served from 6.00 pm to 8.00 pm in the main Hall of the Conference on Sunday, June 30th. **Lunches** will be served from Monday, July 1st to Thursday, July 4th in the main Hall of the Conference. Note that bringing food in the Auditorium is not allowed.

The **conference diner** will be held downtown Toulouse at Espaces Vanel, 1 Allées Jacques Chaban-Delmas, 31500 Toulouse, on Tuesday, July 2nd, starting at 7:00 pm. It can be accessed by walk along Allées Jean Jaurès from Metro line B, or directly from station Marengo of Metro line A.

Meetings of Sunday, June 30th

For participants to the workshops, an appointment is organized at 1:45 pm on Sunday, July 30th, at the main Hall. Please be aware that there is no lunch facility in the immediate area of the conference on Sunday. The exact addresses of the meetings held in the afternoon of Sunday, June 30th are the following:

Workshop on AFM method: (2:00 -5:00 pm) FERMI Laboratory, Building 3R4, Conference room. Contact: kremena.makasheva@laplace.univ-tlse.fr; sombel.diaham@laplace.univ-tlse.fr

Workshop on Green Materials: (2:00 -5:00 pm) Institute of Mathematics, Building 1R3, Amphitheatre Schwartz. Contact: severine.leroy@laplace.univ-tlse.fr; gilbert.teyssedre@laplace.univ-tlse.fr

DEIS AdCom meeting: (1:30 -5:00 pm) Laplace Laboratory, Building 3R2, Seminar Rooms. Contact: virginie.griseri@laplace.univ-tlse.fr

Excursions

Upon registration, participants are asked to choose among available activities proposed for the Wednesday, July 3rd in the afternoon. We have tried to meet their expectancy in the limit of available places. See section Excursion for a short description of the activities.

Activity
Aeroscopia Museum, Blagnac
La Halle de la Machine, Toulouse Montaudran
Guided visit of Toulouse downtown
Technical visit – EDF Bazacle
Not available / interested

A take away lunch is organized after the last Session on Wednesday, July 3rd in the morning. Buses will depart from the main Hall to reach the Aeroscopia Museum and Halle de la Machine. Exact meeting time will be given on-site. For the other activities which are downtown Toulouse, the meeting point for the visits will be in the City. Announcements will be achieved at the conference.

Wi-fi

The conference hall and all the facilities of the Université Toulouse III - Paul Sabatier campus are equipped with Wi-fi connection. Participants having **Eduroam credentials** can in principle connect directly. In addition, the Wi-fi of the University will be made available for participants. The codes for the Wi-fi are individualized and will be provided with the registration kit.

Practical information for Authors

Key dates

Conference Dates: Sunday, June 30th, 2:00 pm to Thursday, July 4th, 4:30 pm. The Sunday, June 30th afternoon is dedicated to Workshops. The registration will be open on Sunday, June 30th at 5:00 pm and at the desk during the conference.

Abstracts:	Submission deadline:	15/11/2023
	Acceptance notification:	21/12/2023
Full papers:	Submission deadline:	30/03/2024
	Acceptance notification:	20/04/2024
	Provision of final version	31/05/2024

Presentations

All presentations are with physical attendance to the conference. Registration is required and opens to the presentation of up to two papers. The publication of the paper in IEEE Xplore is committed to the effective presentation of the paper at the conference.

Oral presentations

Oral presentations for regular sessions are expected to **last 20 min, including questions** (maximum 15 min for the presentation and 5 min for the questions). Presenters can use the house style of their institution for slides and provide either a PPT or PDF file. **The file should use the format 16:9.** The format 4:3 is inacceptable, otherwise the slides will be truncated. Each speaker will be asked to upload his/her presentation by means of a USB memory stick at least 30 minutes prior to the opening of the respective Oral Session.

Poster presentations

The size of the poster should be **A0 (118.9 x 84.1 cm)**. Please arrange text and figures in vertical order (portrait). Posters fixing utensils will be provided for you to use in fixing your paper on the poster board. We don't offer service for Poster printing.

The collection of accepted papers will be published in IEEE-Xplore provided presentation has been effectively achieved at the conference. A copyright agreement has to be signed online using the Conftool account.

History of the contribution campaign

Call for papers

The call for papers was launched in August 2023. Vectors used were first the list of contributors to the 2022 Edition, to which bulk mails were sent using Conftool. A second main vector was e-notice proposed by IEEE in direction of DEIS members. The call was published in the IEEE Electrical Insulation magazine. Finally, members of the Executive and Technical Program Committees were invited to advertise about ICD in conference and in their networks.

Abstracts campaign

The campaign for abstract deposit started at the beginning of September 2023 and end-up in mid-November 2023. The reviewing step was organized by the Technical Program Committee. One page abstracts had to be submitted online using Conftool at: https://www.conftool.pro/icd2024/. The instructions and the template are available on the ICD web site https://ieee-icd.org/

Not less than 423 abstracts were received and distributed to the 17 members of the TPC. Each member had in charge to find at least two reviewers for a set of roughly 25 abstracts. Reviewers were chosen among reviews of previous edition of ICD, among new submitters having at least the title of Doctor, and among new reviewers designated on purpose by the TPCs. A pool of nearly 250 reviewers was so created. Up to 8 abstracts could be attributed to each reviewer and the vast majority of them had at least 1 paper assigned.

The abstracts were evaluated based on the soundness of the work, the originality, the English expression, etc. The abstracts having obtained low marks were discussed among the TPC members to take a decision about acceptance. In fine, 410 abstracts were accepted and the authors were informed on December, 20th, 2023. Instructions for the next steps were sent at the same time.

Paper collection campaign

Authors of accepted abstracts were asked to submit their full paper online. The template for paper submission was available at the Authors section of the ICD Website. This electronic document is a “live” template and already defines most of the components of your paper [title, text, heads, etc.] in its style sheet. The paper had to be limited to 4 pages in length, in English. The first deadline for paper submission was set to March, 15th, 2023. Relatively early deadline has been set as we wished to anticipate higher activity in Consulates for providing Visas due to Olympic Games organized in France in Summer 2024. Accordingly, we acted at optimizing the time between paper submission and final decision. The deadline was postponed once up to end-March 2024. To save time and secure information, a copy of the data provided at the abstract submission step has been done, serving as basis for the paper submission with as index ID1xxx for abstract IDxxx. The second important point is that the vast majority of reviewers already assigned to abstracts were contacted to realize the reviewing of papers. Thus, time was saved at the reviewer selection step.

Thanks to all efforts achieved by the TPC and the reviewers, formal acceptance of papers could be dispatched by 20th of April 2024 and submission of revised papers ended up by the 10th of May. This paper campaign ended up with about 320 papers accepted, some withdrawals occuring before the paper submission step. A second phase of paper management came with strict control of homogeneity of papers vis template, checking of compatibility with IEEE standard and finally gathering Copyright Agreements through the Conftool application. At the final submission stage, IEEE PDF eXpress service is used to help authors convert and check their papers.

The acceptance as oral / poster presentation was dispatched by the end of May 2024 during program construction. The proposed program listed in this document contains about 300 contributions having followed all these selection steps. We would like to point on the high efficiency and robustness of the Conftool tool to manage all the conference data (paper collection and registration management), along with the reactivity of the team providing the service.

Conference Support and Sponsors

The 5th IEEE ICD 2024 is Financially managed by **IEEE France Section**.

IEEE ICD 2024 is **DEIS** fully financially sponsored conference.

Acknowledgement to Sponsors

Several partners have supported ICD under various forms and we warmly thank them for that. These are:

-**Laplace Laboratory**, to which most of the Organizers belong. Laplace is a joint research unit between Centre National de la Recherche Scientifique (CNRS), Université Toulouse III - Paul Sabatier and Institut National Polytechnique de Toulouse;

-**Université Toulouse III - Paul Sabatier**, the hosting organization the Conference;

-**Technological Research Institute (IRT) Saint-Exupery**, acting for research transfer toward aeronautic and space industries;

-**Safran company**, an international high-technology group operating in the fields of aeronautics (propulsion, equipment and interiors), space and defense;

-**Federation Fermat**, a structure supporting interdisciplinary research between 9 laboratories having activities in Engineering within Université Fédérale de Toulouse;

-**Bruker Company**, a manufacturer of scientific instruments for molecular and materials research, as well as for industrial and applied analysis;

-**Toulouse Convention Bureau**, a local organization specialized in supporting professional events.

Information from the DEIS

DEIS Graduate Fellowship

The graduate fellowship, established by the Dielectrics and Electrical Insulation Society (DEIS), is a prestigious grant and enables its winners to further explore a research topic in the areas of electrical insulation and dielectric phenomena. The fellowship aims at students pursuing their Ph.D. degree and is awarded for a one-year research topic aside (but close to) the larger research project of the applicant. **The anticipated award for 2024 is up to FIVE fellowships of up to US$ 5000 each.**

2024 Call

Applications for the "2024 DEIS Graduate Student Fellowship Award" are invited from graduate students in the general areas of electrical insulation and dielectric phenomena. The application is done by sending a research proposal document to the Educational Committee Chair: Prof. Christian M. FRANCK, **cfranck@ethz.ch** Receipt of application will be confirmed via mail. In case you don't hear back within 1 week after submission, please check back with committee chair. The document (maximum 3 pages) must contain a detailed but concise description and plan of this research topic. Please see details at the DEIS Graduate Fellowship call.

The call is open for applicants from all over the world, but the applicant must be a student member of IEEE and member of DEIS (or have applied for a student membership in IEEE at the time of application submission). Priority will be given to those applicants for who the main advisor is also a DEIS member. Previous recipients of this award are not eligible for consideration. Only one proposal per research group per year is recommended. **The deadline for submitting proposals is September 1st, 2024.**

Awards will apply to the 2024–2025 academic year. The award notification to the successful applicants is expected to be made in late November 2024.

DEIS Graduate Fellowship at IEEE-ICD2024

One of the duties of awarded Fellowships is the presentation at one DEIS conference of the results of the research. This is a condition for getting the second installment of the grant.

For this Edition of ICD, we will have the pleasure to welcome the presentations of 3 awardees:

- Haoliang LIU (Call 2023), Tianjin University, China: *Space charge measurement of polymer dielectrics in strong magnetic field based on current integral method*.
- Rohith SANGINENI (Call 2022), IIT Guwahati, Guwahati, India: *A Robust, cost-effective, portable and non-invasive device for condition assessment of liquid insulation*.
- Duvan MENDOZA-LOPEZ (Call 2021), Université Toulouse III - Paul Sabatier, France: *Study of charge trapping phenomena by coupled LIMM and PSD measurements in BOPP thin films*.

Young Professionals in DEIS

The DEIS Young Professionals Affinity Group is dedicated to supporting post-student members who are within 15 years of receiving their first professional degree. As the future of the Dielectric and Electrical Insulation Society (DEIS) hinges on the engagement of younger and early-career members, our primary goal is to inspire and inform DEIS-YPs on both technical and non-technical subjects, fostering their interest and active participation within the society.

There are several activities organized by DEIS-YP:

- Streaming monthly webinars;
- YP Luncheon at all DEIS-sponsored conferences, including ICD, scheduled for Monday, July 2nd, 2024 at this ICD Edition;
- Launch and preparation of the CEIDP centennial celebration flip book, available at https://www.ieee.org/ns/periodicals/DEIS/eBook/index.html

These initiatives boom on the involvement of our society's members. Stay connected and follow us on **LinkedIn** at for the latest updates and event details relevant to DEIS-YPs. See also the DEIS website **DEIS-YP** for a broader description of our activities.
Contact: Mattewos TEFFERI **mattewos@ieee.org**

Women in Engineering

Vision

The IEEE DEIS Women in Engineering (WIE) envisions creating a diverse, inclusive, and innovative community within dielectrics and electrical insulation. Despite having a relatively small membership of around 1,800, with women making up approximately 7%, the goal is to expand the network and support women professionals. This aims to foster an environment where women can excel and significantly contribute to technological advancements, particularly in high-voltage engineering, a field often lacking visibility and representation. The ultimate goal is to be recognized as a symbol of empowerment and excellence, driving a brighter and more inclusive future.

Mission

The mission of DEIS WIE is to advance inclusivity and innovation and the focus is on increasing female participation in DEIS activities and conferences. This includes disseminating information, engaging individuals globally through webinars, workshops, social media campaigns, and sharing success stories. By highlighting and supporting women's contributions, especially in high-voltage engineering, the mission aims to provide support, mentorship, and recognition, nurturing future leaders and promoting greater diversity and inclusion in the community.

If you're ready to be a trailblazer and leave an indelible mark on the engineering community, join us today! Send an email to us expressing your interest and briefly describing why you would be an asset to the DEIS WIE committee.

Links: **Website** **LinkedIn** **Youtube** **Instagram**

Contact: Sneha Satish HEGDE, Chair of IEEE DEIS WiE: **sneha.hegde@ieee.org**

3rd Thematic School on Dielectrics

After 2018 and 2021, the **3rd Thematic School on Dielectrics** is organized in **Porquerolles island**, South of France, from **September 15th – 20th, 2024**.

This Thematic School, fully in English to welcome people from everywhere, intends to train Scientists, Researchers, PhD students, Engineers and Technical staff coming from both Academia and Industry and all interested in the field of Dielectrics and Electrical Insulation from fundamental basics to applications in electrical and electronic engineering.

For this 3rd edition, the School will be focused on **Multifunctional Composite Insulating Materials for Electrical Applications** covering a broad range of sub-topics in the field of composites and nanocomposites.

We wish to maintain what made the originality and strength of the two previous editions: the intervention of renowned researchers through plenary lectures, the international openness and the articulation of courses with situational approaches through practical works / workshops. These lab-work, brought specifically on-site, will cover the use of modelling tools as well as supporting experimentation for dielectric characterizations.

We are pleased to confirm some of our Distinguished Lecturers:

- Prof. Nick QUIRKE, Imperial College London, UK
- Prof. Andrea CAVALLINI, University of Bologna, Italy
- Prof. Masahiro KOZAKO, Kyushu Institute of Technology, Japan
- Assoc.-Prof. Thomas ANDRITSCH, University of Southampton, UK
- Drs. Marie-Paule BESLAND, CNRS, University of Nantes, France

Information on the program is available on the Thematic School website:
https://seedsschool2024.sciencesconf.org/

Registration

The registration to the school is open, with as **deadline July, 31st, 2024**. Due to limited accommodation facilities, pre-registration is required. You can now pre-register by filling the form to download on the website and sending it back at: **seedsschool2024@sciencesconf.org**

Do not hesitate to advertise this event through your professional network and to come back to us for any further information at the occasion of the IEEE ICD-2024 conference.

We are looking forward to seeing you in Porquerolles Island, South of France, from 15 to 20 September 2024.

The organizing committee

Assoc-Prof. Sombel DIAHAM, University of Toulouse, LAPLACE.

Dr. Gilbert TEYSSEDRE, CNRS Toulouse, LAPLACE.

Prof. Petru NOTINGHER, University of Montpellier, IES.

PROGRAM OF ICD 2024

The timetable of the IEEE ICD 2024 Conference program is provided below and the contents of the various events are detailed in the following sections.

	Sunday 30/06/2024	Monday 01/07/2024	Tuesday 02/07/2024	Wednesday 03/07/2024	Thursday 04/07/2024	Friday 05/07/2024
8:00am – 8:15am		*Registration*	*Registration*	*Registration*	*Registration*	
8:15am – 8:30am			**Oral session 3 Special session Aeronautics**	**Oral session 6 Advanced and functional materials**	**Dakin award Lecture**	
8:30am – 9:00am		Opening Session				
9:00am-10:00am		**Eric Foster Memorial Lecture**			**Oral session 7 Nanodielectrics**	Tutorial PEA Cable (9:00am-01:00pm)
10:00am-10:30am		Break	Break	Break	Break	
10:30am-12:30pm		**Oral session 1 Materials in insulation systems**	**Oral session 4 Modelling**	**Poster sessions 3 YR contest**	**Poster sessions 4 (//)**	
12:30pm-02:00pm		Lunch	Lunch *Young Professional Event*	Lunch box	Lunch / *IAC meeting*	
02:00pm-04:00pm	**DEIS AdCom** (1:30 5:00pm) **Workshop 1** AFM for Characterization of Dielectrics at Nanoscale **Workshop 2** Eco-friendly materials in electrical insulation	**Oral session 2 Space charge and related effects**	**Oral session 5 Diagnostic methods**	Excursion	**Oral session 8 Ageing, degradation and breakdown**	
04:00pm-04:30pm		Break	Break		YR Awards CLOSING SESSION	
→ 05:00pm	*Registration*	**Poster sessions 1 (//)**	**Poster sessions 2 (//)**			
→ 06:30pm	*Registration* Welcome Cocktail		GALA DINNER + WiE event			

Two Workshops will be held on the first day of the conference, dealing with application of AFM-based method to the characterization of dielectric materials and to Green materials in electrical engineering.

Two lectures will be given awarding scientists from our community for outstanding contributions: **The Eric O Forster memorial lecture** which is an award of the IEEE-ICD conference series, and the **Dakin award**, which is a DEIS award.

As traditional now with ICD, papers cover all areas of solid, liquid and gas dielectrics. There are no dedicated sessions to specific dielectric media. Instead, regular sessions are split by scientific approach: materials, development, experiments, modelling, diagnosis, etc. A special session dedicated to Dielectrics in aeronautics is organized as it is a domain in which Toulouse has substantial activity. An invited speaker from Airbus company will initiate the session. A total of 41 regular oral presentations will be given in 7 regular oral sessions plus de special one.

Regular Poster presentations are organized in 3 time windows of 2 h each with 3 sessions in each of them. This is complemented by a 4th set of sessions held on Wednesday morning fully dedicated to the young researchers' contest.

The **Young Researchers' Contest** is an innovation of this ICD Edition, with 3 prizes being distributed during the closing session. Another innovation is the distinction of one person having acting for the promotion of **Women in Engineering**. This will occur during the conference diner.

Young Professionals will communicate on their activities on Tuesday July 1st, before the afternoon session.

The Eric Forster Memorial Lecture

Eric Forster was one of the founding fathers for the ICSD/ICD conference series. The Eric O. FORSTER Memorial Lecture is a prestigious lecture given at the opening of the conference. It honors a scientist for his outstanding contribution to the field of dielectrics. For the 2024 edition, Dr Christian FRANCK from ETH Zürich, Switzerland will be awarded.

Green Developments in Gaseous Insulation Systems

Christian M. FRANCK

Abstract

Climate change, pollution, and limited material resources are some of the most pressing global problems that need to be urgently addressed and will entail a fundamental change in the way modern societies operate. Our community of dielectric and electrical insulation experts has accepted to tackle these challenges and is increasingly working on finding solution.

This Eric O. FORSTER Memorial Lecture aims to give an introduction into the challenges that we're facing with respect to gaseous insulation systems and to give an overview on current trends in research and development, as well as on achievements of the past decade. The lecture closes by highlighting future trends and making societal questions explicit that need to be debated in parallel to the technical developments.

Biography

Christian Michael FRANCK (Senior Member of IEEE) was born in Bonn, Germany in February 1973. He studied physics in Bonn, Edinburgh (Scotland) and Kiel (Germany), where he received his diploma degree from the University of Kiel in 1999. Afterwards he worked at the Max Planck-Institute for Plasma Physics and the University of Greifswald, Germany. Under the supervision of Prof. KLINGER, he performed research in the area of electromagnetic wave propagation in magnetized plasmas, receiving his Ph.D. in experimental physics in 2003.

From 2003 to 2009, he was with the ABB Swiss Corporate Research Center, Baden-Dattwil, Switzerland, as a scientist and later as a group leader for gas circuit breakers and high-voltage systems. In January 2010 he joined ETH Zurich as Assistant Professor. He was promoted to Associate Professor in June 2015 and to Full Professor in March 2020.

His current main research interests include gaseous insulation and switching arcs, with focus on SF_6-alternatives, and solid insulation systems, with emphasis on their resilience to HVDC and mixed electrical stresses, as well as overhead powerline corona.

He served as convenor for CIGRE JWG A3/B4.34 and WG D1.67. He is the chair of the IEEE-DEIS Education Committee since January 2023.

The Thomas W. Dakin Distinguished Technical Contribution Award Lecture

The Dakin award, which was first given in 1978, is named in honor of the late Thomas W. DAKIN, one of the most distinguished scientists in our field. Tom Dakin was a life-long employee of Westinghouse Electric and was a key figure in the development of new insulation systems for capacitors and rotating machines. Every two years, the IEEE Dielectrics and Electrical Insulation Society selects a researcher to recognize outstanding, original technical contributions, as evidenced by their sustained impact in advancing the science and technology of dielectrics and electrical insulation.

For the year 2024, the T.W. DAKIN award was attributed to Prof. Yoshimichi OHKI, from Waseda University, Japan. Prof. OHKI provided us the honor to choose ICD-2024 for giving his lecture.

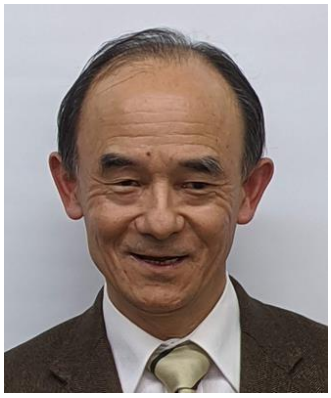
Attracted to Dielectric Materials Research

Yoshimichi OHKI

Abstract

"Dielectric" literally means a substance attracted to electricity in Japanese. The title of the Dakin Award Presentation is tentatively "Attracted to Dielectric Materials Research". The presentation title and the word "dielectric" rhyme with "attracted to." The presenter will introduce some research he has been "attracted to." Although the research fields to talk about are still not fixed, they probably include surface flashover in a vacuum, radiation effects on silica optical fiber, functional inorganic materials, nanocomposites, and degradation mechanisms of polymers.

Biography



Yoshimichi OHKI (Life Fellow of IEEE and Fellow of IEE Japan) was born in Amagasaki, Japan in December 1950. He received the Dr. Eng. degree from Waseda University in 1978. He is currently a Senior Research Professor and Professor Emeritus at Waseda University. He is also an Honorary Professor at Xi'an Jiaotong University, China. He was a Visiting Scientist at MIT, USA from 1982 to 1984 and a Senior Fellow of the Japan Science and Technology Agency from 2006 to 2008.

He was the President of the Japanese Electrotechnical Committee from 2015 to 2019. He was a recipient of many awards, including the IEEE-DEIS Whitehead Memorial Lecture Award and Eric O. FORSTER Award, the IEE-Japan Outstanding Achievement Award (two times), the Prize for Science and Technology awarded by the Minister of Education of Japan, and the Okuma Memorial Academic Award and the Research Award (six times) from Waseda University. He has written many papers; 728 listed in Scopus with 14,363 citations and an H-index of 54, as of April 2024.

Women in Engineering: Distinction

This event is scheduled during the Conference Diner, Tuesday, July 2nd, in the evening.

As an innovative action within ICD, the Executive Committee of ICD-2024 wished to put forward the involvement of Women in our research fields. Already within the Executive Committee, the gender equilibrated representation was achieved. Along with the WiE group at DEIS, the idea of rewarding a person who has significant action for promoting the involvement of Women in Engineering has emerged. It will be in the form of an event during the Conference dinner, with awarding of a recognition mark to Prof. Florence SÈDES.

Prof. Florence SÈDES

Professor of Computer Science at the Faculty of Sciences, University Toulouse III - Paul Sabatier, in the research area of data science, Prof. SÈDES is active in database and information system research since 1987. She has published over one hundred papers, books and book chapters and has been leading international, European and national projects on personal (meta)data privacy and management, CCTV and forensic, IoT and security, geospatial and indoor/outdoor data, and social networks, with applications via deep/machine learning for alert, spam detection, social emotion and interaction. She has been heavily involved in designing data sets and platforms in order to enable assessment of the various contributions, software and systems of our community.

Her research addresses notably gender imbalance and biases in AI.

IEEE Senior member, she is co-founder –and **IEEE President of the French Chapter of Women in Engineering**. From 2020 to 2024 she was Vice deputy chairwoman for Societal Responsibility and Sustainable Development at our University. She is a board member, in charge of Women in Informatics at the French Computer Science Society. She is a board member of Femmes & Sciences, the French Women and Science society.

Her first ambition for the WiE French Chapter is that for each event organized by IEEE France Section, people carrying a real message of inclusion, are present, visible, highlighting their skills and responsibilities and not being just a representation. Her second wish is to establish a culture of gender equality within the IEEE France Section, being internally through the recognition of the WiE stamp, and externally, why not, through the signing of a charter promoting equality between women and men, which would mark women adherence to certain values and certain operating processes. The third wish is at the generational step, the earlier the better: supporting and encouraging the development of the student branches of WiE. Her ultimate wish will be to work on these issues in France, of course, but also in the heart of Region 8 which brings together Europe, the Middle East and Africa.

We address our recognition to Prof. Florence SÈDES, for her achievements for the promotion of Women in Engineering and for the encouragement and source of inspiration she represents for Women in our fields of activities. We look forward for listening about her vision and count on her incitation both for French women to be involved in the French Chapter and foreigner ones to launch actions in their country.

Special session on Insulations in Aeronautic Environment

Since the invention of the first aircraft, attributed to Clément ADER at the end of the 19th century, Toulouse has successfully set out to conquer the skies, positioning itself as a leader in aeronautics activities. Many mythical aircrafts have taken off from Toulouse, and companies have developed civil and commercial air transport. The Aeropostale story and the famous supersonic aircraft known as the Concorde participate in this heritage. Certainly one of the greatest achievements was the Airbus company who has his headquarters in Toulouse. Electrification of aircraft is constantly increasing, and this naturally provides activities in our field, the reasons why we proposed this special session. As introductory talk, an invited lecture, given by Dr Jean RIVENC, from Airbus SAS, France is scheduled.

Physical phenomena and challenges in electrical insulation for airborne applications

Jean RIVENC

Synopsis

The purpose of the talk is to give an overview of physical phenomena and challenges in electric insulation systems for airborne applications. First of all, the general context will be remembered. The embedded electric power is expected to significantly increase in future aircrafts. In order to manage this increase, while limiting the mass and volume of electric conductors, there is a need to increase the voltage. However, the transition to higher voltages in airborne applications is a real challenge.

In this lecture, concrete examples will be presented. Examples of questions, which will be discussed during the presentation, are: how to design a partial-discharge-free cable? How to test a complex equipment, like a converter, with respect to partial discharges? How to determine creepage distances at high altitude? Is there a need to take the space charge phenomenon into account in sizing of the electric insulation system, or can it be neglected? What is the aging effect on dielectric performances, and how to demonstrate that no electrical insulation failure will occur for a 30 years' application?

We will try to bring - at least partially - answers to these questions, to share our vision on how to manage the electrical insulation and to give perspectives in order to design a safe and reliable insulation system for airborne applications.

Jean RIVENC was born in Toulouse, France, in 1973. He received the Ph.D. degree in applied science from Paul Sabatier University, Toulouse, in 1998. During his Ph.D. studies, he worked on electrostatics, dielectrics, and electrical insulation, and was a Visiting Engineer at the Massachusetts Institute of Technology, Cambridge, MA, USA. From 1998 to 2013, he was an Engineer at Renault, Paris, France, where he managed a team and a laboratory in the field of electrical and electronics systems reliability. He tested various systems with respect to physicochemical environment and hazards linked to electronics failures. Since 2013, he has been with Airbus Group, Toulouse, as a Research Engineer, in the field of electromagnetic compatibility, power electronics, and composite materials. He is currently expert in High Voltage, Partial discharges, Arc and Plasmas Technologies.

Young Researchers' Contest

The DEIS strongly supports distribution of prizes to young professionals

The Executive Committee of ICD, with support from the DEIS Educational Committee and from the DEIS Young Professionals Committee, has set up a Young Researchers Contest to encourage the participation of students and young researchers in the conference. An award of 500€ per winner will be distributed

Proven full-time engineering and science researchers and PhD students from academia as well as industry are encouraged to participate. In order to promote the involvement of the last generation of researchers into the DEIS community, and to stimulate the emergence of talented early stage researchers, candidates being within five years after their graduation are privileged. Besides the condition on seniority, candidates must be first author of their paper and commit to present it in person to participate to this contest.

Young researchers are kindly requested to "tick" a check case at the abstract/paper submission steps. Candidates whose papers are preselected based on regular reviewing will be invited to present their papers at the conference. An independent Jury, constituted of 7 members, presided by Prof. Davide FABIANI will establish a classification. Prizes will be awarded to the authors of the best contributions during the closing session of the conference.

Three prizes will be distributed, awarding

- The Best Paper
- The Best Oral Presentation
- The Best Poster Presentation

About 80 papers are finally in competition for the prizes.

The Best Paper will be selected based on the re-evaluation of the top 20 papers marked during the reviewing phase.

Jury members of the Young Researchers' Contest

Davide FABIANI, *University of Bologna, Italy*
Sneha EDGE, *Laboratoire Ampere, France*
Nandini GUPTA, *IIT Kanpur, India*
Akiko KUMADA, *The University of Tokyo, Japan*
Peter MORSHUIS, *Solid Dielectric Solutions, Netherland*
Christina VILLENEUVE FAURE, *University of Toulouse, France*
Yewen ZHANG, *Tongji University, Shanghai, China*

Regarding the competition for Best Oral prize, it will be among papers selected for an oral when building the conference program. Those papers are spread in regular sessions. 15 papers are in competition. For electing the winner, the session chairs and the jury will complete an evaluation procedure based on the oral performance.

Finally, the Poster session dedicated to the Young Researchers Contest is organized on Wednesday, July 3rd, in the morning. About 65 papers will be presented and evaluated in this session.

Workshops

Ahead of the conference, two Workshops, accessible upon registration, are organized in parallel. The following topics have been selected:

I. Atomic Force Microscopy for characterization of dielectrics at nanoscale.

This workshop is held Sunday, June 30th, 2.00 pm-5.00 pm, Conference room of FERMI Laboratory, Building 3R4.

The workshop is proposed by the IEEE DEIS Technical Committee on Nanodielectrics in coordination with the IEEE Nanotechnology Council. A presentation of the activities of the two bodies will be given in the beginning. Then the floor will be given to 3 speakers treating different aspects of the AFM:

1. **'Nanomechanical properties of polymer based nanocomposites'** by Dr. Nadine LAHOUD DIGNAT, associate professor at Université de Toulouse since 2013. Nadine has a M.SC degree in polymer materials science from Université Claude Bernard Lyon1 and a Ph.D. degree in materials for electrical engineering from Université de Toulouse, France. Her research work concerns the ageing of polymer electrical insulation as well as the multiscale characterization of nanodielectrics. Her presentation will focus on the importance of a nanoscale characterization in the case of nanodielectrics. Particularly, the use of the atomic force microscopy (AFM) in order to characterize the mechanical properties of the different components within nanocomposite materials will be developed.

Contact: nadine.lahoud@laplace.univ-tlse.fr

2. '**Nanocomposite electrical probing at nanoscale'** by Dr Christina VILLENEUVE-FAURE from LAPLACE (CNRS, UTIII, University of Toulouse). Christina Villeneuve-Faure received an engineering degree in materials and nanophysics from Institut National Polytechnique de Grenoble in 2004 and the Ph.D. degree in materials physics from the University of Toulouse in 2007. After 4 years' post-doctoral position in LAAS-CNRS on MEMS reliability she is, since 2011, associate professor in LAPLACE, France. Her researches focus on AFM characterization of electrical properties of thin dielectric and semiconductor films. She developed methodologies combining AFM measurements and Finite Element Model to simulate to determine quantitative dielectric properties, such as dielectric permittivity, at nanoscale.

Contact: christina.villeneuve@laplace.univ-tlse.fr

3. '**Newly developed AFM techniques – AFM infrared**' by Mr Emmanuel PARIS from Bruker (France). Emmanuel Paris received a Master of Sciences (MSc) in electronic, energy and automatism from University Paris 6. He has acquired more than 30 years of experience in surface characterization and Atomic Force Microscopy techniques. He is currently managing the Bruker Nano Surface division in France.
Contact: Emmanuel.Paris@bruker.com

The presentations will be followed by a discussion on different architectures of nanodielectrics and a debate on the AFM application for their study, moderated by Dr Kremena MAKASHEVA and Assoc. Prof. Sombel DIAHAM.

II. Eco-friendly materials in electrical insulation

This second workshop is held Sunday, June 30th, 2:00 pm-5:00 pm, at IMT Amphitheatre, Building 1R3.

The topics of 'Green Materials' or 'Eco-friendly materials' is very broad and is currently the subject of full conferences. For this edition of ICD we propose a Workshop willing to address different aspects of dielectric materials in electrical engineering regarding their ecological impact. The questions can be from bio-sourced materials, to recyclability aspects of materials in applications ranging from cables to power modules, to life-cycle assessment. The following presenters will initiate the discussion:

1. **'Industrial needs for greener materials for insulation in electronic domain'** by Dr Baptiste ARATI, from IRT St Exupery Toulouse. Baptiste was graduated from the University of Toulouse in 2023, for a work on the potentiality of application of vitrimers as self-healing materials for the insulation of power modules. His PhD was prepared in collaboration between Mitsubishi Electric Research Center and Laplace Laboratory. The presentation will be based on current needs viewed from the industry standpoint, with notably expectancies for making electronic modules more recyclable. The attached criteria will be developed, based not only on next materials but also on the possibility of dismantling the objects. Solutions for overcoming these challenges will be discussed.
Contact: baptiste.arati@irt-saintexupery.com

2. **'Sustainable Insulation Materials for Power Cables'**, by Detlef WALD from Eifelkabel Company. Detlef spent most of his career with Borealis company, who is a large produced of polyolefins, followed by a stay with Brugg Kabel. He has over 25 years' experience in the production of cables and performance evaluation. He is now engaged in cables for DC and HVDC energy transmission and in the way of improving the recyclability of cables. In his presentation, Detlef will review the different kinds of insulating polymers currently used from LV to HV cables. He will address the criteria to be considered to evaluate the ecological fingerprint associated with cables production. Finally, challenges and opportunities towards greener materials for these applications, ranging from the production stage to the recycling and after cable life fate of materials, will be discussed. **Contact: d.wald@ieee.org**

3. **'Development of biobased epoxy resins for use in the electrical industry'**, by Prof. Jean-Pierre HABAS, from the University of Montpellier. Jean-Pierre is a physicist having moved to chemistry, specialist of polymers and composite materials. His current research span from biomass to green composite materials, contributing to the development of new class of polymeric materials with versatile physical and chemical properties. His presentation will be on the development of a large generation of bio-based epoxy resins from lipid- and sugar-chemistry. These resins present tunable properties that depend on the chemical nature of the components, their relative proportions in the reactive mixture but also their curing conditions. The application to electrical insulation will be addressed up to the industrial qualification.
Contact: jean-pierre.habas@umontpellier.fr

Once these presentations will be completed, the floor will be given to the audience for exchanges. Topics of interest to attendees will be discussed. We are happy to feed the discussions between participants with short presentations or questions that the participants may have prepared in advance.

Tutorial "Assembly of space charge equipment for cables"

This Tutorial is organized on Friday, June 5th, 9:00 am - 1:00 pm, at Laplace Lab, Seminars Room, Building 3R2. This tutorial, also referred to as "**PEA CE - Fourth International Workshop on Pulsed Electro-Acoustic technique for Cable Engineering**", is initiated by Prof HOZUMI and Dr MORSHUIS. It is held after the last day of the conference as a satellite event to the ICD. It comes after three successful earlier sessions in Japan and South Korea.

Purpose

Space charge measurements of full-scale HVDC insulated cables systems have reached a level where they can be used in practical tests. However, the measurement of actual insulating systems involves unique problems such as voltage application methods and acoustic propagation characteristics. It remains difficult to systematize the know-how for solving these problems, and it is also difficult to let the readers understand their importance when they are described in a paper.

The workshop aims at providing the participants with state-of-the-art information about PEA measurements on full-size cable systems. A key aspect of the workshop is the hands-on experience provided to the participants: they will each build their own cable PEA cell from the basic building blocks. At the end of the workshop, all assembled PEA cells will be tested on an HVDC cable. The PEA cells will become the participants' property and they can bring it home to be used in their company / at their research institute.

Speakers

The workshop will be given by:

- Naohiro HOZUMI (Emeritus Professor Toyohashi University of Technology, Japan),
- Peter MORSHUIS (Solid Dielectric Solutions, the Netherlands)
- June-Ho LEE (Professor at Hoseo University, South Korea).

Program

1. Tutorial by Professor HOZUMI and Dr MORSHUIS on PEA measurements on HVDC cable systems. From the basics of building a PEA test set up to the latest developments on how to use the PEA technique on full-size cable systems, including joints.
2. A guided hands-on experience of building your own cable PEA cell.
3. Testing of your PEA cell by Professor HOZUMI and his team.
4. You will become the owner of the PEA cell you assembled during the workshop.

Access

A limited number of seats (15) is available and the Workshop is run with full attendance. Registration (fees: 400€) is achieved separately from that to the ICD.
Contact for any formation: Dr Peter MORSHUIS- **peter.morshuis@dielectrics.nl**

Monday 01 July 2024

E. O. Forster Memorial Lecture

Time: Monday 01 July 2024 – 9:00am - 10:00am
***Session Chair*:** Peter Morshuis

"Green Developments in Gaseous Insulation Systems"
Christian M. Franck
ETH Zürich, Switzerland

Oral Sessions 1: Materials in insulation systems

Time: Monday 01 July 2024 – 10:30am - 12:30pm
***Session Chair*:** Yuriy Serdyuk
Session Chair: Marie-Laure Locatelli

1-1 **Breakdown testing of pressure- and cure-bonded silicone rubber interfaces**
Harry McDonald[1], Steven Qi Li[1], Simon M. Rowland[1], Antonios Tzimas[2]
[1]The University of Manchester, United Kingdom; [2]Advanced Energy Industries

1-2 **Characterization of structural and dielectric properties of silicon nitride thin films deposited by PECVD**
Tania Al Moussi[1], Cian O'Dalaigh[2], Jérome Esvan[3], Paul Lambkin[2], Ramji Lakshmanan[2], Baoxing Chen[4], Sombel Diaham[1,2]
[1]LAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France; [2]Analog Devices International, Limerick, Ireland ; [3]CIRIMAT, Université de Toulouse, École Nationale Supérieure des Ingénieurs en Arts Chimiques et Technologiques, Toulouse, France; [4]Analog Devices Incorporation, Wilmington, MA, USA.

1-3 **Effects of extremely cold weather on the thermal stress distribution of GIS cable termination**
Boxue Du[1], Qi Li[1], Wenbo Zhu[3], PengXian Song[2], Longji Li[2], Chengyao Hou[1], XiaoXiao Kong[1], Jiaqian Zhang[1], Zhankang Gao[1], Yingting Luo[1]
[1]School of Electrical and Information Engineering, Tianjin university, China; [2]State Grid Tianjin Electric Power Company Electric Power Research Institute, China; [3]Electric Power Research Institute of State Grid Tianjin Electric Power Company, China

1-4 **Effect of moisture and oil-immersion on dielectric properties of paper insulation**
Shengkang Wang, Ruiqi Liu, Fuchang Lin, Hua Li
School of Electrical and Electronic Engineering, Huazhong University of Science and Technology, China

1-5 **All-inorganic electrical insulation systems for high-power-density electrical machines**
Zakhar R. Kudrynskyi[1], Peter H. Connor[2], Timothy P. Cooper[1], Matthew D. Wadge[1], James Kerfoot[3], Xiang Zheng[4], Reda M. Felfel[5], Vladimir V. Korolkov[3], Martin Kuball[4], Christopher Gerada[2], David M. Grant[1]
[1]Advanced Materials Research Group, Faculty of Engineering, University of Nottingham, Nottingham, UK; [2]Power Electronics, Machines and Control Research Group, Faculty of Engineering, University of Nottingham, Nottingham, UK; [3]Park Systems UK Limited, Nottingham, UK; [4]Centre for Device Thermography and Reliability, University of Bristol, Bristol, UK; [5]Advanced Composites Group, University of Strathclyde, Glasgow, UK

1-6 **Substitution of solid encapsulant materials by dielectric fluid in power modules: potentialities and challenges**
Rabih Khazaka[1,2], Chencho Dorji[2], Rachelle Hanna[2], Olivier Lesaint[2], Yvan Avenas[2], Stephane Azzopardi[1]
[1]Safran, France; [2]Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, France

Oral Sessions 2: Space charge and related effects

Time: Monday 01 July 2024 – 02:00pm - 04:00pm
***Session Chair*:** Kai Wu
Session Chair: Espen Doedens

2-1 **The Impact of needle electrode curvature radius on space charge distribution evolution: A combined experiment and simulation study**
Yuxin Liu, Penglong He, Bo Zhang, Jinliang He
State Key Laboratory of Power Systems, Department of Electrical Engineering, Tsinghua University, Beijing, China

2-2 **Hindered phenolic compound grafting modification and space charge investigation of PP cable insulation**
Yifan Yin, Zhonglei Li, Shuai Zhao, Boxue Du
Tianjin University, China

2-3 **New advancements in measuring the distribution of electric charges within liquids using PEA**
Thierry Paillat[1], Laurent Berquez[2], Paul Leblanc[1]
[1]PPRIME, Poitiers, France; [2]LAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France

2-4 **Space charge distribution measurements of thin-film insulating materials with slow sound velocity using a high-resolution PEA system**
Ryota Kobayashi, Kosuke Sato, Hiroaki Miyake, Yasuhiro Tanaka
Tokyo City University, Japan

2-5 **Fundamental study for correction technique in space charge measurements of cables under load-cycle using pulsed electro-acoustic method**
Shosuke Morita[1,2], Norikazu Fuse[1], Toshihiro Takahashi[1], Yoshinobu Murakami[2], Naohiro Hozumi[2]
[1]Central Research Institute of Electric Power Industry, Japan; [2]Toyohashi University of Technology, Japan

2-6 **Ability of thermal method of measuring electric fields at metal-polymer and metal-semicon interfaces: an experimental study**
Sneha Hegde[1], Jean-Charles Laurentie[1], Stéphane Holé[2], Petru Notingher[1]
[1]Université de Montpellier / CNRS, France; [2]ESPCI / PSL / Sorbonne Université, France

Poster session 1A: Theories and Models

Time: Monday 01 July 2024 – 04:30pm - 06:30pm
***Session Chair*:** Anh Hoang

1A-01 **Study on space charge accumulation allowance for DC cables using bipolar transport calculation**
Norikazu Fuse[1,2], George Chen[2]
[1]Central Research Institute of Electric Power Industry, Japan; [2]University of Southampton, United Kingdom

1A-02 **Trap spectroscopy from the dielectric isothermal step response: theory and simulations**
Philippe Molinié
Laboratoire de Génie Electrique et Electronique de Paris (GeePs), France

1A-03 **Study on accelerated deterioration and early failure mechanism of silicone elastomers under nanosecond pulsed electric field**
Dongxin He[1], Haochen Wang[1], Teng Gao[1], Qingquan Li[1], Gilbert Teyssedre[2]
[1]School of Electrical Engineering, Shandong University, Shandong Province, China; [2]Laplace, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France

1A-04 Simulation and mechanism study of cavity discharge under pulsed electric field
Zhe Zhang[1], Dongxin He[1], Wenjie Gong[2], Zhe Xu[3], Haochen Wang[1], Qingquan Li[1]
[1]Shandong University, China; [2]State Grid Jinan power supply company, China; [3]State grid Shandong electric power company ultra-high voltage company, China

1A-05 Influencing factors and potential early warning for wind-biased transmission line discharges
Yufeng Guo[1], Yong Liu[1], Yuepeng Xin[1], Minxin Wang[1], Qiran Li[2], Boxue Du[1]
[1]Key Laboratory of Smart Grid of Ministry of Education, School of Electrical and Information Engineering, Tianjin University, Tianjin, China; [2]Tangshan Power Supply Company of State Grid Jibei Electric Power Company Limited, China

1A-06 Galloping mechanical characteristics of overhead insulated lines in 10 kV distribution network
Yufeng Guo[1], Yong Liu[1], Zhihui Wang[1], Xiaowen Li[2], Boxue Du[1]
[1]Key Laboratory of Smart Grid of Ministry of Education, School of Electrical and Information Engineering, Tianjin University, Tianjin, China; [2]State Grid Jiangxi Electric Power Company Limited Xinfeng County Power Supply Branch Company, Ganzhou, China

1A-07 Development process of electrical arc movement on ice-covered HVDC outdoor insulator
Bohan Wang[1], Yong Liu[1], Chao Li[1], Minxin Wang[1], Xiaowen Li[2], Boxue Du[1]
[1]Key Laboratory of Smart Grid of Ministry of Education, School of Electrical and Information Engineering, Tianjin University, Tianjin, China; [2]State Grid Jiangxi Electric Power Co., Ltd. Xinfeng Power Supply Branch, Xinfeng, China

1A-08 Effects of icing and galloping on the insulation performance of 10 kV overhead insulated conductor
Hucheng Liang[1], Zekai Zhang[1], Daiyong Yang[2], Lixin Jiao[2], Jingyao Luan[2], Chunbo Liu[2], Xiaoxiao Kong[1], Boxue Du[1]
[1]School of Electrical and Information Engineering, Tianjin University, Tianjin, China; [2]Electric Power Research Institute of State Grid Jilin Electric Power Co., Ltd., Changchun, China

1A-09 Dynamic characteristics of electric field and mechanical stress distribution of GIS insulation rod during operation
Chengyao Hou[1], Xiaoxiao Kong[1], Yun Chen[1,2], Jinpeng Jiang[2], Yifang Wang[1], Chong Zhang[1], Boxue Du[1]
[1]Tianjin University, China; [2]China Electric Power Research Institute, China

1A-10 Simulation of partial discharge from a railway pantograph
Joanna Rzempoluch[1], Jiakun Yang[1], Giulio Girelli[1], George Callender[1], Paul L Lewin[1], Paul Naylor[2], Richard Stainton[2], Matthew Atkins[3]
[1]University of Southampton, United Kingdom; [2]Network Rail, Milton Keynes, United Kingdom; [3]Brecknell Willis, Chard, United Kingdom

1A-11 Behavior of water and ions within polyethylene: Insights from molecular dynamics simulations
Shinya Iwata[1], Ryota Kitani[1], Tomoka Tsuya[1], Hiroaki Uehara[2], Tatsuki Okamoto[2], Tatsuo Takada[3]
[1]Osaka Research Institute of Industrial Science and Technology, Japan; [2]Kanto Gakuin University, Japan; [3]Tokyo City University, Japan

1A-12 The evolution of space charge and electric field in HVDC cable under polarity reversal voltage superimposed with temperature gradient
Zhong Zheng, Zhonglei Li, You Wu, Heyu Wang, Boxue Du
Tianjin University, China

1A-13 Core loss distribution of anode saturable reactor using J-A dynamic hysteresis model
Meng Xiao, Yuyan Chen, Xiangyu Dong, Boxue Du
School of Electrical and Information Engineering, Tianjin University, China

1A-14 Evaluation of behavior of Q(t) measurement and noise effects
Ryota Kitani, Shinya Iwata, Tomoka Tsuya
Osaka Research Institute of Industrial Science and Technology, Japan

1A-15 Numerical simulation of surface charge accumulation on epoxy insulator in DC-GIS considering temperature gradient
Pinhao Huang, Yu Gao, Di Lu, Shuangying Li, Boxue Du
Tianjin University, China

1A-16 **Numerical investigation of the dynamic of electrons implanted in a polymeric material**
Abdeslem Beldjilali, Nadia Saidi-Amroun
LPM Laboratory, Physics Faculty, USTHB University, Algeria

1A-17 **New model for acetophenone ions in XLPE insulation – Space charge and electric field characteristics using bipolar charge transport theory**
Ajith John Thomas[1], Mikael Unge[1,2], Anh Hoang[3], Amirhossein Abbasi[3], Claire Pitois[1]
[1]NKT HV Cables AB, Technology Consulting, Västerås, Sweden; [2]Department of Fibre and Polymer Technology, School of Engineering Sciences in Chemistry, Biotechnology and Health, KTH Royal Institute of Technology, Stockholm, Sweden; [3]NKT HV Cables AB, R&D, Karlskrona, Sweden

1A-18 **The role of defect aspect ratio in the partial discharge phenomenology under DC voltage and temperature gradient**
Giuseppe Rizzo[1], Antonino Madonia[1], Roberto Candela[1], Vincenzo Li Vigni[1], Antonino Imburgia[2], Pietro Romano[2], Alessio Di Fatta[2], Guido Ala[2]
[1]EOSS, Prysmian Group, Italy; [2]Univeristy of Palermo, Italy

1A-19 **Insulation state assessment of Press-pack IGBTs based on electric and temperature field simulation**
Yiting Zhan, Feihu Zheng, Yewen Zhang
Tongji University, China

1A-20 **An adaptive algorithm for electrothermal simulation of surge arrester**
Yudong Jiang, Hua Li, Fuchang Lin, Guohao Zhang
Huazhong University of Science and Technology, China

1A-21 **Simulation of insulation defects of distribution cable accessories based on harmonic current characteristics**
Xu Lu[1], Kongying Guo[2], Weixin Sun[2], Ran Hu[1], Jie Tian[1], Daning Zhang[3], Yanhui Wei[2], Guochang Li[2]
[1]Shenzhen Power Supply Bureau Co, Ltd, Shenzhen, Guangdong, China; [2]College of Automation and Electronic Engineering, Qingdao University of Science and Technology, Qingdao, China; [3]School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, China

1A-22 **Quasi-2D finite volume modeling of corona discharges for ionic propulsion: comparison of reduced reaction schemes**
Fabio Ragazzi[1], Giuseppe Caliò[2], Giacomo Pierotti[1], Andrea Cristofolini[1], Paolo Barbante[2], Arturo Popoli[1]
[1]Department of Electrical, Electronic and Information Engineering "Guglielmo Marconi", University of Bologna, Bologna, Italy; [2]MOX – Modelling and Scientific Computing, Department of Mathematics, Politecnico di Milano, Milan, Italy

1A-23 **Effect of dissociation-recombination processes in a dielectric dispersion medium on the coalescence and non-coalescence of conducting droplets suspended in it**
Danil Saifullin, Vladimir Chirkov, Sergei Vasilkov
St. Petersburg State University, Russian Federation

1A-24 **Numerical modeling of non-coalescence outcomes for different-sized conducting droplets suspended in a dielectric liquid**
Vladimir Chirkov, Ilia Elagin, Vasilii Lutsek
St. Petersburg State University, Russian Federation

Poster session 1B: Space charge and related effects

Time: Monday 01 July 2024 – 04:30pm - 06:30pm
***Session Chair*:** Stéphane Holé

1B-01 **Study on space charge properties of different nano/epoxy composites**
Xi Pang, Tianlei Xu, Zongliang Xie, Dingxin Wei, Peng Liu, Zongren Peng
Xi'an Jiaotong University, China

1B-02 A Charge microscopy for high temperature use with a polymer acoustic coupler
Naohiro Hozumi
Hozumi Measurement Lab, Japan

1B-03 Effect of semiconductive layer on space charge accumulation of polypropylene blends for DC cable insulation
Bosen Si, Yu Gao, Baixin Liu, Chenyi Guo, Jing Li, Boxue Du
Tianjin University, China

1B-04 Effect of semiconductive layer on space charge accumulation of polypropylene blends for DC cable insulation
Bosen Si, Yu Gao, Baixin Liu, Chenyi Guo, Jing Li, Boxue Du
Tianjin University, China

1B-05 Phase dependence of surface charge accumulated on epoxy insulator in C4F7N/CO2 under AC voltage
Shuangying Li, Yu Gao, Di Lu, Pinhao Huang, Boxue Du
Tianjin University, China

1B-06 Analysis of space charge and current characteristics of Al/LDPE interface
Jinyang Peng[1], Zepeng Lv[1,2], Xuze Zhang[1], Kai Wu[1,2], Yonghong Cheng[1,2]
[1]Xi 'an Jiaotong University, China; [2]State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China

1B-07 Effect of temperature on charge mobility in oil-paper insulation
Lu Gao, Hao Xu, Zepeng Lv, Kai Wu
State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China

1B-08 Simulation of space charge in HVDC cable under DC superimposed operation impulse voltage
Yanqing Li, Jia Chu, Qiang Li, Tao Han, Boxue Du
Tianjin University, China

1B-09 Effect of radial space charge distribution on electric field distribution in HVDC XLPE cables
Kai Shi, Jiandong Wu, Yi Yin
Shanghai Jiao Tong University, China

1B-10 Effect of continuous polarity reversals at different temperatures on the space charge characteristics of XLPE
Xuebei Wang, Jiandong Wu, Yi Yin, Qiaohua Wang, Xiang Luo
Shanghai Jiao Tong University, China

1B-11 Space charge and conduction character of PP/POE composites under high temperature
Dan Cao, Lv Zepeng, Liang Qilu, Wu Chenyu, Wu Kai, Cheng Yonghong
Xi'an Jiaotong University, China

1B-12 Insight into 525 kV HVDC cable system performance by means of cable peeling characterizations
Birender Singh[1], E. H. Doedens[1], M. Jarvid[1], R. Guffond[2]
[1]Nexans Norway AS, Halden, Norway; [2]Nexans France, Lyon, France

1B-13 Space charge deflection behavior under strong magnetic fields
Haoliang Liu, Ke Chen, Meng Xiao, Boxue Du
Tianjin University, China

1B-14 Effect of carbon black structure on charge accumulation at the interface between insulation and shielding for thermoplastic polyethylene cable
Xiangyang Peng[1], Baiyuan Chang[2], Xin Yu[1], Nuo Xu[2], Yinge Li[1], Hong Zhang[2]
[1]Electric Power Research Institute of Guangdong Power Grid Co., Ltd, China.; [2]State Key Laboratory of Electrical Insulation and Power Equipment, China

1B-15 Polarity reversal effect on space charge characteristics of double layer of natural ester oil-impregnated paper with different moisture contents
Hyungjin Yoon, George Chen
University of Southampton, United Kingdom

1B-16 **Influence of moisture absorption on space charge accumulation in LSR under high DC electric field**
Chen Zhang[1], Zepeng Lv[1], Zihang Xu[1], Kai Wu[1], Peter Morshuis[2], Aurore Claverie[3]
[1]Xi'an Jiaotong University, China; [2]Solid Dielectric Solutions, Leiden, the Netherlands; [3]Carros, France

1B-17 **A Review on different deconvolution techniques on frequency domain for a PEA cell for HVDC cables**
Alessio Di Fatta[1], Antonino Imburgia[1], Giuseppe Rizzo[2], Ghulam Akbar[1], Vincenzo Li Vigni[2], Grazia Berardi[2], Marco Albertini[2], Pietro Romano[1], Roberto Candela[2], Guido Ala[1], Stefano Franchi Bononi[2]
[1]University of Palermo, Italy; [2]Prysmian Group S.p.A., Milan, Italy

1B-18 **Electret charge stability and thermomechanical properties of polypropylene blends with ethylene-methyl acrylate copolymer**
Anna Guliakova[1,2], Arthur Henderyckx[3,4], Nikolay Shishkin[2], Bart Buffel[3], Frederik Desplentere[3], Dmitry Rychkov[1]
[1]Technology Center Weissenburg, Deggendorf Institute of Technology, Richard-Stücklen-Strasse 3, Weissenburg, Germany; [2]Herzen State Pedagogical University, Moika River Embankment 48, St. Petersburg, Russia; [3]Research Group Propolis, Department of Materials Engineering, KU Leuven Campus Bruges, Spoorwegstraat 12, Bruges, Belgium; [4]Beaulieu International Group, Kalkhoevestraat 16, Waregem, Belgium

1B-19 **Hetero and homocharge in LDPE at low electric fields**
Balaji Sriram, Nandini Gupta
Indian Institute of Technology Kanpur, India

1B-20 **A novel evaluation method of the effect of space charge in passivaton materials to IGBTs blocking voltage**
Hirotaka Muto, Atsushi Yamatake, Hiroki Shiota, Koki Kishimoto, Shuichi Kitamura
Mitsubishi Electric Corporation, Japan

1B-21 **Interface charge characteristics of silicone elastomer/AlN double layer dielectric using in the power module under DC voltage**
Jinqiang Zhang, Xuebao Li, Zezhong Sun, Peng Sun, Zhibin Zhao
North China Electric Power University, China

1B-22 **Transient current and space charge in gamma irradiated PTFE: Discussion on heterocharge formation**
Sarah Mouaci[1], Virginie Griseri[2], Nadia Saidi-Amroun[1], Gilbert Teyssedre[2], Mohamed Saidi[1]
[1]University of Sciences and Technology Houari Boumediène (USTHB), Algeria; [2]LAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France

Poster session 1C: Conduction, polarization and breakdown

Time: Monday 01 July 2024 – 04:30pm-06:30pm
***Session Chair*:** Hiroaki Miyake

1C-01 **Breakdown characteristics of insulating oil in uniform to non-uniform electric field under AC voltage**
Shigeyoshi Yoshida[1], Atsushi Yamatake[1], Masahiro Kozako[2], Masayuki Hikita[2]
[1]Mitsubishi Electric, Japan; [2]Kyushu Institute of Technology, Fukuoka, Japan

1C-02 **Influence of different step time and step voltage on the calculation of endurance coefficient in polypropylene ac step-stress tests**
Binjie Zhang[1], Shuai Hou[2], Yunpeng Zhan[2], Yi Yin[1], Yalin Wang[1]
[1]Department of Electrical Engineering, School of Electronic Information and Electrical Engineering, Shanghai Jiao Tong University, Shanghai, China; [2]Electric Power Research Institute, China Southern Power Grid, Guangzhou, China

1C-03 **Effects of different diluents on dielectric property of epoxy resin based on molecular dynamics**
Xiaoxiao Kong[1], Chengyao Hou[1], Xining Li[2], Yun Chen[1,2], Jinpeng Jiang[2], Yifang Wang[1], Chong Zhang[1], Boxue Du[1]
[1]Tianjin University, China; [2]China Electric Power Research Institute, China

1C-04 Research on charge variation of discharges in pure nitrogen and its mixture with sulfur hexafluoride
Wei Wang, Xinyan Wang, Zhenyu Wu, Yao Qin, Yongpeng Meng, Zepeng Lv, Kai Wu
Xi'an Jiaotong University, China

1C-05 Analysis of the test results of glass transition pressure and conductivity of polypropylene under different pressure conditions
Weizhuo Li[1], Taixiang Luan[1], Yewen Zhang[2], Xuan Wang[1]
[1]Harbin university of science and technology, China; [2]Tongji University, China

1C-06 Study on insulation relaxation current characteristics of transformer with different operating time
Haotian Shen, Jiandong Wu, Yi Yin, Qiaohua Wang, Xiang Luo
Shanghai Jiao Tong University, China

1C-07 On the dielectric relaxation characteristics of epoxy resins under different aging conditions
Chong Zhang[1], Xiaoxiao Kong[1], Qiang Fu[2], Chengyao Hou[1], Hangyu Mi[1], Yifang Wang[1], Boxue Du[1]
[1]School of Electrical and Information Engineering, Tianjin University, Tianjin, China; [2]Electric Power Research Institute of Guangdong Power Grid Co., Ltd., Guangzhou, China

1C-08 Improvement of high-temperature energy storage performance of PI with non-planar structures
Zhaoyu Ran, Li Meng, Yuhang Liu, Jun Hu, Jinliang He, Qi Li
Tsinghua University, China

1C-09 Improved energy storage performance of biaxially stretched polypropylene films based on molecular semiconductor grafting
Zhaoyu Ran, Zhen Luo, Junluo Li, Li Meng, Yuhang Liu, Jun Hu, Jinliang He, Qi Li
Tsinghua University, China

1C-10 AC breakdown voltages of PEEK insulation used in subsea cable connections
Danny Alexander Guana Niquinga[1], Qiang Liu[1], Michael Jeschke[2], Daniel Walton[2]
[1]University of Manchester, United Kingdom; [2]Siemens Energy Limited, Ulverston, United Kingdom

1C-11 Effect of atmospheric air pressure and electrode curvature on air breakdown voltage & surface flashover of solid dielectric with same clearance & creepage distances
Guillaume Belijar, Mohammed El Amine Slama, Mourad Jebli, Michaël Darques
French Institute of Technology IRT Saint Exupéry, France

1C-12 Constant voltage breakdown measurement of lapped insulation under cryogenic conditions
Luhan Zu[1], Stéphane Holé[1], Christian-Éric Bruzek[2], Georg Gamper[2], Umberto Melaccio[2], Nicolas Lallouet[3]
[1]ESPCI/SU/CNRS, France; [2]ASG, Italy; [3]NEXANS, France

1C-13 Evaluating rejuvenation effects on water-tree aged cables under diverse electric field induction using PDC method
Xurui Zhang, Kai Zhou, Yaping Wu, Siyan Lin, Hao Yuan, Chengyu Liu
College of Electrical Engineering, Sichuan University, Chengdu, China

1C-14 Effect of low temperature on energy storage performance of polypropylene film
Ke Chen, Boxue Du, Haoliang Liu, Meng Xiao
School of Electrical and Information Engineering, Tianjin university, China

1C-15 Effect of low molecular weight part of LDPE on DC conductivity of XLPE
Rui Sui, Zibin Liu, Nuo Xu, Jinghui Gao, Lisheng Zhong
State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China

1C-16 Numerical modeling of the DC breakdown of a sphere gap due to a weakly nonuniform electric field
Noorul Haque M[1], Gowrishankar Shanmugam[2], Jineeth Joseph[3], Sunitha Karakkad[1]
[1]National Institute of Technology Calicut, India; [2]National Institute of Technology Puducherry, India; [3]Independant Consultant

1C-17 Effect of thermal aging on the dielectric properties of polypropylene/elastomer cable insulation
Meng Zhang, Zhonglei Li, Boxue Du
Tianjin University, School of Electrical and Information Engineering, Tianjin, China

1C-18 Dielectric and molecular structural properties of biaxially stretched polypropylene under DC/AC mixed voltages

Yuhang Liu, Zhaoyu Ran, Junluo Li, Jinliang He, Qi Li
Tsinghua University, China

1C-19 Correlating crystallinity and electrical conductivity in gamma-irradiated PTFE

Ali Mezouar[1], Nadia Saidi-Amroun[1], Virginie Griseri[2], Gilbert Teyssedre[2], Mohamed Saidi[1]
[1]University of Sciences and Technology Houari Boumediène (USTHB), Algeria; [2]LAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France

1C-20 Radiation aging effect on electrical properties of superconductive magnet wires

Simone Vincenzo Suraci[1], Roland Piccin[2], Javier Osuna[2], Christian Scheuerlein[2], Davide Fabiani[1]
[1]LIMES (Laboratory of Innovative Materials for Electrical Systems) – DEI University of Bologna, Bologna, Italy; [2]Superconducting Magnet Technologies - Technology Department – CERN, Switzerland

1C-21 Study on the effect of pressure on breakdown and electrode loss behavior of metallized polypropylene films

Guohao Zhang, Hua Li, Jing Lan, Yudong Jiang, Fuchang Lin, Qin Zhang
Huazhong University of Science and Technology, China

Tuesday 02 July 2024

Oral session 3 : Special session Aeronautics

Time: Tuesday 02 July 2024 – 8:15am - 10:00am
***Session Chair*:** Emmanuel Odic
***Session Chair*:** Andrea Cavallini

INVITED **"Physical phenomena and challenges in electrical insulation for airborne applications"**
Dr Jean Rivenc
Airbus SAS, France

3-1 **Surface discharges inception & flashover of solid insulating materials with homogeneous and inhomogeneous electrical field for aeronautical applications**
Somya Anand[1,2], Solomon Berihu Araya[1], Mohammed El Amine Slama[2], Pierre Henrard[2], Alain Philippe[1]
[1]Souriau-Eaton, France; [2]IRT Saint-Exupéry, French Institute of Technology

3-2 **Partial discharge inception voltage of pigtail samples with Type II insulation and sinusoidal vs switched voltage**
Torstein Aakre[1], Espen Eberg[1], Athanasios Mermigkas[1], Astrid Røkke[2]
[1]SINTEF Energi AS, Norway; [2]Rolls-Royce Electrical Norway AS, Norway

3-3 **Effect of pressure on the electrical treeing and discharge characteristics of epoxy resin**
Maria-Irina Oancea, Qinghua Han, Lujia Chen
University of Manchester, United Kingdom

Oral session 4 : Modelling

Time: Tuesday 02 July 2024 – 10:30am - 12:30pm
***Session Chair*:** Masahiro Sato
***Session Chair*:** Fulbert Baudoin

4-1 **Evaluation of electric field in a DC model cable during superimposed impulse voltage tests**
Anh Hoang[1], Amirhossein Abbasi[1], Ajith J. Thomas[2], Mikael Unge[2], Claire Pitois[2]
[1]NKT HV Cables AB, R&D, SE-371 23 Karlskrona, Sweden; [2]NKT HV Cables AB, Technology Consulting, Västerås, Sweden

4-2 **A Study of negative differential mobility in low-density polyethylene based on Monte Carlo analysis with percolation**
Ryotaro Ozaki[1], Taiki Kanamitsu[1], Akira Ohno[2], Hiroaki Iino[2], Kazunori Kadowaki[1]
[1]Ehime University, Japan; [2]Tokyo Institute of Technology, Japan

4-3 **About plasma-polymer interaction and treeing progression**
Andrea Barbareschi Villa[1], Giacomo Buccella[1], Luca Barbieri[1], Daniele Palladini[1], Giovanni D'Avanzo[1], Roger Schurch[2]
[1]Ricerca Sul sistema Energetico, RSE, Milan, Italy; [2]Universidad Tecnica Federico Santa Maria, Valparaiso, Chile

4-4 **A Modular fractional-order circuit model for broadband impedance characterization of polymeric insulation systems**
Xize Dai[1], Andrea Cavallini[2], Jian Hao[3], Ruijin Liao[3], Claus Leth Bak[1], Huai Wang[1]
[1]Department of Energy, Aalborg University, Denmark; [2]ARCES and DEI, University of Bologna, Italy; [3]School of Electrical Engineering, Chongqing University, Chongqing, China

4-5 **Breakdown process modeling of tri-post insulator subjected to electrical and mechanical loadings in HVAC-GIL**
Jianan Dong[1], Boxue Du[1], Hucheng Liang[1], Zhijun Guo[1], Boyuan Cui[2], Yun Chen[2]
[1]Tianjin University, China; [2]China Electric Power Research Institute, Beijing, China

4-6 **Usage of Physics-Informed Neural Network to Extract Physical Parameters from High Voltage Experiments**
Olof Hjortstam[1], Carl-Johan Björnson[2], Felix Ågren[2], Thomas Hammarström[2], Yuriy V. Serdyuk[2], Christian Häger[2]
[1]Hitachi Energy Research, Sweden; [2]Chalmers University of Technology, Sweden

Oral session 5 : Diagnostic methods

Time: Tuesday 02 July 2024 – 02:00pm - 04:00pm
***Session Chair*:** Antonios Tzimas
***Session Chair*:** Thierry Paillat

5-1 **Mechanoluminescence of anhydride and imidazole cured epoxies under the combined effect of thermal and cyclic mechanical stresses**
Baptiste Robbiani, Jean-Louis Augé, Gilbert Teyssedre
Laplace, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France

5-2 **Effect of electric field profile changes on partial discharge phenomenon in a loaded HVDC cable**
Pietro Romano[1], Guido Ala[1], Marco Albertini[2], Ghulam Akbar[1], Grazia Berardi[2], Roberto Candela[2], Alessio Di Fatta[1], Antonino Imburgia[1], Vincenzo Li Vigni[2], Giuseppe Rizzo[2], Stefano Franchi Bononi[2]
[1]LEPRE HV Laboratory, Department of Engineering, University of Palermo, Palermo, Italy; [2]Prysmian Group, Milan, Italy

5-3 **Unveiling internal partial discharges in wiring and cable systems with novel testing method**
Youcef Kemari, Guillaume Belijar, Cédric Abadie
IRT Antoine de Saint Exupéry, France

5-4 **Studying the novel interaction of carbon dots with aged mineral oil through photoluminescence emission**
Abdellatif Rashed[1,2], Mohsen Ghali[3,4], Abdallah Rezk[3], Diaa-Eldin Mansour[2,5]
[1]Laboratoire des Sciences de l'Ingénieur Appliquées à la Mécanique et au génie Electrique – Fédération IPRA, Université de Pau et des Pays de l'Adour/E2S UPPA, Pau, France; [2]Department of Electrical Power and Machines Engineering, Faculty of Engineering, Tanta University, Tanta, Egypt; [3]Physics Department, Institute of Basic and Applied Science, Egypt-Japan University of Science and Technology, Alexandria, Egypt; [4]Physics Department, Faculty of Science, Kafrelsheikh University, Kafrelsheikh, Egypt; [5]Department of Electrical Power Engineering, Faculty of Engineering, Egypt-Japan University of Science and Technology, Alexandria, Egypt

5-5 **Electric field distribution detection and surface insulation enhancement for GIS/GIL by flexible smart surface coating insulators**
Yuhuai Wang[1], Songtao Liu[2], Yufan Wang[2], Renyong Zhao[3], Hein Htet Aung[1], Boxue Du[1], Jin Li[1]
[1]Tianjin University, China; [2]High Voltage Company, State Grid Tianjin Electric Power Company, Tianjin, China; [3]Zibo Power Supply Company, State Grid Shandong Electric Power Company, Zibo, China

5-6 **Identification of the defect type in epoxy resin using the differences in reflected THz wave characteristics**
Rieko Mizuuchi[1], Yuji Hisazato[1], Hiroaki Cho[1], Yusuke Nakamura[1], Yuichi Sumimoto[1], Kunihiko Wada[1], Hiroki Mori[2], Ryota Sekiya[2]
[1]Toshiba Infrastructure Systems & Solutions Corporation, Japan; [2]Toshiba Corporation, Japan

Poster session 2A: Theories and Models

Time: Tuesday 02 July 2024 – 04:30pm - 06:30pm
***Session Chair*:** Thomas Andritsch

2A-01 **Dielectric performance of sustainable fluids**
Rongsheng Liu[1], Maria Lundmark[1], Lars Walfridsson[1], Jonas Hedberg[1], Dejan Vuković[2], Jan Hajek[2], Miguel Cuesto[2]
[1]Hitachi Energy Research in Sweden; [2]Hitachi Energy Transformers

2A-02 **Preliminary characterization of dielectrics for insulated metal substrates (IMS) of power modules**
Paolo Seri[1], David Demian[1], Andrea Reolon[2], Andrea Cavallini[1]
[1]University of Bologna, Italy; [2]Serigroup, Italy

2A-03 **Experimental evaluation of the moisture effect on the dielectric properties of thermally upgraded Kraft paper impregnated with mineral oil and natural ester**
Ismael Antolin[1], Cristina Méndez[1], Cristian Olmo[1], Félix Ortiz[1], Pedro J. Quintanilla[1], Diego F. García[2]
[1]Universidad de Cantabria, Spain; [2]Universidad del Valle

2A-04 **Analysis of the degradation of five esters and the effect of the cellulose on their properties**
Cristina Méndez[1], Büsra Oezdemir[2], Peter Werle[2], Cristian Olmo[1], Pedro Quintanilla[1], Alfredo Ortiz[1]
[1]Universidad de Cantabria, Spain; [2]Institute of Electric Power Systems, Division of High-Voltage and Asset Management - Schering-Institute, Leibniz University Hannover, Germany

2A-05 **Enhancing the piezoelectric properties of bacterial cellulose films by incorporation of ZnO nanoparticles**
Meng Xiao, Xiangyu Dong, Zhaochen Wang, Xiaodan Du, Zening Lu, Boxue Du
Tianjin University, China

2A-06 **A Novel piezoelectric paper-based flexible nanogenerator composed of Rochelle salt nanoparticles and bacterial cellulose**
Meng Xiao, Xiangyu Dong, Yuyan Chen, Zhiyuan Zhang, Liangtian Zhang, Boxue Du
Tianjin University, China

2A-07 **Effect of graft distribution on conductivity and breakdown strength of polypropylene film for power capacitor**
Meng Xiao, Xiaodan Du, Zhiyuan Zhang, Xiangyu Dong, Boxue Du
Tianjin University, China

2A-08 **Enhanced dielectric properties of polypropylene film by multilayered structural design for power capacitor**
Meng Xiao, Zhiyuan Zhang, Yuyan Chen, Liangtian Zhang, Boxue Du
Tianjin University, China

2A-09 **Performance enhancement of piezoelectric materials based on bacterial cellulose**
Zhaochen Wang, Meng Xiao, Xiangyu Dong, Xiaodan Du, Boxue Du
Tianjin University, China

2A-10 **Surface gradient modified basin insulator suppresses metal particle lifting and surface discharge characteristics**
Yuhuai Wang[1], Songtao Liu[2], Meiyang Zuo[3], Jiwei Zhang[3], Hein Htet Aung[1], Jin Li[1]
[1]Tianjin University, China; [2]High Voltage Company, State Grid Tianjin Electric Power Company, Tianjin, China; [3]Jinan Power Supply Company, State Grid Shandong Electric Power Company, Jinan, China

2A-11 **Suppression of metal particle and surface flashover by dielectric functionally graded spacers**
Boxue Du[1], Zhouyu Jin[1], Hucheng Liang[1], Jinpeng Jiang[2]
[1]Tianjin University, China; [2]China Electric Power Research Institute, China

2A-12 Influence of thermal conductivity of multi-scale particles epoxy composites on high frequency electrical insulation property
Yan-Hui Song, Zhi-min Dang
Tsinghua, China

2A-13 Significantly improving the energy storage performance of BOPP films based on the surface polymer layer
Ke Chen, Boxue Du, Haoliang Liu, Meng Xiao
School of Electrical and Information Engineering, Tianjin University, China

2A-14 Conductivity and breakdown strength of polybutene and its copolymer insulation varying with crystal form
Zechao Yang, Zhonglei Li, Boxue Du
Tianjin University, China

2A-15 Enhanced dielectric properties of recycled PLA/BaTiO3 nanocomposites: Towards sustainable capacitor applications
Keerati Meeporn[1], Hayri Okcu[2], Liam Johnston[2], Gwenn Morvezen[1], Benjamin Borgnic[2], Sebastien Flury[1], David Muñoz-Rojas[2], Vincent H. Mareau[3], Alain Sylvestre[1]
[1]University Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France; [2]University Grenoble Alpes, CNRS, Grenoble INP, LMGP, Grenoble, France; [3]University Grenoble Alpes, CEA, CNRS, IRIG, SyMMES, Grenoble, France

2A-16 Conductivity and permittivity of CNT-epoxy nanocomposites with filler concentrations in the neighborhood of percolation threshold
Himanshu Gupta, Nandini Gupta
Department of Electrical Engineering, IIT Kanpur, India

2A-17 Low-frequency dielectric analysis of promising lead-free dabcoH+A- ferroelectric materials for energy applications
Gwenn Morvezen[1,2], Nicolas Brefuel[1], Daniel Bourgault[2], Hervé Guillou[2], Alain Sylvestre[1]
[1]University Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France; [2]University Grenoble Alpes, CNRS, Grenoble INP, Institut Néel, Grenoble, France

2A-18 Comparison of high temperature dielectric properties between epoxy resins with alicyclic and bisphenol A
Keisuke Shinozaki[1], Masayuki Hikita[1], Masahiro Kozako[1], Minoru Ueshima[2]
[1]Kyusyu Institute of Technology, Japan; [2]Daicel Corporation, Japan

2A-19 Enhancing high-temperature aeronautic cables with extruded Perfluoroalkoxy: Insights from partial discharge and polarization current analysis
Youcef Kemari[1], Laurent Moisset[1,2], David Thomasse[1,2], Pierre Henrard[1,2]
[1]IRT Antoine de Saint Exupéry, France; [2]SAFRAN Electrical & Power (SEP)

2A-20 Screening of suitable random copolymer polypropylene blends for HVDC cable insulation
Minna Niittymäki[1], Kari Lahti[1], Ilkka Rytöluoto[2], Eetta Saarimäki[2], Mika Paajanen[2], Bassel Diban[3], Paolo Seri[3], Giovanni Mazzanti[3], Maya Mourad[4], Anais Leproux[4], Rafal Anyszka[5], Frederik Wurm[5], Timo Rheinberger[5]
[1]Tampere University, Finland; [2]VTT Technical Research Centre of Finland, Finland; [3]University of Bologna, Italy; [4]SuperGrid Institute, France; [5]University of Twente, Enschede, Netherlands

2A-21 Effect of elastomer blend on high temperature dielectric properties of polypropylene
Hana Kim[1], Keisuke Shinozaki[1], Masayuki Hikita[1], Masahiro Kozako[1], Seunggun Yu[2]
[1]Kyushu Institute of Technology, Japan; [2]Korea Electrotechnology Research Institute

2A-22 Epoxy-glass-mica layered composites with nanoparticle fillers incorporated by air-brush technique
Ondrej Musil, Petr Kadlec, Radek Polansky
University of West Bohemia, Faculty of Electrical Engineering, Czech Republic

2A-23 Electrical tree resistance enhancement of polypropylene based on heterogeneous structure modulation
You Wu, Heyu Wang, Zhong Zheng, Zhonglei Li, Boxue Du
Tianjin University, China

2A-24 **Flashover improvement of AC-DC mixed voltages on HVDC-GIS spacer with functionally graded materials**
Jianan Dong[1], Boxue Du[1], Zehua Wang[2], Hucheng Liang[1], Hang Yao[1]
[1]Tianjin University, China; [2]State Grid Tianjin Power Chengnan Power supply Branch, Tianjin, China

Poster session 2B: Diagnostics and experiments 1

Time: Tuesday 02 July 2024 – 04:30pm - 06:30pm
***Session Chair*:** Veronika Gavrilenko

2B-01 **A cable defect location and assessment method based on the Hilbert-enveloped reflection coefficient**
Xingyu Zou, Haibao Mu, Renjie Wang, Ci Song, Kaixuan Fan, Ziqian Cheng, Guanjun Zhang
Xi'an Jiaotong University, Xi'an, China

2B-02 **A low-cost capacitive non-intrusive sensor for the detection, localization and identification of defects in MVAC cables**
Jérémie Cicéron, Pascal Rain, Cornel Ioana
Univ Grenoble Alpes, France

2B-03 **Comparative analysis of partial discharge measurements for artificial defects under HVAC and HVDC voltage stresses for cable insulating materials**
Paolo Pieroni, Giacomo Ciotti, Andrea Caprara
Techimp - Doble Engineering, Italy

2B-04 **A noncalibration partial discharge magnitude measurement method based on an embedded bushing sensor**
Chunlin Hao, Tao Han, Boxue Du[1], Jin He[2]
Tianjin University, China, [2]State Grid Tianjin Electric Power Research Institute, Tianjin, China

2B-05 **An improved algorithm of cable fault diagnosis considering signal attenuation compensation**
Yan Jin[1], Yuxiao Hu[1], Chaoqun Shi[1], Guanghua He[2], Jinlong Qi[2], Yang Xu[1]
[1]State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China; [2]Jiangsu Wuxi Power Supply Company, State Grid Corporation of China, Wuxi, China

2B-06 **Defect location and identification method for long-distance cable based on frequency modulated continuous wave**
Shurong Li, Ao Li, Binjiang Wang, Xiaoguang Zhu, Junbo Deng, Guanjun Zhang
Xi'an Jiaotong University, China

2B-07 **Condition assessment of insulation systems through electric field mapping using electro-optic sensors**
Sneha Satish Hegde[1,3], Gwenaël Gaborit[2,3], Ayyoub Zouaghi[1], Lionel Duvillaret[3], Christian Vollaire[1]
[1]Univ Lyon, Ecole Centrale de Lyon, INSA Lyon Université Lyon 1, CNRS, Ampère, UMR5005, Ecully, France; [2]IMEP-LAHC laboratory, Université Savoie- Mont-Blanc, Le Bourget-du-Lac Cedex, France; [3]Kapteos SAS, Bât. Cleanspace 354 voie Magellan, Z.A. Alpespace, Sainte-Hélène- du-Lac, France

2B-08 **Holistic reliability analysis strategy for high-voltage polymeric cable assets based on field-dependent dynamic mechanisms**
Xize Dai[1,2], Jian Hao[2], Ruijin Liao[2], Claus Leth Bak[1]
[1]Department of Energy, Aalborg University, Denmark; [2]State Key Laboratory of Power Transmission Equipment Technology, Chongqing University, China

2B-09 **Identification of installation defects on MV cable systems through on field PD measurements performed with the aid of NPF voltage source**
Antonino Madonia, Giuseppe Rizzo
EOSS, Prysmian Group, Italy

2B-10 Cable system setup for PD measuring systems tests and analysts´ training
Eduardo Arcones[1], Fernando Álvarez[1], Abderrahim Khamlichi[1,2], Fernando Garnacho[1], Ignacio Dopazo[1]
[1]Universidad Politécnica de Madrid, Spain; [2]LCOE-FFII, Spain

2B-11 Application of a reference method for the training and evaluation of PD analysts
Eduardo Arcones[1], Fernando Álvarez[1], Javier Ortego[1,2], Fernando Garnacho[1], María Sanz[1]
[1]Universidad Politécnica de Madrid, Spain; [2]Ampacimon, Spain

2B-12 Evaluation of data acquisition systems for dielectric frequency response measurements
Daniel Svensson[1], Thomas Hammarström[1], Xiangdong Xu[1], Olof Hjortstam[2], Yuriy Serdyuk[1]
[1]Chalmers University of Technology; Gothenburg, Sweden; [2]Hitachi Energy Research, Västerås, Sweden

2B-13 Identification of defect type in an aged 22 kV cast resin transformer from phase-resolved PD patterns
Mizuki Miyagawa[1], Yuanhang Yao[1], Takumi Satake[1], Hideaki Kawano[1], Masayuki Hikita[1], Masahiro Kozako[1], Yoshihiro Harada[2], Katsutoshi Takei[2], Masaru Ikeda[2], Kazunori Miyazaki[2], Kazuhiro Futakawa[2]
[1]Kyushu Institute of Technology, Japan; [2]TEPCO Power Grid, Inc., Tokyo, Japan

2B-14 A Micro-identification method of composite insulation sheds aging based on IC-FHA-YOLOv8 and SEM images
Yuepeng Xin[1], Yong Liu[1], Guangming Feng[2], Minxin Wang[1], Yufeng Guo[1], Jingyi Jiao[3], Boxue Du[1]
[1]Tianjin university, China; [2]Suzhou Nuclear Power Research Institute Co., Ltd., China; [3]North China Electric Power University, China

2B-15 An aging evaluation method of composite insulators based on deep learning and decision tree model
Yuepeng Xin[1], Yong Liu[1], Chao Li[1], Xingwang Huang[2], Qiran Li[3], Boxue Du[1]
[1]Tianjin university, China; [2]State Grid Hebei Electric Power Research Institute, State Grid Hebei Electric Power Limited Corporation, China; [3]Tangshan Power Supply Company of State Grid Jibei Electric Power Company Limited, China

2B-16 Design of a flexible UHF antenna for PD detection in inverter-fed motors
Shijin Ma, Peng Wang, Chizhou Cheng, Wendong Huang
Sichuan university, China

2B-17 Cable defects location method based on M-sequence with broadband impedance spectroscopy
Yanqing Li, Wenhao Li, Yufei Yao, Qiang Li, Tao Han
Tianjin University, China

2B-18 Pulsed electrical aging tests of insulation systems and components for support of HV power supplies design
Alex Pokryvailo
Spellman High Voltage Electronics Corp., United States of America

2B-19 An optical measurement method for electrostatic sensing based on Fabry-Perot sensing system
Yufei Wang[1], Jiawei Zhang[1], Li Wang[1], Lin Fu[2], Xiaobin Wang[2], Fouad Belhora[3]
[1]School of Electrical Engineering, Xi'an University of Technology, Xi'an, Shaanxi, China; [2]State Grid Xinjiang Electric Power Co., Ltd. Economic and Technical Research Institute Urumqi, Xinjiang, China; [3]Laboratoire des Sciences de l'Ingénieur Pour l'Energie (LabSIPE), Ecole Nationale des Sciences Appliquées, El Jadida, Morocco

2B-20 New markers based on HF signals for series DC arc detection
Juan M. Martínez-Tarifa[1], Gabriel Barroso-de-Maria[2], Daniel Izquierdo[2], Sergio Garcia-Alfayate[2], Guillermo Robles[1]
[1]Universidad Carlos III de Madrid, Spain; [2]Airbus Defence and Space

Poster session 2C: Materials and insulation systems 1

Time: Tuesday 02 July 2024 – 04:30pm - 06:30pm
***Session Chair*:** Yu Gao

2C-01 **Effect of silica content and surface chemistry on the dielectric performance of silicone rubber**
Orestis Vryonis[1], Thomas Andritsch[1], Alun S Vaughan[1], Peter Morshuis[2], Aurore Claverie[3]
[1]The Tony Davies High Voltage Laboratory, University of Southampton, Southampton, UK; [2]Solid Dielectric Solutions, Leiden, Netherlands; [3]Single Buoy Moorings Inc, Marly, Switzerland

2C-02 **Dielectric spectra of polyurethane casting resins for electrical engineering applications**
Josef Pihera[1], Pavel Prosr[1], Petr Kadlec[1], Petr Kvasnička[1], Michal Klauber[2], Radek Nejdl[2]
[1]University of West Bohemia, Czech Republic; [2]Kabex a.s.

2C-03 **Effect of mechanical stress on dielectric properties of epoxy resin**
Wenjin Zhang[1], Mi Xiao[1], Zehua Wang[2], Hucheng Liang[1], Boxue Du[1]
[1]School of Electrical and Information Engineering, Tianjin University, Tianjin China; [2]State Grid Tianjin Power Chengnan Power supply Branch, Tianjin, China

2C-04 **Electrical tree growth characteristics of epoxy resin under combined effects of low temperature and mechanical stress**
Qi Li[1], Boxue Du[1], Rundong Xue[1], Pengxian Song[2], Tiancheng Huang[2], Longji Li[2], Yifang Wang[1], Xiaoxiao Kong[1], Liping Fan[1], Yanjie Ren[1]
[1]School of Electrical and Information Engineering, Tianjin university, China; [2]State Grid Tianjin Electric Power Company Electric Power Research Institute, China

2C-05 **Lifetime investigations on insulating materials for High Voltage DC airborne applications**
Jean Rivenc[1,2], Cecilien Thomas[2], Samuel Pin[2], Mourad Jebli[2], Guillaume Belijar[2], Jean-Charles Laurentie[3], Serge Agnel[3], Jerome Castellon[3], Frederic Forget[1,2], Romain Magnan[1], Lea Pommier[1], Bastien Neveux[1,3], Emilie Fond[4], Bastien Detilleul[5], Florent Buttin[4], Emmanuel Perez[6], Christian Geertsen[6]
[1]Airbus SAS, Toulouse, France; [2]IRT Saint Exupéry, Toulouse, France; [3]Institut d'Electronique et des Systèmes, University of Montpellier / CNRS, Montpellier, France; [4]Radiall, Voreppe, France; [5]Radiall, Chateau-Renault, France; [6]ITP Interpipe, Louveciennes, France

2C-06 **Effect of metal deactivator on breakdown and energy storage properties of polypropylene modified by deashing method for film capacitors**
Meng Xiao, Zhiyuan Zhang, Xiaodan Du, Liangtian Zhang, Xiangyu Dong, Boxue Du
Tianjin University, China

2C-07 **Crystallization regulation of cross-linking polypropylene film for capacitors on high-temperature dielectric property**
Meng Xiao, Yuyan Chen, Xiangyu Dong, Boxue Du
School of Electrical and Information Engineering, Tianjin University, China

2C-08 **Effect of microstructure and stretching ratio on dielectric properties of polypropylene films for HVDC capacitors**
Meng Xiao, Xiaodan Du, Liangtian Zhang, Xiangyu Dong, Boxue Du
Tianjin University, China

2C-09 **Effect of stretching temperature on the breakdown performance of long-chain branched polypropylene films for HVDC capacitors**
Meng Xiao, Xiaodan Du, Liangtian Zhang, Xiangyu Dong, Boxue Du
Tianjin University, China

2C-10 **Effect of graft modification on electrical tree growth in PP/POE composite insulation cables**
Yifan Yin, Zhonglei Li, Shuai Zhao, Boxue Du
Tianjin University, China

2C-11 Investigation on resistance to corona erosion of different epoxy-amine combinations
Ettore Fazio[1], Mattia Ferraris[1], Michael Loreti[1], Marco Viola[1], Angelo Croci[2]
[1]ELANTAS Europe srl, Italy; [2]ETW Consulting Sagl, Switzerland

2C-12 Cold behavior of dielectric esters
Fabio Scatiggio, Giorgio Campi, Letizia De Florentis
A&A Fratelli Parodi, Italy

2C-13 Effect of functional grafting on breakdown strength and DC conductivity of polypropylene blend insulation
Shuai Zhao, Zhonglei Li, Yifan Yin, Boxue Du
Tianjin University, China

2C-14 Investigating the impact of grafted molecule types on frequency domain spectroscopy of polypropylene insulation
Shuai Zhao, Zhonglei Li, Yifan Yin, Boxue Du
Tianjin University, China

2C-15 Characterization of isotactic-polypropylene-based compounds for HVDC cable insulation
Bassel Diban[1], Giovanni Mazzanti[1], Paolo Seri[1], Mika Paajanen[2], Ilkka Rytöluoto[2], Eetta Saarimäki[2], Kari Lahti[3], Minna Niittymäki[3], Maya Mourad[4], Anais Leproux[4], Rafal Anyszka[5], Frederik Wurm[5], Lorenzo Palmieri[5], Timo Rheinberger[5]
[1]University of Bologna, Italy; [2]VTT research center, Finland; [3]Tampere University, Finland; [4]Supergrid institute, France; [5]University of Twente, Netherland

2C-16 Ageing of aeronautical cables exposed to partial discharges: the effects of voltage frequency
Vladimir Ricardo Pineda Bonilla[1,2], Riantsoa Rabemarolahy[2], Françoise Foray[2], Michael J. Kirkpatrick[1], Philippe Molinié[1], Emmanuel Odic[1]
[1]Laboratoire de Génie Électrique et Électronique de Paris (GeePs -UMR8507 CNRS, Centrale Supélec, Université Paris-Saclay, Sorbonne Université) Gif-sur-Yvette, France; [2]Airbus Helicopters, Marignane, France

2C-17 Analyses of RTV composite coating under DC stress for high voltage outdoor insulation
Israr Ullah[1], Urooj Shahzadi[2], Muhammad Mehran Bashir[3], Rahmat Ullah[4], Sajid Iqbal[1], M. Tariq Nazir[5]
[1]Faculty of Electrical Engineering, Ghulam Ishaq Khan Institute of Engineering Sciences and Technology, Topi, Swabi, Pakistan; [2]Institute of Chemical Sciences, University of Peshawar, Pakistan; [3]Nawaz Sharif University of Engineering and Technology, Multan, Pakistan; [4]Advanced High Voltage Engineering Research Centre, Cardiff University, UK; [5]School of Engineering, RMIT University, Melbourne, VIC, Australia

2C-18 Electrical and morphological behavior of silicone rubber before and after accelerated thermal aging
El Hadi Belhiteche[1], Sébastien Rondot[2], Madjid Meziani[3], Philippe Dony[2], Mustapha Moudoud[3], Omar Jbara[2]
[1]University of Msila, Algeria; [2]Lab. MATIM Matériaux & Ingénierie Mécanique, Reims, France; [3]Lab LATAGE, University of Tizi Ouzou, Algeria

2C-19 Effect of LDPE molecular structures on the cross-linking and scorching characteristics of XLPE material for high-voltage cable
Hongjian Liu[1], Shihang Wang[1], Luwei Du[1], Jinfei Qu[1], Jiaojian Liu[2], Shengtao Li[1]
[1]Xi'an Jiaotong University, China; [2]State Grid Shaanxi Electric Power Research Institute, China

2C-20 Performance enhancement of BNNS/NFC modified three-layer insulating paper
Xinnan Zhai[1], Daning Zhang[1], Xuan Li[1], Jiongting Jiang[2], Chao Li[2], Wendong Li[1], Haibao Mu[1], Guanjun Zhang[1], Lulin Xu[1]
[1]State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China; [2]State Grid Ningbo Electric Power Supply Company, Ningbo, China

Wednesday 03 July 2024

Oral session 6: Advanced and functional materials

Time: Wednesday 03 July 2024 – 8:15am - 10:00am
***Session Chair*:** Roman Kochetov
***Session Chair*:** Guillaume Belijar

6-1 **Highly sensitive piezoelectric ceramic nanofibers for flexible transducers and advanced applications**
Leonardo Gasperini, Giacomo Selleri, Davide Fabiani
University of Bologna, Italy

6-2 **Electric field regulation by surface functionally graded spacer under variable temperature gradients**
Hang Yao, Hucheng Liang, Boxue Du
Tianjin University, China

6-3 **Insulating capacity of a sphere-plane electrode arrangement with thick dielectric coating under negative lightning impulse voltage stress in synthetic air at high pressures**
Patrick Gambeck[1], Johannes Auer[1], Myriam Koch[2]
[1]Professorship for High Voltage Engineering and Switchgear Technology, Technical University of Munich (TUM), Germany; [2]High-Voltage Laboratories, Technical University of Darmstadt, Germany

6-4 **Effect of stress relaxation on insulating properties of dielectric elastomers with different pre-strain ratios**
Li-Juan Yin[1], Hui-Yi Hu[1], Wen-Zhuo Dong[1], Yu Zhao[2], Zhi-Min Dang[1]
[1]Department of Electrical Engineering, Tsinghua University, Beijing, China; [2]School of Electrical Engineering, Zhengzhou University, Zhengzhou, China

6-5 **Electrical properties comparison: enamelled-extruded wires vs. conventional wires**
Giovana Pereira dos Santos Lima[1], Sonia Ait-Amar[1], Gabriel Velu[1], Philippe Frezel[2]
[1]Univ. Artois, UR 4025, Laboratoire Systèmes Electrotechniques et Environnement (LSEE), Béthune, France; [2]Green Isolight International, Labourse, France

Poster session Young Researcher Contest
Session 3A: Conduction, polarization, space charge and related effects

Time: Wednesday 03 July 2024 – 10:30am - 12:30pm
***Session Chair*:** Davide Fabiani

3A-1 **Study of the impact of a DC electric field on charge distribution at solid/liquid interface by acoustic method.**
Valentin Berry[1], Paul Leblanc[1], Stéphane Hole[2], Thierry Paillat[1]
[1]Institut Pprime, Université de Poitiers, CNRS, ENSMA, Poitiers, France; [2]Laboratoire de Physique et d'Etude des Matériaux, Sorbonne Université, ESPCI Paris PSL Université, CNRS, France

3A-2 **Average streamer channel field strength in pressurized synthetic air at lightning impulse voltage stress**
Maximilian Millisterfer[1], Konstantin Wagner[1], Myriam Koch[2]
[1]Professorship of High Voltage Engineering and Switchgear Technology, Technical University of Munich, Germany; [2]High Voltage Laboratories, Technical University of Darmstadt, Germany

3A-3 Ionic liquid grafted silicone fillers for high permittivity dielectric elastomers
Leo John Kershaw, Anne Ladegaard Skov
Technical University of Denmark, Denmark

3A-4 Effect of mechanical stress on interfacial charge of double-layer cross-linked polyethylene
Yao Qin, Zepeng Lv, Kai Wu
Xi'an Jiaotong University, China

3A-5 Charge transport in a filler-free silicone rubber: exploring non-linear mechanisms and the "liquid-like" anomaly
Igor Silva[1,2], Pascal Rain[2], Lou Lacquement[1,2], François Gentils[2]
[1]G2Elab, France; [2]Schneider Electric, France

3A-6 The trap and dielectric characteristics of polyimide nanofiber membranes at different temperatures
Wenrui Li[1], Guanjun Zhang[1], Xiong Yang[1], Yibo Dong[2], Zhiliang Gao[2], Na Feng[2]
[1]State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China; [2]Beijing Orient Institute of Measurement and Test, Beijing, China

3A-7 Electric field distribution and evolution in ±500 kV submarine cable factory joint under steady and transient voltages
Zhong Zheng, Zhonglei Li, Heyu Wang, You Wu, Boxue Du
Tianjin University, China

3A-8 A ternary co-polyimide for high-temperature capacitive energy storage
Manxi Li[1], Yujie Zhu[1,2], Jinliang He[1], Qi Li[1]
[1]Department of Electrical Engineering, Tsinghua University, Beijing, China; [2]Department of Materials Science and Engineering, University of Wisconsin-Madison, Madison, USA

3A-9 Effect of insulation thickness on space charge and electric field distribution in ±500kV HVDC extruded cables
You Wu, Zhong Zheng, Heyu Wang, Zhonglei Li, Boxue Du
Tianjin University, China

3A-10 Impact of semi-conductive layers on the DC conductivity of XLPE MVAC cables
Patrik Ratheiser, Uwe Schichler
Graz University of Technology, Austria

3A-11 Space charge accumulation and DC breakdown strength of epoxy nanocomposites
Motoshi Hirai[1], Muneaki Kurimoto[1], Tomohiro Kawashima[2], Sunny Chaudhary[3], Thomas Andritsch[3]
[1]Nagoya University, Japan; [2]Toyohashi University of Technology, Japan; [3]University of Southampton, United Kingdom

3A-12 Electronic transitions in biaxially oriented polypropylene accounting for photo-stimulated currents
Duvan Mendoza Lopez, Laurent Boudou, Laurent Berquez, Christian Laurent, Gilbert Teyssedre
LAPLACE, Université de Toulouse, CNRS, INPT, UPS, France

3A-13 Modulation of carrier injection and migration in polyethylene cable insulation based on core-shell quantum dots composite
Heyu Wang, Zhonglei Li, You Wu, Zhong Zheng, Zechao Yang, Boxue Du
Tianjin University, China

3A-14 Fundamental analysis of interfacial signal in double-layer with different permittivity using PEA method
Yeongguk An, Hiroaki Miyake, Yasuhiro Tanaka
Tokyo City University, Japan

3A-15 Study of intermediate state of Ge-rich GeSbTe phase change memories by impedance spectroscopy
Adrien Delpoux[1], Sijia Ran[2], Alain Claverie[2], Daniel Benoit[3], Jérémie Grisolia[1]
[1]INSA Toulouse, France; [2]CEMES, Toulouse, France; [3]STMicroelectronics, Crolles, France

Poster session Young Researcher Contest
Session 3B: Ageing, degradation and breakdown

Time: Wednesday 03 July 2024 – 10:30am - 12:30pm
***Session Chair*:** Davide Fabiani

3B-1 **Breakdown characteristics and electrical life evaluation of 500 kV EHVAC cable insulation at different temperatures**
Tianyin Zhang[1], Yuantao Zhao[2], Feng Xia[1,2], Mingyue Liu[2], Awais Muhammad[1,2], Xiangrong Chen[1]
[1]College of Electrical Engineering, Zhejiang University, Hangzhou, China; [2]Ningbo Orient Wires & Cables Co., Ltd., Ningbo, China

3B-2 **Relation between chalking of HTV and decay-like aging of FRP in composite insulators**
Yanan Peng, Wendong Li, Shiyin Zeng, Yuelin Liu, Xiaochang Hua, Xinyi Yan, Guanjun Zhang
Xi'an Jiaotong University, China

3B-3 **Breakdown strength study of barium titanate ceramics for power electronics applications**
Veronika Gavrilenko[1], Paul-Etienne Vidal[1,2], Thomas Kohler[1], Romain Raisson[1,2], Sophie Guillemet-Fritsch[3], Pascal Dufour[3], Laurent Pecastaing[1]
[1]Laboratoire des Sciences de l'Ingénieur Appliquées à la Mécanique et au génie Electrique – Fédération IPRA, Université de Pau et des Pays de l'Adour/E2S UPPA, Pau, France; [2]Université de Toulouse, INP-ENIT, Tarbes, France; [3]CIRIMAT, Université de Toulouse, CNRS, France

3B-4 **PDIV and AC breakdown behavior of magnet wire in different embedded media**
Laureen Stahl, Büsra Özdemir, Javier Torres, Peter Werle
Leibniz University Hannover, Institute of Electric Power Systems, High Voltage Engineering and Asset Management, Schering-Institute, Germany

3B-5 **Characterization of polymeric components of a cable for applications in a radiation environment**
Federica Bortoletto, Jose Gascon, Thomas Kramer, Marija Kranjcevic, Javier Riveiro Herrero, Berta Ruiz-Palenzuela, Tobias Stadlbauer
CERN, Switzerland

3B-6 **Thermal ageing of extrudable fluorinated polymer for aerospace application**
Younnes Chikhoune[1,2], Gilbert Teyssedre[1], Laurent Berquez[1], Philippe Collin[2]
[1]Laplace, University of Toulouse and CNRS, France; [2]Beyond Aero

3B-7 **Experimental study on dielectric behavior of silicone gel under long-term high temperature service**
Xinnuo Guo[1], Dazhi Su[1], Fuping Zeng[1], Rirong Chen[1], Hengxin Zhong[1], Qiang Yao[2], Baojia Deng[2], Ju Tang[1]
[1]State Key Laboratory of Power Grid Environmental Protection, School of Electrical Engineering and Automation, Wuhan University, China; [2]State Grid Chongqing Electric Power Research Institute, China

3B-8 **Scale change approach to assess thermo-oxidative degradation in NMN insulating paper**
Adrien Rubio[1,2], Sombel Diaham[2], Nadine Lahoud Dignat[2], Louiza Fetouhi[3], Guillaume Belijar[1], Samuel Pin[1], Zarel Valdez-Nava[2], Mateusz Szczepanski[3]
[1]IRT Saint Exupéry, Toulouse, France; [2]LAPLACE, University of Toulouse, CNRS, INPT, UPS, Toulouse, France; [3]Nidec - Leroy Somer, France

3B-9 **Erosion of polymers by partial discharge at atmospheric pressure**
Hugo Lagarrigue[1,2], Antoine Belinger[2], Nicolas Naudé[2], Guillaume Belijar[1], Mourad Jebli[1]
[1]IRT Saint Exupery, France; [2]LAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France

3B-10 **Dielectric breakdown of Alumina: Effect of mechanical and electrical prestress**
Tara Niakan, Zarel Valdez-Nava, David Malec
LAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France

3B-11 **Effects of water immersion on silicone rubber surface before and after exposure to precipitating droplets in AC electric field**
Karina Poluektova, Sergei Vasilkov
Saint Petersburg State University, Russian Federation

3B-12 **Effect of cracks on the dielectric breakdown of polymers and ceramics**
Raul Pech-Piste[1,2], Francis Aviles[1], Zarel Valdez-Nava[2], David Malec[2]
[1]Centro de Investigación Científica de Yucatán, A.C., Unidad de Materiales, Mérida, Mexico; [2]LAPLACE, Université de Toulouse, CNRS, INPT, UPS, France

3B-13 **Breakdown and partial discharge in dry air under non-uniform electric field for MVDC applications**
Ayyoub Zouaghi[1,2], Caterina Toigo[1], Arel Rako[1], Thanh Vu-Cong[1], Frank Jacquier[1], Alain Girodet[1]
[1]SuperGrid Institute, 23 rue Cyprian, Villeurbanne, France; [2]Ecole Centrale de Lyon, INSA Lyon, Universite Claude Bernard Lyon 1, CNRS, Ampère, UMR5005, Ecully, France

3B-14 **Study on the catalytic degradation of strong greenhouse gas SF6 using a two-dimensional metal organic framework**
Kexin Zhu[1], Langlang Lv[1], Guangzhi Chen[1], Hua Jiang[1], Xiangyu Wang[1], Liangjun Dai[2], Fuping Zeng[1]
[1]State Key Laboratory of Power Grid Environmental Protection, School of Electrical Engineering and Automation, Wuhan University, Wuhan, China.; [2]State Key Laboratory of Power Transmission Equipment & System Security and New Technology, Chongqing University, Chongqing, China

3B-15 **Influence of harmonic distortion on the breakdown voltage of a composite material for the use in dry type transformers**
Javier Torres, Kristin Homeier, Laureen Stahl, Peter Werle
Leibniz University of Hannover, Germany

3B-16 **Failure analysis of silicone rubber in corrosive environment under AC operation**
Guohui Pang[1,2], Zhijin Zhang[1], Steven Qi Li[2,1], Xingliang Jiang[1], Hanyu Zheng[1]
[1]Xuefeng Mountain Energy Equipment Safety National Observation and Research Station, Chongqing University, Chongqing, China; [2]School of Engineering, The University of Manchester, Manchester, UK

Poster session Young Researcher Contest
Session 3C: Experimental techniques and models

Time: Wednesday 03 July 2024 – 10:30am -12:30pm
***Session Chair*:** Davide Fabiani

3C-1 **Charge transport model considering the presence of ions in an XLPE containing by-products**
Assane Ndour[1], Séverine Le Roy[1], Gilbert Teyssedre[1], Raphaël Guffond[2], Julien Fernandez[2]
[1]LAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France; [2]Nexans France

3C-2 **Dielectric model of polarization mechanisms in time domain field simulation including temperature dependence**
Manuel Eckert[1,2], Josef Pihera[1]
[1]University of West Bohemia, Faculty of Electrical Engineering, Research and Innovation Centre of Electrical Engineering (RICE), Pilsen, Czech Republic; [2]Haefely AG, Basel, Switzerland

3C-3 **A novel electric field stress optimization method for high-voltage IGBT module based on AC dielectrophoresis**
Huanmin Yao[1], Haibao Mu[1], He Li[1], Chengshan Liu[2], Zhiyuan Qian[2], Wendong Li[1], Daning Zhang[1], Guanjun Zhang[1]
[1]Xi'an Jiaotong University, China; [2]Aerospace System Engineering Shanghai, Shanghai, China

3C-4 **Equivalent circuit modelling of the dielectric response of PA6/BaTiO3 nanocomposites with different levels of absorbed moisture**
Keyvan Rasti[1,3], Sathyamoorthy Dhayalan[1,3], Nikola Chalashkanov[1], Nick Tucker[1], Len Dissado[2]
[1]University of Lincoln, United Kingdom; [2]University of Leicester, United Kingdom; [3]DPI, the Netherlands

3C-5 Numerical simulation of a transformer-based test platform
Pedro Jose Quintanilla[1], Eugenio Sainz[1], Ramazan Altay[2], Agustin Santisteban[1], Felix Ortiz[1], Alfredo Ortiz[1]
[1]University of Cantabria, Spain; [2]BEST Transformer, Türkiye

3C-6 Simulation on tree growth under electrical and mechanical stresses
Hucheng Liang[1], Bei Chu[1], Zehua Wang[2], Wenjin Zhang[1], Yunqi Xing[3], Boxue Du[1]
[1]Tianjin University, China; [2]State Grid Tianjin Power Chengnan Power Supply Branch, Tianjin, China; [3]Hebei University of Technology, Tianjin, China

3C-7 A study towards machine learning prediction of thermal conductivity of polymers based on molecular dynamics
Hiroto Yokoyama, Hajime Shimakawa, Akiko Kumada, Masahiro Sato
The University of Tokyo, Japan

3C-8 Generalizing numerical simulation results for droplet electrodeformation threshold under pulsed DC voltage
Petr Kostin, Vladimir Chirkov
St. Petersburg State University, Russian Federation

3C-9 Trapping activated tautomerism of acetophenone in Polyethylene
Max Pierre[1], Mikael Unge[1,2], Claire Pitois[2], Mikael S Hedenqvist[1]
[1]Department of Fibre and Polymer Technology, Polymeric Materials Division, School of Engineering Sciences in Chemistry, Biotechnology and Health, KTH Royal Institute of Technology, Stockholm, Sweden; [2]NKT HV Cables AB, Technology Consulting, Sweden

3C-10 Methodology for MD simulation and estimation of material properties of cross-linked epoxy resin
Pratyasha Das[1], Sumit Basu[2], Nandini Gupta[1]
[1]Department of Electrical Engineering, IIT Kanpur, India; [2]Department of Mechanical Engineering, IIT Kanpur, India

3C-11 Numerical analysis of the reasons for partial coalescence of uncharged water droplet and layer under DC electric field
Grigorii Yagodin, Ilia Elagin, Vladimir Chirkov
Saint-Petersburg State University, Russian Federation

3C-12 Correlative calibration for space charge measurement in cables using PEA method
Xiaoxin Li[1], Shosuke Morita[2], Tomohiro Kawashima[1], Yoshinobu Murakami[1], Naohiro Hozumi[1,3]
[1]Toyohashi University of Technology, Japan; [2]Central Research Institute of Electric Power Industry, Japan; [3]Hozumi Measuremnet Lab, Japan

3C-13 A Portable, non-invasive and non-destructive technique for condition assessment of liquid insulation
Rohith Sangineni[1,2], Sisir Kumar Nayak[1,3], Manu A Haddad[2]
[1]School of Energy Science and Engineering, IIT Guwahati, Guwahati, India; [2]Advanced High Voltage Engineering Research Centre, Cardiff University, Cardiff, United Kingdom; [3]Department of Electronics and Electrical Engineering, IIT Guwahati, Guwahati, India

3C-14 Separation and recognition of partial discharge signals from multiple sources using encoder-decoder based neural network
Kotaro Matsuyama, Yasutomo Otake
Mitsubishi Electric Corporation, Japan

3C-15 Enhanced partial discharge evaluation through integrated RF and IEC measurements
Rahmat Ullah[1], Alistair Reid[1], Michail Michelarakis[1], Kai Zhang[1], Manu Haddad[1], Matthew Barnett[2], Mini Nambiar[2], Peter Taddei[2]
[1]Cardiff University, United Kingdom; [2]SSEN Transmission, United Kingdom

3C-16 Multi-point vibration monitoring of power transformer based on optical fiber sensing system
Sihan Wang, Xiaolong Zhang, Jing Hu, Hao Liu, Wei-qi Qin, Guo-ming Ma
State Key Laboratory of Alternate Electrical Power System with Renewable Energy Sources, North China Electric Power University, Beijing, China

3C-17 **Electric field mapping by electro-optical probes in known geometries under high voltage**
Fang Liu[1], Erwin Lopez[1], Andrew West[1], Veeresh Ramnarine[1], Ramy Afia[1], Vidyadhar Peesapati[1], Sinisa Djurović[1], Ian Cotton[1], Khristopher Kabbabe[1], Stephen Mbisike[2], Damon Stewart[2]
[1]The University of Manchester, UK; [2]National Grid, UK

3C-18 **Simultaneous measurement of space charge distribution and partial discharge by PEA method**
Kazuki Endo[1], Kazuya Kondo[1], Junpei Kobayashi[1], Hiroaki Miyake[1], Yasuhiro Tanaka[1], Masahiro Kozako[2], Masayuki Hikita[2]
[1]Tokyo City University, Japan; [2]Kyushu Institute of Technology, Japan

3C-19 **Partial discharge waveform analysis using dynamic mode decomposition**
Tomoka Tsuya[1], Shinya Iwata[1], Ryota Kitani[1], Hiroaki Uehara[2], Tatsuki Okamoto[2], Tatsuo Takada[3]
[1]Osaka Research Institute of Industrial Science and Technology, Japan; [2]Kanto Gakuin University; [3]Tokyo City University

Poster session Young Researcher Contest
Session 3D: Advanced and functional materials, eco-friendly materials

Time: Wednesday 03 July 2024 – 10:30am -12:30pm
***Session Chair*:** Davide Fabiani

3D-1 **An Investigation into the influence of parylene surface modification on the characteristics of cellulose insulating paper for eco-friendly fire-retardant transformers**
Jian Zhou, Feipeng Wang, Jie Zhang, Shi Li, Ying Zhang, Bojun Li, Sichen Yan
State Key Laboratory of Power Transmission Equipment Technology, School of Electrical Engineering, Chongqing University, China

3D-2 **Study of injection and retention of charges in silica-based nanocomposite dielectrics: impact of size of silver nanoparticles**
Sariette Nowa Tatchum, Christina Villeneuve-Faure, Laurent Boudou, Kremena Makasheva
LAPLACE, University of Toulouse, CNRS, UT3, INPT, Toulouse, France

3D-3 **Performance evaluation of a next generation ester based dielectric for single-phase precision immersion cooling**
Beau Van Vaerenbergh, Marion Kerbrat, Pieter Struelens
Oleon, Belgium

3D-4 **Effects of chemical grafting on the dielectric properties of aramid fiber reinforced epoxy composites**
Xiaoxiao Kong[1], Chengyao Hou[1], Jinpeng Jiang[2], Yun Chen[1,2], Yifang Wang[1], Chong Zhang[1], Jing Mu[3], Boxue Du[1]
[1]Tianjin University, China; [2]China Electric Power Research Institute, China; [3]State Grid Jibei Electric Power Company Limited Management Training Center, China

3D-5 **Research on the recycling of EP/Al2O3 and its insulation performance after reconstitution**
Xin Zhao[1], Guanjun Zhang[1], Wendong Li[1], Wang Guo[1], Wenrui Li[1], Hongbao Zong[2]
[1]School of electrical engineering, Xi'an jiaotong university, Xi'an; [2]State Grid Tianjin Electric Power Company, Tianjin, China

3D-6 **Electric field-assisted preparation of anisotropic BNNw/SiR composites for thermal management**
Zikui Shen[1], Yanpeng Hao[1], Meng Zhou[2], Zhidong Jia[2], Jun Wang[3], Dongyuan Du[1], Fengzhen Zhang[3], Wei Liang[1]
[1]South China University of Technology, China; [2]Tsinghua University, China; [3]China National Electric Apparatus Research Institute Co., Ltd. China

3D-7 **Effect of halloysite nanotubes on the properties of LLDPE/HNT composites for the cable industry**
Jan Sipla[1], Anna Vykydalová[2], Petr Kadlec[1], Radek Polanský[1]
[1]University of West Bohemia, Faculty of Electrical Engineering. Department of Materials and Technology, Pilsen, Czech Republic; [2]Slovak Academy of Sciences, Polymer Institute, Bratislava, Slovakia

3D-8 Optimizing printing parameters on dielectric properties in additive manufacturing
Maik Kahn, Michael Kurrat
TU Braunschweig, Germany

3D-9 Dielectric and structural insight into an innovative self-healing copolymer
Daniel Haze[1], Petr Kadlec[1], Josef Pihera[1], Radek Polansky[1], Masayoshi Nishiura[2,3], Zhaomin Hou[2,3]
[1]University of West Bohemia, Faculty of Electrical Engineering, Department of Materials and Technology, Czech Republic; [2]Advanced Catalysis Research Group, RIKEN Center for Sustainable Resource Science, Japan; [3]Organometallic Chemistry Laboratory, RIKEN Cluster for Pioneering Research, Japan

3D-10 Developing novel self-healable capacitor materials with improved thermostability
Neha Mulchandani[1], William Greenbank[2], Thomas Ebel[2], Anne Ladegaard Skov[1], Anders Egede Daugaard[1]
[1]Technical University of Denmark, Denmark; [2]University of Southern Denmark, Denmark

3D-11 Graded surface modification of electric vehicles motor insulating material by using plasma to tailor surface charges
Shakeel Akram[1], Inzamam Ul Haq[1], Fang Zhi[1], Peng Wang[2]
[1]College of Electrical Engineering and Control Sciences, Nanjing Tech University, Nanjing, China; [2]College of Electrical Engineering and Control Sciences, Nanjing Tech University, Nanjing, China

3D-12 Make it stick – Influence of hydrophobicity of nano silica functionalization on dispersion and breakdown performance of BOPP nanocomposites
Siegfried Werner, Michael Kellner, Joachim Kaschta, Dirk W. Schubert
Friedrich-Alexander University Erlangen-Nuremberg, Germany

Thursday 04 July 2024

T. W. Dakin Award Lecture

Time: Thursday 04 July 2024 – 8:15am - 9:00am
***Session Chair*:** Davide Fabiani

"Attracted to dielectric materials research"
Pr Yoshimichi Ohki
Waseda University, Japan

Oral session 7: Nanodielectrics

Time: Thursday 04 July 2024 – 9:05am - 10:00am
***Session Chair*:** Jérôme Castellon
***Session Chair*:** Laurent Boudou

7-1 **Impact of particle thermal treatment on dielectric properties of core-shell filled epoxy nano-composites**
Sunny Chaudhary, Orestis Vryonis, Thomas Andritsch
Tony Davies High Voltage Laboratory, Department of Electronics and Computer Science, University of Southampton, Southampton, United Kingdom

7-2 **Space charge characteristics of epoxy resin/carbon Quantum Dots nanocomposites**
Daniele Mariani, Simone Vincenzo Suraci, Fabrizio Palmieri, Davide Fabiani
LIMES – Laboratory of Innovative Materials for Electrical Systems - Department of Electrical Engineering, University of Bologna, Italy

7-3 **Electrical characteristics and surface topography of elastomeric nanocomposites based on multi-walled carbon nanotubes and poly(dimethylsiloxane)**
Iryna Sulym[1,2], Konrad Terpiłowski[3], Olena Goncharuk[4], Nadine Lahoud Dignat[1], Marie-Laure Locatelli[1], Zarel Valdez-Nava[1]
[1]LAPLACE, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France; [2]Chuiko Institute of Surface Chemistry, NASU, Ukraine; [3]Maria Curie-Sklodowska University, Poland; [4]Institute of Agrophysics, Polish Academy of Sciences, Poland

Poster session 4A: Ageing, degradation and failure

Time: Thursday 04 July 2024 – 10:30am - 12:30pm
***Session Chair*:** Nikola Chalashkanov

4A-01 **A study of ageing and gelling in natural ester oils**
Ian L Hosier[1], Thomas Andritsch[1], Paul L Lewin[1], Gordon Wilson[2]
[1]University of Southampton, United Kingdom; [2]National Grid, United Kingdom

4A-02 **Thermal fault assessment of high-voltage cable based on evolved gas analysis**
Hao Yuan, Kai Zhou, Yuan Li, Jiamin Kong, Zerui Li
Sichuan University, China

4A-03 **Increase in electrical resistance of rubber-containing epoxy resin by heat and radiation**
Yoshimichi Ohki[1], Naoshi Hirai[1,2], Yasuhiro Tanaka[2]
[1]Waseda University, Japan; [2]Tokyo City University, Japan

4A-04 Effect of different coating materials on partial discharge characteristics and electrical tree of printed circuit board

Jianhong Song[1], Zepeng Lv[1], Kai Wu[1], Xiangheng Zeng[1], Qixuan Wang[1], Zengbiao Huang[2], Qi Li[3]
[1]Xi'an Jiaotong University; [2]SHENGYI Technology Co. Ltd; [3]The University of Manchester, UK

4A-05 Effects of temperature gradients on breakdown of AC-GIL tri-post insulators

Boxue Du[1], Zhijun Guo[1], Hucheng Liang[1], LC Hao[2], DP Yuan[2], YX Wang[2]
[1]Tianjin University, China; [2]Pinggao Group Co., Ltd, Pingdingshan, China

4A-06 Effects of climatic aging on the performance of EPDM used in power cables insulation

Djaffar Bouguedad[1], Dahmane Mouri[1], Issouf Fofana[3], Aomar Hadjadj[2]
[1]Laboratoire de Génie Electrique, Université Mouloud Mammeri, Tizi-Ouzou, Algeria; [2]Matériaux & Ingénierie Mécanique, Université de Reims Champagne-Ardenne, France; [3]Modelling and Diagnostic of Electrical Power Network Equipment Laboratory, University of Quebec, Chicoutimi, Canada

4A-07 Monitoring aging of natural ester insulating fluid using supercritical fluid chromatography-mass spectrometry (SFC-MS)

Prabaharan Thiruvengetam[1], John G. Langley[1], Julie Herniman[1], Ian L Hosier[2], Thomas Andritsch[2], Paul L. Lewin[2], Gordon Wilson[3], Richard C. D. Brown[1]
[1]School of Chemistry, University of Southampton, UK; [2]Tony Davies High Voltage Laboratory, University of Southampton, UK; [3]National Grid, Warwick Technology Park, Warwick, UK

4A-08 Effect of gamma-ray irradiation on dielectric properties of PP/Elastomer/TiO2 nanocomposite

Baixin Liu, Yu Gao, Chenyi Guo, Di Lu, Bosen Si, Boxue Du
Tianjin University, China

4A-09 Effect of gamma-ray irradiation on ageing of LDPE micro/nanocomposites estimated by DCIC method

Chenyi Guo, Yu Gao, Baixin Liu, Jing Li, Bosen Si, Boxue Du
Tianjin University, China

4A-10 Radiation resistance of PET and PEN as probed by luminescence and conductivity measurements

Nassiba Belkahla[1], Gilbert Teyssedre[2], Nadia Saidi-Amroun[3], Virginie Griseri[2], Mohamed Saidi[3]
[1]UMMTO University, Tizi-Ouzou, Algeria; [2]LAPLACE, University of Toulouse and CNRS; [3]USTHB University, Algiers, Algeria

4A-11 Lifetime evaluation of photovoltaic insulating backsheets based on elongation at break considering the drop off rate

Kai Feng[1], Jiawei Zhang[1], Ping Wang[2], Lin Fu[3], Li Wang[1], Rong Jia[1], Fouad Belhora[4], Bin Zhang[5]
[1]School of Electrical Engineering, Xi'an University of Technology, Xi'an, Shaanxi, China; [2]Shenzhen Power Supply Planning Design Institute Co., Ltd., Shenzhen, China; [3]State Grid Xinjiang Electric Power Co., Ltd. Economic and Technical Research Institute Urumqi, Xinjiang, China; [4]Laboratoire des Sciences de l'Ingénieur pour l'Energie (LabSIPE), Ecole Nationale des Sciences Appliquées, El Jadida, Morocco; [5]School of Mechanical, Electrical and Information Engineering, Shandong University, Weihai, China

4A-12 Aging characteristics of silicone rubber composite insulators based on space charge behavior

Yangruisi Li, Jiandong Wu, Yi Yin, Qiaohua Wang, Xiang Luo
Shanghai Jiao Tong University, Shanghai, China

4A-13 Interfacial insulation degradation characteristics between epoxy resin and silicone rubber under different interface pressures

Zekai Zhang[1], Lanqian Yang[2], Qi Li[1], Pengxian Song[3], Yang Yu[3], Hucheng Liang[1], Xiaoxiao Kong[1], Boxue Du[1]
[1]Tianjin University, China; [2]Guangdong Power Grid Co., Ltd. Guangzhou Power Supply Bureau, China; [3]State Grid Tianjin Electric Power Research Institute, China

4A-14 A comparative study on thermal aging characteristics between silicone rubber and epoxy resin for dry-type transformer

Xiaoxiao Kong[1], Chong Zhang[1], Lidong Yan[2], Mingyang Wang[2], Hangyu Mi[1], Chengyao Hou[1], Boxue Du[1]
[1]School of Electrical and Information Engineering, Tianjin University, Tianjin, China; [2]State Grid Tianjin High Voltage Company, Tianjin, China

4A-15 **Investigating effects of composite dielectric material components and temperature on breakdown strength**
Benjamin Adam Orton[1], Nikola Chalashkanov[2], Stephen Dodd[2]
[1]STFC ISIS, United Kingdom; [2]University of Lincoln, UK

4A-16 **Different oxygen diffusion patterns in XLPE under thermal oxidative aging**
Nuo Xu, Yueting Liu, Yang Liu, Zixuan Wang, Lisheng Zhong
Xi'an Jiaotong University, China

4A-17 **Effect of antioxidant on irradiation resistance of PP composites for nuclear cable insulation**
Baixin Liu, Yu Gao, Di Lu, Chenyi Guo, Bosen Si, Boxue Du
Tianjin University, China

4A-18 **Effect of functionalized organic antioxidants on electrical treeing degradation of XLPE insulation**
Heyu Wang, Zhonglei Li, You Wu, Zhong Zheng, Yifan Yin, Shuai Zhao, Boxue Du
Tianjin University, China

4A-19 **Effect of the bending radius on the breakdown strength of rectangular PAI/PEEK insulated winding wire of electric motors**
Zoltán Ádám Tamus, Richárd Cselkó
Budapest University of Technology and Economics, Hungary

4A-20 **Aging characteristics and lifespan prediction of composite insulator SiR under multi-haze environment in coastal area**
Yuepeng Xin[1], Yong Liu[1], Minxin Wang[1], Bohan Wang[1], Xuejia Dong[2], Zhen Yin[3], Boxue Du[1]
[1]Tianjin university, China; [2]Shijiazhuang Power Supply Branch of State Grid Hebei Electric Power Limited Corporation, China; [3]State Grid Tianjin Electric Power Company High Voltage Company Branch, China

4A-21 **Electrical tree characteristics of fiber/epoxy composites under repetitive impulse voltage**
Lu Wang[1], Boxue Du[1], Yun Chen[1,2], Yifang Wang[1], Chengyao Hou[1], Xiaoxiao Kong[1]
[1]Tianjin University, China; [2]China Electric Power Research Institute, Beijing, China

4A-22 **Electrical tree degradation characterization of epoxy resin under thermal and temperature composite stresses based on photoelastic effect**
Siyuan Chen[1], Htet Aung Hein[1], Ying Zhang[2], Renyong Zhao[3], Yuhuai Wang[1], Jin Li[1]
[1]Tianjin University, China; [2]Skills Training Center of State Grid Jibei Electric Power Co., Ltd., Baoding, China; [3]Zibo Power Supply Company, State Grid Shandong Electric Power Company, Zibo, China

4A-23 **Electrical treeing degradation characteristics of glass fibre reinforced epoxy composites under compressive-tensile loads**
Siyuan Chen[1], Yun Chen[2], Yuhuai Wang[1], Renyong Zhao[1], Yong Yang[3], Boyuan Cui[2], Fang Liu[3], Wenqiang Li[3], Jin Li[1]
[1]School of Electrical and Information Engineering, Tianjin University, Tianjin, China; [2]China Electric Power Research Institute, Haidian District, Beijing, China; [3]Shandong Taikai Electrical Insulation Co., Ltd., Tai'an, China

4A-24 **Initiation and growth characteristics of electrical trees at ultra-low frequency voltage**
WenHao Li, Tao Han, Boxue Du, Youcong Huang, Zhiwei Fu
Tianjin university, China

Poster session 4B: Diagnostics and experiments 2

Time: Thursday 04 July 2024 – 10:30am - 12:30pm
***Session Chair*:** Juan M. Martínez-Tarifa

4B-01 **Typical defect study of HVAC power cable through distortion analysis of grounding current**
Minxin Wang[1], Yong Liu[1], Guangming Feng[2], Yuepeng Xin[1], Bohan Wang[1], Yufeng Guo[1], Hao Wang[3], Qun Gao[3], Boxue Du[1]
[1]School of Electrical and Information Engineering, Tianjin University, China; [2]Suzhou Nuclear Power Research Institute Co., Ltd., China; [3]Chengnan District Power Supply Company of State Grid Tianjin Electric Power Company, China

4B-02 Detection and diagnosis of high voltage cable water-blocking buffer layer defect based on frequency domain reflection method

Jingtao Huang[1], Kai Zhou[1], Qi Zhao[2], Hao Yuan[1]
[1]Sichuan University, China; [2]State grid Sichuan electric power company Leshan power supply company, Leshan, Sichuan Province, China

4B-03 Research on transient voltage characteristics of EHV cable considering corrugated sheath structure

Junyao Li, Yuxiao Hu, Yan Jin, Yang Xu
State key laboratory of electrical insulation and power equipment, Xi'an Jiaotong University, China

4B-04 Research on partial discharge and self-healing characteristics for metallized film of capacitors

Meng Xiao, Liangtian Zhang, Zhiyuan Zhang, Yuyan Cheng, Zening Lu, Boxue Du
Tianjin University, China

4B-05 Study on partial discharge characteristics of dielectric films for metallized film capacitors

Meng Xiao, Liangtian Zhang, zhiyuan Zhang, Xiaodan Du, Xiangyu Dong, Boxue Du
Tianjin University, China

4B-06 Partial discharge recognition of medium voltage switchgear based on CatBoost model

Chunlin Hao, Jia Chu, Tao Han, Quanwei Hu
Tianjin University, China

4B-07 Research on transformer oil condition diagnosis technology based on multi-frequency ultrasonic detection

Xiaochang Hua, Haibao Mu, Yanan Peng, Chenhui Zhou, Zekai Lai, Guanjun Zhang
Xi'an Jiaotong University, Shaanxi, China

4B-08 Research on typical faults of oil-impregnated paper bushing based on tanδ and capacitance measurement

Shihua Huang[1], Liyun Ying[1], Chao Su[2], Jianming Feng[1], Wei Liu[1], Da Xie[1]
[1]Qingyuan Power Bureau of Guangdong Power Grid Corporation, Qingyuan, China; [2]Yangshan Qingyuan Power Bureau of Guangdong Power Grid Corporation, Qingyuan, China

4B-09 Partial discharge detection beyond the frequency ranges of IEC 60270

Asawin Rajakrom[1], Chayapitch Cheechang[1], Prechapol Laochu[1], Phethai Nimsanong[1], Peerawut Yutthagowith[2]
[1]Metropolitan Electricity Authority; [2]King Mongkut Insitute of Technology Ladkrabang

4B-10 Partial discharges at boundaries of oil-pressboard immersed in mixed insulating oils

Rohith Sangineni[1,2], Thirumurugan Chandrasekaran[3], Sisir Kumar Nayak[1,4], Manu A Haddad[2]
[1]School of Energy Science and Engineering, IIT Guwahati, Guwahati, India; [2]Advanced High Voltage Engineering Research Centre, Cardiff University, Cardiff, United Kingdom; [3]TIFAC CORE, Vellore Institute of Technology, Vellore, India; [4]Department of Electronics and Electrical Engineering, IIT Guwahati, Guwahati, India

4B-11 Correlation method to explore corona discharge dynamics under DC harmonic voltages

Kai Zhang, Alistair Reid, Michail Michelarakis, Rahmat Ullah, Manu Haddad
Cardiff University, United Kingdom

4B-12 PSO and SLPSO to improve the SVM with RBF kernel for the diagnosis of power transformer oil by DGA

Youcef Benmahamed[1], Omar Kherif[2], Sofiane Chiheb[3], Madjid Teguar[1]
[1]Ecole Nationale Polytechnique, El Harrach , Algiers, Algeria; [2]Advanced High Voltage Research Centre, Cardiff University, Cardiff, UK; [3]Ecole Nationale Superieure de Technologie et d'Ingénierie, Annaba, Algeria

4B-13 Research on characteristics of typical partial discharge pattern in GIS based on SiPM

Zihan Xu[1], Lijun Zheng[1], Ruixiang Liu[1], Chuan Peng[1], Zhijie Zhang[1], Pengyue Gao[1], Liang Liang[2], Zhipeng Lei[1]
[1]Taiyuan University of Technology, Taiyuan, China; [2]Urumqi Power Company of State Grid Xinjiang Electric Power Co., Urumqi, China

4B-14 **Partial discharges detection using an electromagnetic antenna: a new approach based on polyimide-epoxy samples**
Steven Coutin[1,3], Veronika Gavrilenko[1], Roman Leduc[1], Bertrand Nogarede[3], Jean-Marc Dienot[1,2], Robert Ruscassie[1]
[1]Laboratoire SIAME - Fédération IPRA, EA4581 - Université de Pau et des Pays de l'Adour/E2S UPPA, Pau, France; [2]LABCEEM - Université Paul Sabatier-Toulouse III, Tarbes, France; [3]NOVATEM SAS, Toulouse, France

4B-15 **Measurement limitations in identifying partial discharges in turn-turn insulation of low-voltage induction motor**
Ondřej Šefl, Raphael Färber, Christian M. Franck
High Voltage Laboratory, ETH Zürich, Switzerland

4B-16 **Effects of bending stress on the propagation of abnormally shaped electrical trees in PP**
Guoning Sun, Boxue Du, Zhonglei Li
Tianjin university, China

4B-17 **Inductive loop operation versus loop antenna for partial discharge detection**
Sana Chouaibi[1], Mohamed Hadj Said[3], Antonino Imburgia[2], Pietro Romano[2], Sinda Kaziz[2], Guido Ala[2], Mossaad Ben Ayed[1], Denis Flandre[4], Fares Tounsi[4]
[1]National Engineering School of Sousse (ENISo), Sousse University, Tunisia, Tunisia; [2]L.E.PR.E. H.V. Laboratory, Department of Engineering, University of Palermo, Italy; [3]Center for Research in Microelectronics & Nanotechnology (CRMN), Sousse, Tunisia; [4]SMALL Group, ICTEAM Institute, Université catholique de Louvain, Belgium

4B-18 **Ageing assessment of submarine cables based on ultra-low frequency dielectric loss**
WenHao Li, Tao Han, Boxue Du, Youcong Huang, Zhiwei Fu
Tianjin university, China

4B-19 **Partial discharge inception and extinction voltages in motor coils for aerospace electric propulsion**
Diego Machetti, Florian Schulz, Vitik Idrizi, Andreas Reeh
Rolls-Royce Deutschland, Germany

Poster session 4C: Materials and insulation systems 2

Time: Thursday 04 July 2024 – 10:30am - 12:30pm
***Session Chair*:** Feihu Zheng

4C-01 **Thermal characterization and time-dependent-dielectric breakdown study of polyimide thin film capacitors**
Marco Salina[1], Rossella Chiara[1], Francesco Guzzi[1], Gabriele Scarpiello[2], Dario Paci[1], Donata Asnaghi[1]
[1]STMicroelectronics, Italy; [2]Politecnico di Milano, Italy

4C-02 **The homogenization effect of dielectric functionally graded materials on the electric field of insulation defects**
Hao Li, Yu-Cheng Zhang, Wen-Dong Li, Chao Wang, Jun-Bo Deng, Guan-Jun Zhang
State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, Shaanxi, China

4C-03 **Influence of support insulators on the AC electrical strength of parallel-cylindrical conductors in liquid nitrogen**
André Schmid, Christof Humpert
TH Köln - University of Applied Sciences Cologne, Germany

4C-04 **Numerical simulation of the electric field in HVDC GIL with application of surface conductivity gradient material**
Hendrik Hensel, Lucas Müller, Markus Clemens
University of Wuppertal, Germany

4C-05 Interaction of biaxial mechanical stress with electrical tree growth of epoxy resin

Wenjin Zhang[1], Mi Xiao[1], Zehua Wang[2], Hucheng Liang[1], Boxue Du[1]
[1]School of Electrical and Information Engineering, Tianjin University, Tianjin, China; [2]State Grid Tianjin Power Chengnan Power supply Branch, Tianjin, China

4C-06 Improved dielectric performance of silicone rubber filled with graphene under gradient magnetic field

Hangyu Mi[1], Zekai Zhang[1], Jingang Su[2], Haoliang Liu[1], Xingwang Huang[2], Chong Zhang[1], Xiaoxiao Kong[1], Boxue Du[1]
[1]School of Electrical and Information Engineering, Tianjin University, China; [2]Electric Power Research Institute of State Grid Hebei Electric Power Supply Co. Ltd., Shijiazhuang, China

4C-07 Humidity impact on streamer inception parameters for turn-to-turn insulation in inverter-fed motors

Hadi Naderiallaf[1], Yatai Ji[2], Paolo Giangrande[3], Michael Galea[4], Michele Degano[1], Christopher Gerada[1]
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4C-08 Research on semi-conductive shielding materials for high-voltage cables based on compound resins

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4C-09 Suppression of metal particle lifting under polarity reversal conditions by surface functionally graded insulators

Yuhuai Wang[1], Songtao Liu[2], Yufan Wang[2], Renyong Zhao[3], Hein Htet Aung[1], Jin Li[1]
[1]Tianjin University, China; [2]High Voltage Company, State Grid Tianjin Electric Power Company, Tianjin, China; [3]Zibo Power Supply Company, State Grid Shandong Electric Power Company, Zibo, China

4C-10 High Frequency dielectric properties and losses in partial discharge resistant rotating machine insulation

Hilde Marie Tollefsrud Syvertsen, Espen Eberg
SINTEF Energy AS, Norway

4C-11 Study of insulation strength reduction induced by particle motion behavior under complex physical effects of GIS switching operation

Jian Wang[1], Rakhmonov Ikromjon Usmonovich[2], Teng Zhang[1]
[1]North China Electric Power University, China, [2]Tashkent State Technical University, Tashkent, Uzbekistan

4C-12 Evaluating lifespan of corona armor tape in form-wound rotating machines

Takumi Yasuda[1], Takahiro Mabuchi[1], Ryuji Ikeda[2], Naoki Okajima[2], Shinsuke Kikuta[3], Takayuki Sakurai[2], Tetsushi Okamoto[3]
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4C-13 Structuring HVDC cable joints using smoothly field grading materials

Thi Thu Nga Vu[1], Gilbert Teyssedre[2], Séverine Le Roy[2]
[1]Electric Power University, Hanoi, Vietnam; [2]Laplace, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France

4C-14 Effect of antioxidant grafting on the dielectric properties of polypropylene insulation

Guoning Sun, Boxue Du, Zhonglei Li
Tianjin university, China

4C-15 Polymer composition and film morphology affecting polypropylene electret charge stability

Arthur Henderyckx[1,2], Anna Guliakova[3,4], Dmitry Rychkov[4]
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4C-16 Partial discharge measurement during interfacial tracking degradation under 50 Hz voltage excitation

Pablo Donoso-Daille[1], Vidyadhar Peesapati[1], Colin Smith[2], Koen Tavernier[2]
[1]The University of Manchester, United Kingdom; [2]IPEC Ltd, United Kingdom

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[1]State Key Laboratory of Power Transmission Equipment Technology, School of Electrical Engineering, Chongqing University, China; [2]College of Electrical and Information Engineering, Changsha university of science and technology, Hunan, China

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Shiyin Zeng, Wendong Li, Yanan Peng, Yuelin Liu, Xinyi Yan, Guanjun Zhang
Xi'an Jiaotong University, China

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[1]University of Lincoln, United Kingdom; [2]University of Leicester, United Kingdom; [3]DPI, the Netherlands

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Huseyin Recai Hiziroglu, Alexander Michael Bothar
Kettering University, United States of America

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Time: Thursday 04 July 2024 – 02:00pm - 04:00pm
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Simone Vincenzo Suraci, Lucia Cardarelli, Paolo Seri, Andrea Cavallini
University of Bologna, Italy

8-2 **Lifetime estimation of epoxy cast insulation under medium-frequency square voltage with ramp breakdown tests**
Xingyu Shang, Lei Pang, Qinhao Bu, Qiaogen Zhang
State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China

8-3 **Thermal aging characteristics of epoxy resin: Chemical structure and dielectric property**
Xiaoxiao Kong[1], Chong Zhang[1], Zhuoran Yang[2], Hangyu Mi[1], Chengyao Hou[1], Qi Li[1], Boxue Du[1]
[1]School of Electrical and Information Engineering, Tianjin University, Tianjin, China; [2]State Grid Nanjing Electric Power Supply Company, Nanjing, China

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[1]Xi'an Jiaotong University, China; [2]Solid Dielectric Solutions, Leiden, the Netherlands; [3]SBM Offshore, Carros, France

8-5 **Effects of thermal properties on insulation breakdown behaviors of epoxy/Al2O3 composite with boron nitride doping**
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[1]Tianjin University, China; [2]High Voltage Company, State Grid Tianjin Electric Power Company, Tianjin, China; [3]Jinan Power Supply Company, State Grid Shandong Electric Power Company, Jinan, China

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Sophie Spencer, Edgar Engel
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