2022 9th International Conference on Condition Monitoring and Diagnosis (CMD)

November 13-18, 2022

On-site participation at the Kitakyushu International Conference Center, Kitakyushu, Japan, and online participation

Sponsored by

IEEJ Technical Committee on Dielectrics and Electrical Insulation

Technically Co-sponsored by

IEEE Dielectrics and Electrical Insulation Society

Supported by

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The Institute of Electrical Installation Engineers of Japan, Kyushu Chapter
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Conference Information

The International Conference on Condition Monitoring and Diagnosis (CMD) was established in 2006 with the aim of providing a platform for academia, industry, technology providers, consultants, and experts in power engineering to discuss and share ideas, results, experiences and to talk over future trends and technologies in the field of electric power apparatus monitoring, fault diagnosis, and asset management.

The first CMD conference was held in Changwon (Korea, 2006), followed by in Beijing (China, 2008), Tokyo (Japan, 2010), Bali (Indonesia, 2012), Jeju (Korea, 2014), Xian (China, 2016), Perth (Australia, 2018) and Thailand (Hybrid, 2020).

CMD 2022 will be held on November 13-18 in 2022, at the Kitakyushu International Conference Center in Kitakyushu, Japan, for on-site participation with several attractive events and sessions for researchers, students, engineers, professionals, etc. in this field, and online participation may be offered according to traveling circumstances. The organizing committee cordially invites you to submit papers and participate in the conference.

Slogan and Main Topics

A slogan and main topics are followings, but they do not limit the submission of papers.

Slogan:

Toward Effective Asset Management Technology, Toward Sustainable, Reliable and Secure Future

Main topics:

- Condition monitoring and diagnosis for power equipment and power systems
- Condition monitoring and diagnosis for industry, innovation and infrastructure
- Condition monitoring and diagnosis in renewable energy plants and affordable and clean energy
- Failure phenomena for power equipment based on electrical, mechanical, chemical and thermal causes
- Dielectric materials and their aging mechanisms
- Degradation assessment for power equipment
- State-of-the-art methodologies and strategies for effective replacement
- Advanced sensing techniques and IoT technologies for condition monitoring and diagnosis
- Applications of AI technologies for data mining and condition assessment
- Responsible consumption and production issues including reduce, reuse and recycle
- Carbon neutralization on diagnosis and monitoring on power equipment operation

Language

The working language of the symposium is English. All printed matter will appear in English.

Proceedings

Proceedings of CMD2022 is available on “My Page”.

My Page: https://gakkai-web.net/p/knt/cmd2022/reg/mod2.php

Accepted and presented papers will be published in IEEE Xplore Digital Library as the Conference Proceedings.

Conference style

Some events of CMD 2022 will be held as a hybrid style via Zoom and online storage. Their URL will be available from “My Page”. Please visit “My Page” in order to attend the conference online. The presentation announcement for presenters is shown in a later chapter.

My Page: https://gakkai-web.net/p/knt/cmd2022/reg/mod2.php

- ✧ Hybrid events: Opening, Closing, Plenary Lecture, Workshop, Oral sessions, Poster sessions
  - ➢ Opening, Closing, Plenary Lecture, Workshop: Real time event via Zoom.
  - ➢ Oral sessions:
    - ✓ For on-site listeners: Real-time event in person.
    - ✓ For online listeners: Poster on-demand event via an online storage. Please see the PDF file of posters, and please ask questions and make discussions by email described in their papers.
- ✧ Onsite events: Tutorial, Welcome party, Banquet, Exhibition including Demo sessions, Technical Tour, Excursion

Wifi information

Free wifi will be available at conference rooms.

SSID: CMD2022wifi

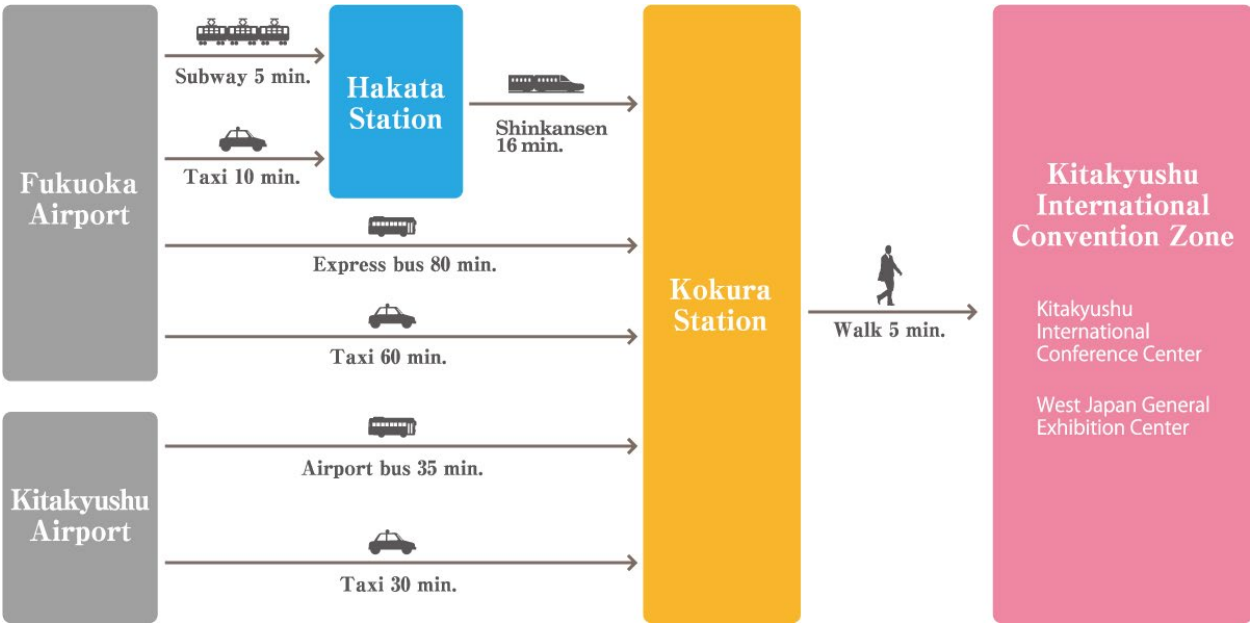
Password: cmd2022jpn

[NOTE]
To prevent the spread of COVID-19, please wear a mask at CMD2022 conference!

About conference venue

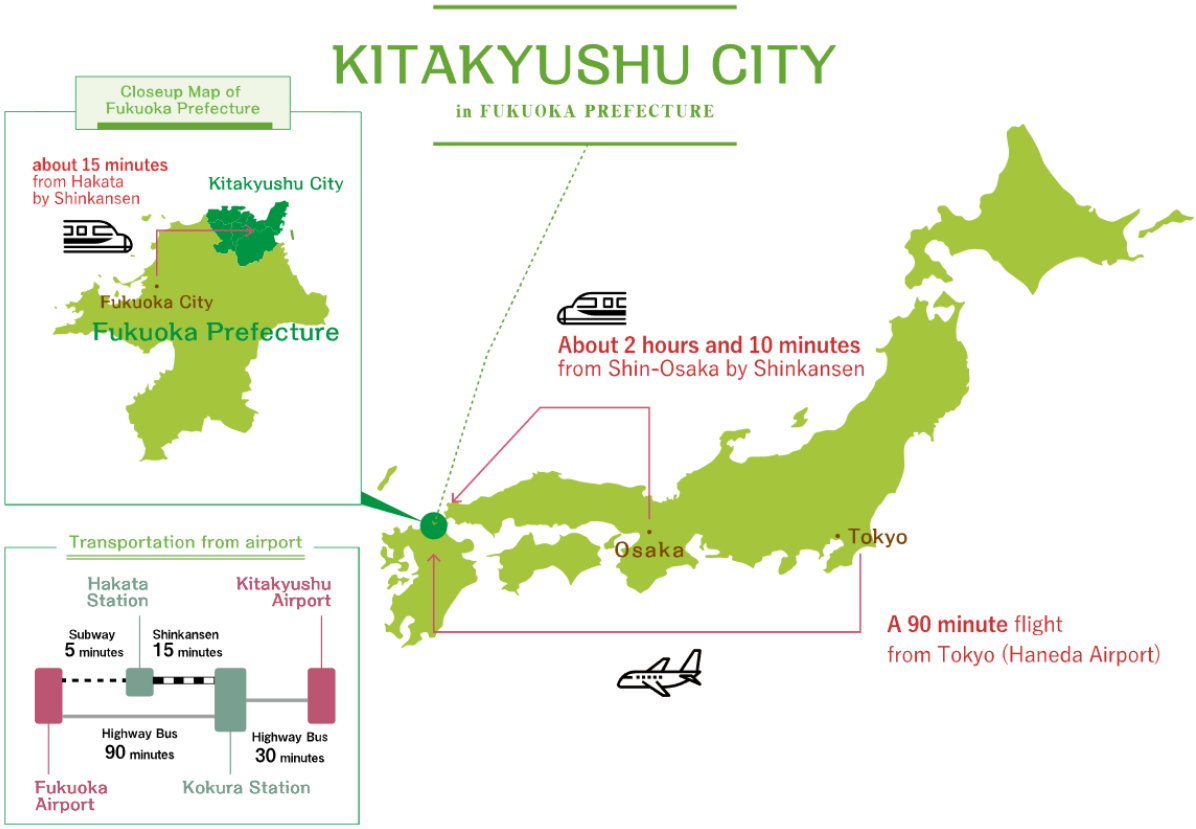
The conference venue will be the Kitakyushu International Conference Center. It was designed by Isozaki Arata, one of Japan's most world-renowned architects. It is located near the JR Kokura Station in Kitaa.

Adress: 3-9-30 Asano, Kokurakita-ku, Kitakyushu-shi, Fukuoka 802-0001



About Kitakyushu

Kitakyushu is situated in the western area in Japan. It takes 90 minutes by airplane from Tokyo, or it takes 2 hours and 10 minutes by Japanese bullet train called Sinkansen from Osaka. Kitakyushu city has a long history to overcome major urban challenges, such as pollution. Thus, Kitakyushu has begun to contribute to the improvement of the global environment through environmental cooperation activities focusing on Asia. In 2011, the organization for economic co-operation and development (OECD) selected Kitakyushu as one of Green Growth Model City that has a balance between the environment and economy. Kitakyushu is the first Asian city selected for this honor.



Registration & Reception

The payment is very important for all the responsible authors, because publication of your paper on the conference proceedings requires submission of your paper in PDF file and the payment of your registration fee. The paper will not be published if you will fail your registration fee payment until the deadline, that is 17:00, Sep. 20th, 2022 (JST). The paper of which no presenter is registered by this deadline, will not be on the conference program, will not be allowed to give its presentation, and will not be published in the proceedings and IEEE Xplore.

Reception

- ✧ Pre-registrants:

  Please tell your registration ID (5XXX) or show an e-mail with your registration ID sent from CMD2022 Registration desk just after the payment.

- ✧ Onsite registrants:

  Please register via CMD2022 registration system before the reception, and show an e-mail sent from CMD2022 Registration desk just after the payment. Please note that only credit card is acceptable for payment.

  CMD2022 registration system: https://gakkai-web.net/knt/cmd2022/reg/

Date	Reception time
Nov. 13 (Sun.)	13:00 ~ 17:30 (JST)
Nov. 14 (Mon.)	9:00 ~ 21:30 (JST)
Nov. 15 (Tue.)	12:00 ~ 21:30 (JST)
Nov. 16 (Wed.)	12:00 ~ 17:30 (JST)
Nov. 17 (Thu.)	12:00 ~ 21:30 (JST)

Registration

【Deadline of Registration】

- Registration for presenters - Registration for onsite participants from overseas required visa[1)]	17:00 on Sep. 20 (Tue.), 2022 (JST)
- Early-bird	17:00 on Oct. 14 (Fri.), 2022 (JST)
- Regular	10:00 on Nov. 11 (Fri.), 2022 (JST)
- Onsite (Credit card payment via CMD2022 registration system only)	21:00 on 17 (Thu), 2022 (JST)

[1)] This is because of the preparation, issuance and postage of your visa application documents. We issued visa documents for authors only.

【Registration fee[2)]】

	Early-bird	Regular	Onsite
	Onsite / Online[4)]	Onsite/ Online[4)]	Onsite only
Member[3)]	JPY 45,000	JPY 55,000	JPY 55,000
Non-Member	JPY 80,000	JPY 90,000	JPY 90,000
Student	JPY 15,000	JPY 25,000	JPY 25,000
Accompanying person (Only family member and onsite participation)	Domestic: JPY 0 Overseas: JPY 15,000	N/A	N/A

[2)] Member: Tax exemption, Non-Member: Tax included (This tax policy is also applied to students and Accompanying persons.)

[3)] Member: Members of IEEJ, IEEE, CIGRE, CES, KIEE, or IEIEJ.

[4)] Registration fees are the same regardless of whether you participate online or onsite. This is because a special facility is needed fee for online participants.

【Manuscript Publication Fee】

JPY 10,000 per one manuscript, but first manuscript will be free of charge.

【Registration Fee includes】

	Student, Member and Non-Member	Accompanying person
Admission to sessions, special events and exhibitions	✔	✔
Download right of conference proceedings	✔	×
Welcome party, coffee break and Banquet	✔	×[5)]
Visa application documents issuance and their postage fees	✔	✔
Lunch and dinner	×	×

[5)] If you attend the welcome party, coffee break and the banquet with your accompanying person, JPY10,000 participation fee for the accompanying person is required.

Special Events

Tutorial

“Assembly of space charge equipment for full-size HVDC insulation systems”

After more than 40 years of research and development since the proposal of the pulsed electrostatic stress method by Prof. Tatsuo Takada, space charge measurements of full-scale HVDC insulating systems have reached a level where they can be used in practical tests. Unlike film samples, the measurement of acutual insulating systems involves unique problems such as voltage application methods and acoustic propagation characteristics. However, it is difficult to systematize the know-how for solving these problems, and it is also difficult to let the reviewers understand their importance when they are described in a paper. In this short training, the participants will experience the know-how of space charge measurement by practically fabricating a measurement cell, and calibrate the charge intensity induced on the electrodes of a polymer insulator of 10 to 20 mm in thickness, with a bias voltage of about 10 kV. Participants will take home their own measurement cell.

- ✧ Date: Nov.14 (Mon.) AM and PM
- ✧ The maximum number of participants: 16 persons (AM: 8 persons, PM: 8 persons)
- ✧ Participation fee: JPY 45,000 (Including cost of materials for PEA based space charge measuring device)

Workshop-1

“Advanced Maintenance Strategies and Asset Management for Substation Equipment in Japan”

- ✧ Organization: ETRA (Electric Technology Research Association. Members are from utilities, researchers, and manufacturers in Japan)
- ✧ Speaker: 4 engineers in Japanese utilities (Tokyo, Kansai, Chubu, Kyushu)
- ✧ Scope:
  - Survey for asset situation (Spec, Failures, Diagnosis, End of life)
  - Advanced maintenance (ICT/IoT, Monitoring)
  - Decision making and related methodologies
- ✧ Target apparatus: Tr, ShR, LR, GIS, GCB, VCB, OCB, LS, SC, CT, VT, LA
- ✧ Date: Nov.14 (Mon.) 15:30-17:30

Workshop-2

"Weibull Analytics of Observed and Suspended Failure Data - A tutorial on a Weighted Linear Regression Approach-"

✧ Speaker: Professor Robert Ross (Institute for Science & Development (IWO) and Delft University of Technology (TUD), Netherlands)

✧ Date: Nov.16 (Wed.) 13:00-15:00

✧ **Abstract**

The workshop aims at dissemination of a method and a freeware Weibull Data Analyzer that was produced in the FINDGO-project that reviewed and developed asset management techniques for the Netherlands utilities in cooperation with the European Network of Transmission System Operators. The methods and tools aim at supporting resilience of electrical grids by analyzing small sets of times of high impact failures that may or may not be the start of a series of high impact failures.

The workshop will consist of two presentations and two interactive parts.

Electrical power grids are strategic infrastructures that consists of many components. The lifecycle of both product batches and assemblies like circuits and substation bays are often represented by bathtub curves. The classic approach is a mix of three competing processes: teething, random failure and wear-out. Teething is though of as due to imperfections that occur up to commissioning; random failure is incidental ('bad luck') and often by external influences; wear-out is due to aging causing equipment to run out of useful life. Alternative bathtub curves involve extremely fast wear and periodic renewal by servicing. These will be illustrated with practical examples.

The optimum operational region of the bathtub curve is the bottom of the bathroom curve where failures are rare and mainly due to 'bad luck'. Asset management is particularly alarmed by three classes of failure events: 1. Teething (also called child disease of child mortality); 2. Wear-out and 3. Early failures during operation. Such events jeopardize the security of energy supply. An effective counter measure is redundancy, although it has its limits. Failures will occur and resilience is served by handling and interpreting incidents well. The workshop will discuss and treat example cases.

After an introduction on as part of an asset management focused project, a Weibull Data Analyzer is developed as a freeware excel application for non-commercial and for educational purposes. The spreadsheet is based on IEEE Standard 930 with added features. It can be downloaded from the IWO website by then. The facilities and the use of the freeware spreadsheet is demonstrated during the workshop. After the workshop the participants should be able to:

· Analyze failure data from tests and operation, including censored data
· Produce a Weibull plot of two data sets and 1 reference set with confidence intervals
· Obtain estimated distribution parameters by weighted or ordinary linear regression
· Obtain an optimal service cycle based on service and replacement costs
· Predict the time of a next failure with confidence limits

Outline of the Workshop

The workshops scheme is:

1. Presentation on introduction on statistics (Weibull, lifecycles, plots,
2. Demonstration of build-up, capabilities and use of Weibull Data Analyzer
3. Workshop and discussion on data analytics of failure data (bring you own)

Technical Tour

- ✧ Venue: Buzen storage battery substation of Kyushu Electric Power Transmission and Distribution Co., Inc.
  Information: http://www2.iee.or.jp/~cmd2022/PDF/Buzen.pdf
- ✧ Date: Nov. 18 (Fri.), PM
- ✧ Itinerary
  12:45 Meet at JR Kokura Station
  13:00 Transfer with a private coach
  14:20 - 16:00 Visiting Buzen Battery Electrical Substation guided in English
  17:20 Back to JR Kokura Station
- ✧ The maximum number of participants: 30 persons. The application is on first come, first serve basis, and may be closed because of the capacity limitation.
- ✧ Participation fee: JPY 3,000

Welcome party

- ✧ Venue: Kitakyushu International Conference Center
- ✧ Date: Nov.13 (Sun.) 15:30-17:30 (JST)

Banquet

- ✧ Venue: ART HOTEL Kokura New Tagawa
- ✧ Date: Nov.16 (Wed.) 19:00-21:00 (JST)
- ✧ Application deadline: Nov. 4th.

* The banquet application is on first come, first serve basis, and may be closed because of a limitation of venue capacity. In addition, the banquet may be canceled due to the prevention of the spread of COVID-19. Please note that the banquet fee is inseparable from your registration fee and is non-refundable in those cases.

* The banquet is seated style. Thus, the capacity of banquet seats is limited. The CMD2022 organizing committee is trying to provide enough seats available, but even though the number of banquet applications is more than expected, your registration fee will be non-refundable.

Excursion

- ✧ Half day (AM) Histrial Walk Chofu town, Kanmon Channel Tower
- ✧ Date: Nov. 18 (Fri.) 09:00 - 13:30 (JST)
- ✧ Participation fee: JPY 8,800
- ✧ Itinerary
  08:45 Meet at JR Kokura Station
  09:00 Transfer with a private coach
  Visiting Chofu town and Kanmon Channel Tower
  13:30 Back to JR Kokura Station
- ✧ Application was finished.

Exhibition and Demo-session

✧ Exhibition and demo-session area: Event Hall on the 1st floor at the conference venue.

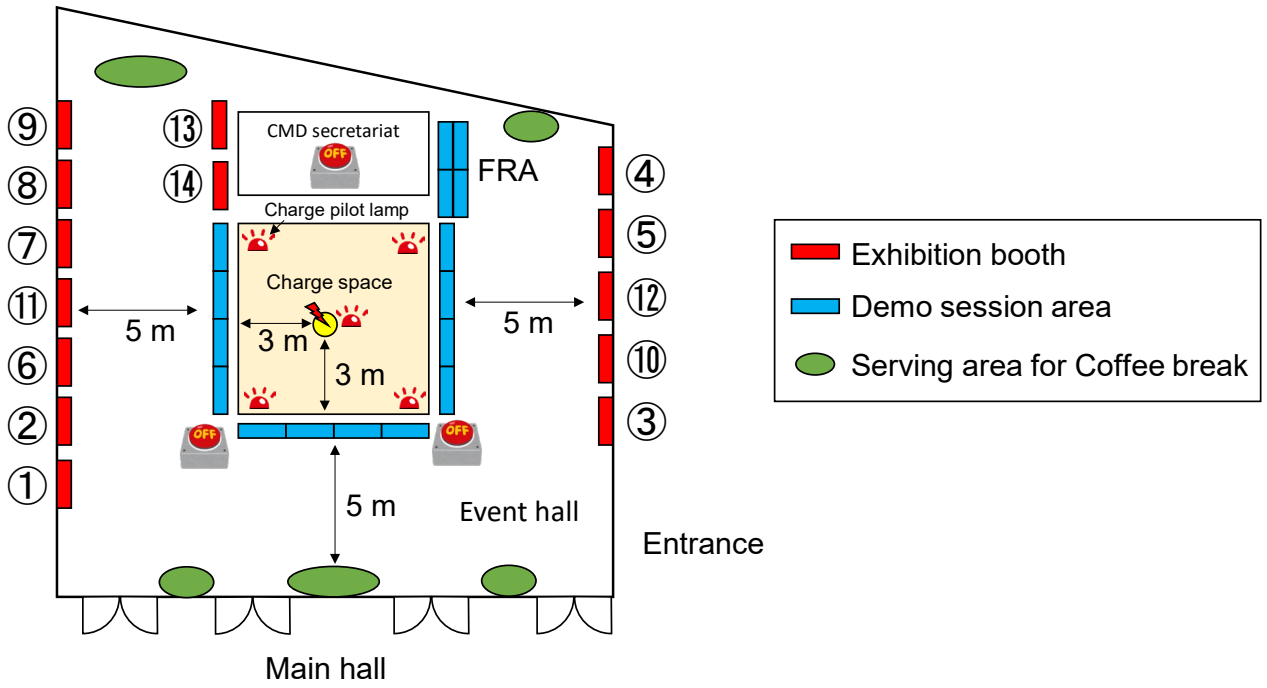
Exhibition

✧ Exhibitions will be held in the conference venue on Nov.14 (Mon.) – 17(Thu.).

Demo-session

✧ Demo sessions will be held in the conference venue on Nov.15 (Mon.) and 17(Thu.).

✧ Scope: To set opportunities for exchange of technical information with actual diagnostic equipment such as PD measuring device, frequency response analyzer (FRA). Some experimental setups simulating abnormality of electric power apparatus as shown below will be prepared by the organizing committee of CMD2022. It will be expected to be a very good opportunities to show the actual operating conditions of diagnostic devices to all participants and let all participants understand them very well.



	Company		Company
①	JFE Advantech Co.,Ltd.	⑧	YUKA INDUSTRIES Co., Ltd.
②	Megger (Agency: JFE Advantech Co.,Ltd.)	⑨	Kyushu Electric Power Co., Inc
③	KS-Global Co.,Ltd.	⑩	SE Technology Limited
④	OMICRON (PD measurement device) (Agency: HIKARI TRADING CO.,LTD.)	⑪	Tektronix & Fluke Corporation.
⑤	OMICRON (FRA measurement device) (Agency: HIKARI TRADING CO.,LTD.)	⑫	SOKEN ELECTRIC CO.,LTD.
⑥	TECHIMP (Agency: Yokkaichi Denki, Co. Ltd.)	⑬	Hozumi's Laboratory, Toyohashi University of Technology.
⑦	ECG KOKUSAI Co., Ltd.	⑭	Central Research Institute of Electric Power Industry

Announcement for Presentation

All papers accepted for CMD2022 must be presented onsite or online. The conference platform will be zoom. Papers will be presented in poster or oral sessions. Please see the program to check which session you assigned.

Program URL: http://www2.iee.or.jp/~cmd2022/PDF/Program.pdf

Assigned sessions (Oral or Poster) were decided according to not only your preference at the abstract submission but also the reviewers' results and the limitation of oral session slots. Therefore, the assigned sessions may have changed from your preference. We would appreciate your sincere understanding. Please note that the change of sessions (Oral or Poster) and participation formats (On-site or Online) will not be accepted because of the preparation of program and presentation equipment.

Template of presentation materials:

The template of presentation materials for oral and poster sessions is not provided. Please use a presentation material that you usually use.

Oral sessions:

The length of your oral presentation must be less than *15 minutes, including discussion and change of presentation*. Your presentation material should be prepared in Microsoft PowerPoint or Adobe PDF.

- On-site presenters:

  Please come to your session room and put your presentation materials into the PC for presenters before the session start.

- Online presenters:

  Please log in the session room in Zoom before the session start.

Poster sessions:

In order for online participants to see all posters, all poster session presenters are required to upload the PDF file of your poster named paper No. to the below URL.

https://cmd202211-my.sharepoint.com/:f:/g/personal/session_cmd202211_onmicrosoft_com/Eu-V249RhLVArOGHjS7mz6YBMJW4xuf7WcC8pa-5ZNb1jQ

The presentation materials will not be able to download, but please make your poster with disclosable information and do not infringe copyright.

- On-site presenters:

  Poster boards are provided during the session for on-site presenters who select “onsite participation” at the registration. Its size is *a height of approx. 2.0 m and a width of 0.9 m*. ‘A-zero’ size posters will be suitable. Please prepare your poster by yourself. The arrangement of poster boards will be announced later.

- Online presenters:

  Digital signages are provided during the session for presenters who select “online participation” at the registration. Please make ‘A-zero’ size posters, and it will be presented to on-site participants with digital

signage via Zoom.

‘A-zero’ size poster frames are available at the following URLs.

‘A-zero’ size poster: http://www2.iee.or.jp/~cmd2022/PPT/A0.ppt

‘A-zero’ size poster with CMD2022 logo: http://www2.iee.or.jp/~cmd2022/PPT/A0_with_logo.ppt

Meeting URL:

The meeting URL of Zoom will be available from “My Page” on conference period.

My Page URL: https://gakkai-web.net/p/knt/cmd2022/reg/mod2.php

CMD2022 Technical Program

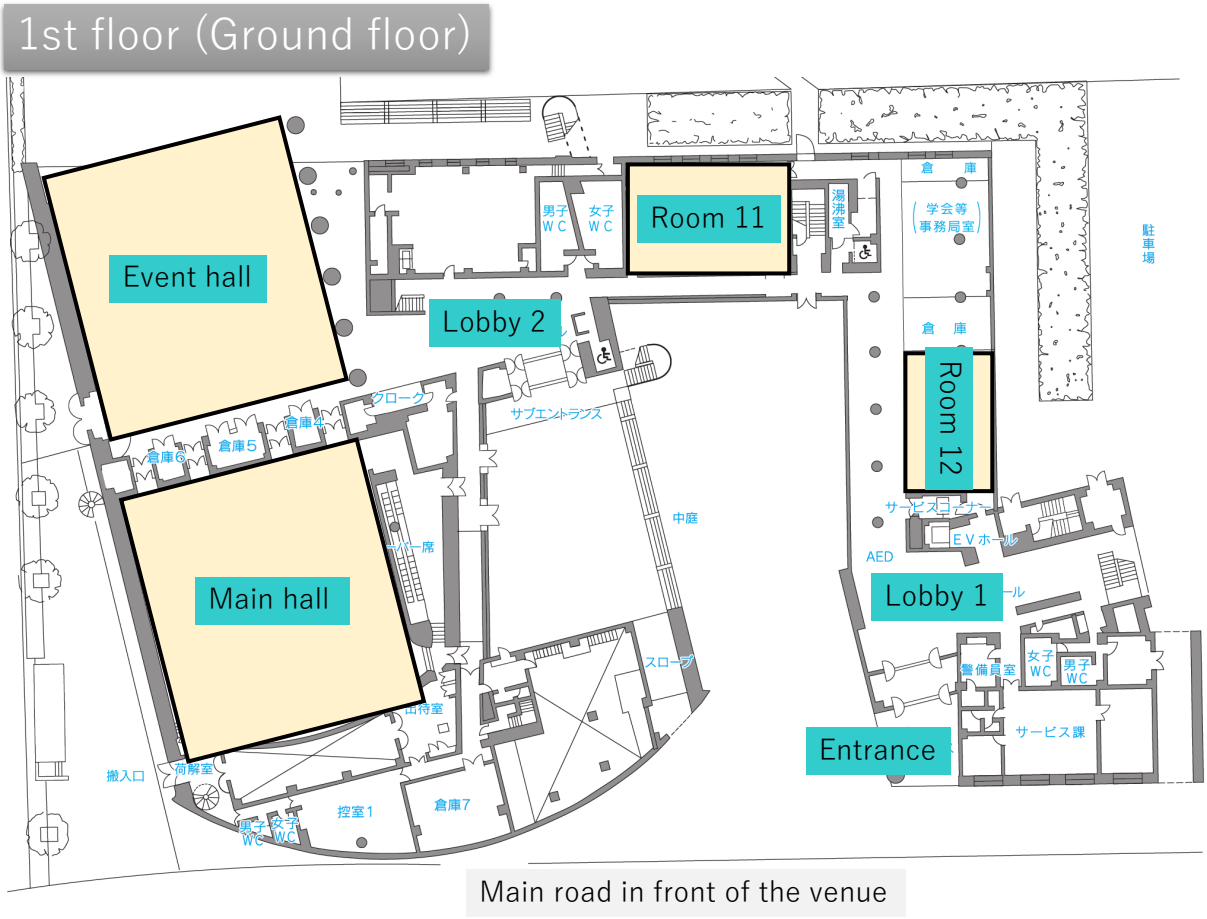
All time indicators shown are based on Japan Standard Time.

Technical sessions except for a tutorial and a demo event will be held as an on-site and real time on-line event on Zoom.

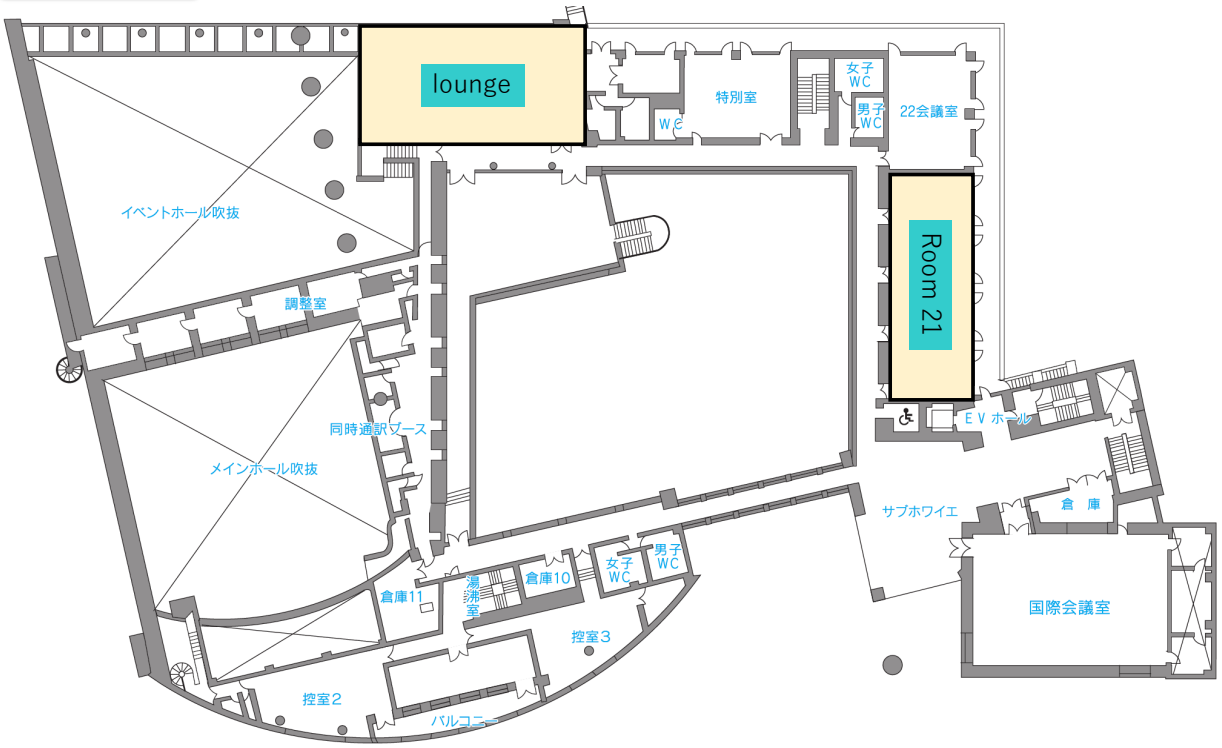
	AM		PM1		PM2		PM3
	09:00-12:00		13:00-15:00		15:30-17:30		19:30-21:30
Nov. 13 (Sun.)					Welcome party (Lounge)		
Nov. 14 (Mon.)	Tutorial (09:00-11:30) (Room 11)	Lunch (Not provided)	Tutorial (12:30-15:00) (Room 11)	Coffee Break (Lounge and Event Hall)	Workshop-1 (Main Hall)	dinner (Not provided)	Opening & Plenary Lecture (Main Hall)
Nov. 15 (Tue.)			Poster session P1 (Rooms 11, 12, 21, 32) /Demo session (Event Hall)		Poster session P2 (Rooms 11, 12, 21, 32) /Demo session (Event Hall)		Oral session A1: Cable (Main Hall) B1: Rotating Machines (Room 21) C1: Insulation Materials (Room 32)
Nov. 16 (Wed.)			Workshop-2 (Main Hall)		Oral session A2: Transformer (Main Hall) B2: Diagnosis Techniques (GIS etc.) (Room 21) C2: Diagnosis and Asset Management (Room 32)		Banquet (19:00-21:00)
Nov. 17 (Thu.)			Poster session P3 (Rooms 11, 12, 21, 32) /Demo session (Event Hall)		Poster session P4 (Rooms 11, 12, 21, 32) /Demo session (Event Hall)		Plenary Lecture & Closing (Main Hall)
Nov. 18 (Fri.)	Technical tour / Excursion						

- ✓ The technical sessions will be held from noon to night on Japanese time with consideration of the time difference of the online participants.
- ✓ Exhibitions will be held in the conference venue on Nov.14 (Mon.) – 17(Thu.).

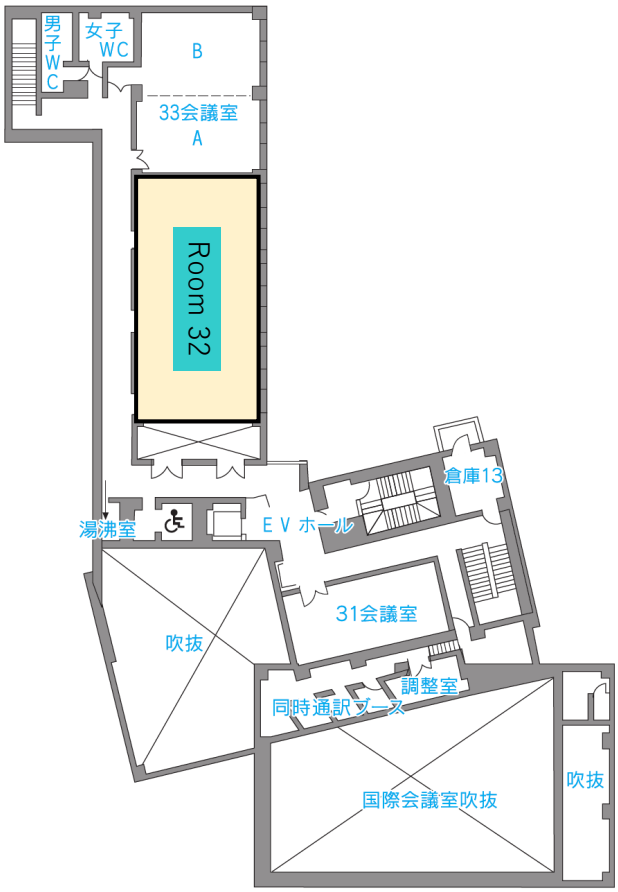
Floor map


1st floor (Ground floor)
Event hall
Main hall
Lobby 2
Room 11
Room 12
Lobby 1
Entrance
男子 WC
女子 WC
湯沸室
倉庫
学会等 事務局室
駐車場
クローク
サブエントランス
倉庫4
倉庫5
倉庫6
中庭
スロープ
AED
EVホール
警備員室
サービス課
出待室
荷解室
搬入口
控室1
倉庫7
Main road in front of the venue

2nd floor



3rd floor



Nov. 14th (Mon.), 19:30 - 21:30

Opening & Plenary Lecture

Chair: Prof. Naoki Hayakawa (Nagoya University, Japan)

Opening Remarks

Naoki Hayakawa (Nagoya University, Japan)

Plenary Lecture

PL-1 ***"The Role of Condition Monitoring and Diagnostic Technologies in Electric Energy Systems to Support the Creation of a Sustainable Society"***

Koji Kawakita 1

(1 Chubu Electric Power Grid, Japan)

PL-2 ***"Condition Assessment of Power Transformers by UHF PD Measurements"***

S. Tenbohlen 1, C. P. Beura 1, M. Siegel 2

(1 University of Stuttgart, Germany, 2 BSS Hochspannungstechnik GmbH, Germany)

PL-3 ***"Anomalous decreasing power loss of ZnO varistor ceramics during the dc aging: phenomena, insights and perspectives"***

Jianying Li 1, Zhuolin Cheng 1, Shengtao Li 1, Kangning Wu 1

(1 Xi'an Jiaotong University, China)

Nov. 17th (Thu.), 19:30 - 21:30

Plenary Lecture & Closing

Chair: Dr. Toshihiro Takahashi (Central Research Institute of Electric Power Industry, Japan)

Plenary Lecture

PL-4 ***"Application of Machine Learning Technique and Sweep Frequency Response Analysis to Classify StatorWinding Insulation Defects"***

Yong Joo Kim 1, Se Hoon Yang 2, Hyun Bin Jo 1

(1 Chung Ang University, Korea, 2 Seoul National University, Korea)

PL-5 ***"Diagnostic Accuracy and Technical Considerations for MV Cable Field Partial Discharge Measurements"***

Sarajit Banerjee 1, Jean-Francois Drapeau 2

(1 Kinectrics Inc., Canada, 2 Consultant JFD CableDiag (retired from Hydro-Quebec), Canada)

Closing Remarks

Toshihiro Takahashi (Central Research Institute of Electric Power Industry, Japan)

June-Ho Jee (Hoseo University, Korea)

Naohiro Hozumi (Toyohashi University of Technology, Japan)

Nov. 14th (Mon.), 15:30 - 17:30

Workshop on "Advanced Maintenance Strategies and Asset Management for the Substation Equipment in Japan"

Chair: Dr. Tsuguhiro Takahashi (Central Research Institute of Electric Power Industry, Japan)

W1-1 ***"Study on advanced maintenance strategies and asset management for the substation equipment in Japan -Investigation of the Transition of Substation Equipment Quantity, Trend Analysis of Failures-"***

Taihei Ofuji 1, Teruyasu Miyazaki 1, Shinya Ikubo 1, Kiyotaka Baba 2, Koichiro Kami 3, Hiroto Ueda 4, Isao Miyajima 5, Masahiro Sota 5

(1 Kyusyu Electric Power Transmission and Distribution Co., Inc., Japan, 2 TEPCO Power Grid, Inc., Japan, 3 Hokuriku Electric Power Transmission and Distribution Company, Japan, 4 Chubu Electric Power Grid Co., Inc., Japan, 5 Kansai Transmission and Distribution, Inc., Japan)

W1-2 ***"Study on advanced maintenance strategies and asset management for the substation equipment in Japan -Analysis of the Degradation Mechanisms and Investigation of Maintenance Strategy-"***

Kosho Kamatani 1, Yuji Aihara 1, Satoshi Ichihara 1, Isao Miyajima 2, Yoshito Tainaka 2, Ken Ito 3, Yasuaki Nakagawa 4, Yusuke Sasaki 5, Yasushi Miyamoto 6, Hideki Ogata 7, Koma Sato 8

(1 TEPCO Power Grid, Inc., Japan, 2 Kansai Transmission & Distribution, Inc., Japan, 3 Chubu Electric Power Grid Co., Inc., Japan, 4 Shikoku Electric Power Transmission & Distribution Co., Inc., Japan, 5 Hokkaido Electric Power Network, Inc., Japan, 6 Toshiba Energy Systems & Solutions Corp., Japan, 7 Hitachi, Ltd., Japan, 8 Mitsubishi Electric Corp., Japan)

W1-3 ***"Study on advanced maintenance strategies and asset management for the substation equipment in Japan -Investigation of Recent Technologies for Advance Maintenance Strategies-"***

Shinichi Ueyama 1, Yasuhito Hashiba 1, Keisuke Yokohata 2, Hiroto Ueda 3, Hiroshi Kameda 4

(1 Kansai Transmission & Distribution, Inc., Japan, 2 TEPCO Power Grid, Inc., Japan, 3 Chubu Electric Power Grid Co., Inc., Japan, 4 Chugoku Electric Power Transmission & Distribution Co., Inc., Japan)

W1-4 ***"Study on advanced maintenance strategies and asset management for the substation equipment in Japan -Survey on Asset Management Methods for Strategic Investment Judgments-"***

Norihiko Aono 1, Kiyohiro Tsuboi 1, Ryo Saeki 2, Takuichi Kinugasa 3, Naoya Ojio 4, Tsuguhiro Takahashi 5, Hironori Sugiyama 6, Masashi Kitayama 7, Tsukasa Onishi 8

(1 Chubu Electric Power Grid Co., Inc., Japan, 2 TEPCO Power Grid, Inc., Japan, 3 Kansai Transmission and Distribution, Inc., Japan, 4 Chugoku Electric Power Transmission & Distribution Co., Inc., Japan, 5 Central Research Institute of Electric Power Industry, Japan, 6 Toshiba Energy Systems & Solutions Corporation, Japan, 7 Mitsubishi Electric Corporation, Japan, 8 Hitachi, Ltd., Japan)

Nov. 16th (Wed.), 13:00 - 15:00

Workshop on "Weibull Statistics for Decision-making after Failures: repair or replace?"

Chair: Prof. Naoki Hayakawa (Nagoya University, Japan)

Speaker: Prof. Robert Ross (IWO – Institute for Science and Development, Ede, Netherlands)

W2-1 ***"Weibull Analytics of Observed and Suspended Failure Data - A tutorial on a Weighted Linear Regression Approach-"***

Robert Ross 1

(1 IWO – Institute for Science and Development, Ede, Netherlands)

Abstract

The workshop aims at dissemination of a method and a freeware Weibull Data Analyzer that was produced in the FINDGO-project that reviewed and developed asset management techniques for the Netherlands utilities in cooperation with the European Network of Transmission System Operators. The methods and tools aim at supporting resilience of electrical grids by analyzing small sets of times of high impact failures that may or may not be the start of a series of high impact failures.

The workshop will consist of two presentations and two interactive parts.

Electrical power grids are strategic infrastructures that consists of many components. The lifecycle of both product batches and assemblies like circuits and substation bays are often represented by bathtub curves. The classic approach is a mix of three competing processes: teething, random failure and wear-out. Teething is though of as due to imperfections that occur up to commissioning; random failure is incidental ('bad luck') and often by external influences; wear-out is due to aging causing equipment to run out of useful life. Alternative bathtub curves involve extremely fast wear and periodic renewal by servicing. These will be illustrated with practical examples.

The optimum operational region of the bathtub curve is the bottom of the bathroom curve where failures are rare and mainly due to 'bad luck'. Asset management is particularly alarmed by three classes of failure events: 1. Teething (also called child disease of child mortality); 2. Wear-out and 3. Early failures during operation. Such events jeopardize the security of energy supply. An effective counter measure is redundancy, although it has its limits. Failures will occur and resilience is served by handling and interpreting incidents well. The workshop will discuss and treat example cases.

After an introduction on as part of an asset management focused project, a Weibull Data Analyzer is developed as a freeware excel application for non-commercial and for educational purposes. The spreadsheet is based on IEEE Standard 930 with added features. It can be downloaded from the IWO website by then. The facilities and the use of the freeware spreadsheet is demonstrated during the workshop. After the workshop the participants should be able to:

- Analyze failure data from tests and operation, including censored data
- Produce a Weibull plot of two data sets and 1 reference set with confidence intervals
- Obtain estimated distribution parameters by weighted or ordinary linear regression
- Obtain an optimal service cycle based on service and replacement costs
- Predict the time of a next failure with confidence limits

Outline of the Workshop

The workshops scheme is:

1. Presentation on introduction on statistics (Weibull, lifecycles, plots,
2. Demonstration of build-up, capabilities and use of Weibull Data Analyzer
3. Workshop and discussion on data analytics of failure data (bring you own)

Nov. 15th (Tue.), 19:30 - 21:30

Oral Session A1: Cable

Chair: Prof. Norasage Pattanadech (King Mongkut Institute's of Technology Ladkrabang, Thailand)

Co-chair: Prof. Yasuhiro Tanaka (Tokyo City University, Japan)

A1-1 ***"Development of a Nondestructive Method for the Chemical Composition Analysis of the Nuclei of Bow-tie Water Trees in Field-aged Cross-linked Polyethylene Cable Insulation"***

Hideki Misaka 1, Toshihiro Takahashi 1

(1 Central Research Institute of Electric Power Industry, Japan)

A1-2 ***"Sheath Potential Induced Failure Modes and Influencing Factors of Bonded Cable System"***

Sreeram V 1, Meena K P 1, Arunjyothi R 1, Thirumurthy 1, Sudhakara S Reddy 1

(1 Central Power Research Institute, India)

A1-3 ***"Investigation on PD Activities in Man-made Defective Distribution XLPE Cable Joints"***

Cao Hongyan 1

(1 SP Group, Singapore)

A1-4 ***"Distributed Fiber-Optic Sensing for Partial Discharge Detection of Stress Cone Dislocation Defects in High Voltage Cable Joints"***

Zhenfu TANG 1, Hao CHEN 1, Yang XU 1

(1 Xi'an Jiaotong University, China)

A1-5 ***"The Effects of Coupling and Grounding on the Partial Discharge Pulse Propagation in the Underground Cable"***

W. Rojanasunan 1, P. Chancharoensook 1, S. Jeenmuang 1, S. Mongkolsatitpong 2, N. Pattanadech 1, D. Suksawat 1

(1 King Mongkut's Institute of Technology Ladkrabang, Thailand, 2 PD Solutions CO., LTD., Thailand)

A1-6 ***"Development of Data Compression Method of Partial Discharge Waveform for Remote Insulation Diagnosis in Manhole for Power Transmission Cable"***

Takafumi Mashimo 1, Toshihiro Takahashi 1, Ryuichi Ishino 1, Yasuhiko Hori 1

(1 Central Research Institute of Electric Power Industry, Japan)

Nov. 15th (Tue.), 19:30 - 21:30

Oral Session B1: Rotating Machines

Chair: Prof. Yong Joo Kim (Chung Ang University, Korea)

Co-chair: Mr. Yuji Ogawa (MEIDENSHA, Japan)

B1-1 ***"Glass Fibre Insulated Wire Assessment Under Partial Discharges Activity via Dielectric Dissipation Factor Measurements"***

Hadi Naderiallaf 1, Paolo Giangrande 1, Michael Galea 1, 2

(1 The University of Nottingham, U.K., 2 The University of Malta, Malta)

B1-2 ***"Analysis and Comparison of Characteristics for Offline PD Measurements in Turbo-Generators at Different Test Time Intervals"***

K. Dorkmai 1, P. Pannil 2, K. Tattiwong 3, S. Maneerot 4, D. Suksawat 1, N. Pattanadech 1

(1, 2 King Mongkut's Institute of Technology Ladkrabang, Thailand, 3 Rajamangala University of Technology Krungthep, Thailand, 4 TESLA Power Co., Ltd., Thailand)

B1-3 ***"Online and Offline Partial Discharge Measurement in Rotating Machines using Transient Earth Voltage Sensors"***

Lunnetta Safura Lumba 1, Akito Houdai 1, Ryota Koresawa 1, Tsutomu Kuno 2, Masahiro Kozako 1, Masayuki Hikita 1, Kenta Yonemura 2

(1 Kyushu Institute of Technology, Japan, 2 Nippon Steel Corporation, Japan)

B1-4 ***"Faulty Class Diagnosis of Three Phase Induction Motor Bearing Using Stator Current Spectral Features and Machine Learning Algorithms"***

Kenichi Yatsugi 1, Shrinathan Esaki Muthu Pandara Kone 1, Yukio Mizuno 1

(1 Nagoya Institute of Technology, Japan)

B1-5 ***"The Application of Polarization and Depolarization Current on the Large Turbo-generators"***

S. Jeenmuang 1, P. Pannil 2, S. Mongkolsatitpong 3, S. Trakuldit 4, V. Wuti 5, N. Pattanadech 1

(1, 2, 5 King Mongkut's Institute of Technology Ladkrabang, Thailand, 3 Plan Market Gold Co., Ltd and PD Solution Co., Ltd., Thailand, 4 Nakhon Si Thammarat Rajabhat University, Thailand)

Nov. 15th (Tue.), 19:30 - 21:30

Oral Session C1: Insulation Materials

Chair: Prof. Bangwook Lee (Hanyang University, Korea)

Co-chair: Prof. Yoshimichi Ohki (Waseda University, Japan)

C1-1 ***"Space Charge Measurement of a 9mm-thick AC-XLPE Cable under Steady-state and Transient Temperature Conditions"***

Shosuke Morita 1, Norikazu Fuse 1, Toshihiro Takahashi 1, Takayuki Matsubara 2, Yoshinao Murata 2, Naohiro Hozumi 3

(1 Central Research Institute of Electric Power Industry, Japan, 2 Sumitomo Electric Industries, Ltd., Japan, 3 Toyohashi University of Technology, Japan)

C1-2 ***"The Study of Polarization and Depolarization Current Measurements on Service-Aged 22 kV XLPE Underground Cables with Presence of Water Trees"***

P. Udomluksananon 1, A. Kunakorn 1, S. Maneerot 3, C. Bunlaksananusorn 2, P. Pannil 2, N. Pattanadech 1

(1, 2 King Mongkut's Institute of Technology Ladkrabang, Thailand, 3 TESLA Power CO., LTD., Thailand)

C1-3 ***"Current Integration Method as a Reliable Tool for Diagnosing Flame-retardant EPDM Cables Removed from Nuclear Power Plants"***

Y. Ohki 1, N. Hirai 1, K. Sato 2, Y. Tanaka 2

(1 Waseda University, Japan, 2 Tokyo City University, Japan)

C1-4 ***"Improvement of Spatial Resolution of Space Charge Measurement at High Temperature using PEA Method"***

Kosuke Sato 1, Hironori Aoki 1, Ryota Kobayashi 1, Hiroaki Miyake 1, Yasuhiro Tanaka 1

(1 Tokyo City University, Japan)

C1-5 ***"Fundamental Study on Calibration of Space Charge Distribution by Frequency-resolved Analysis"***

Naohiro Hozumi 1, Xiaoxin Li 1, Tomohiro Kawashima 1, Yoshinobu Murakami 1

(1 Toyohashi University of Technology, Japan)

C1-6 ***"Partial Discharge Inception Phase and Light Emission Distribution of an Enclosed Void in Epoxy Resin"***

Ryota Ozaki 1, Muneaki Kurimoto 1, Tooru Sawada 2, Shigeyoshi Yoshida 2, Takahiro Umemoto 2, Hirotaka Muto 2

(1 Nagoya University, Japan, 2 Mitsubishi Electric Corporation, Japan)

Nov. 16th (Wed.), 15:30 - 17:30

Oral Session A2: Transformer

Chair: Dr. Peter Morshuis (Solid Dielectric Solutions, Netherlands)

Co-chair: Prof. Satoshi Matsumoto (Shibaura Institute of Technology, Japan)

A2-1 ***"Theoretical Aproach for Impulse Arc Energy Estimation"***

Satoshi Matsumoto 1, Masamichi Kato 2

(1 Shibaura Institute of Technology, Japan, 2 YUKA INDUSTRIES Co., Ltd., Japan)

A2-2 ***"Rise Time Characteristics on the Order of Picoseconds of Negative PD Current Pulses in SF_6 Gas and Mineral Oil and Impact of PD-Emitted EM Waves on the 5G Frequency Band"***

Shinya Ohtsuka 1, Tatsuhiko Yamauchi 1, Hiroki Shibata 1

(1 Kyushu Institute of Technology)

A2-3 ***"Identification of Partial Discharge Source in Shunt Reactor by Frequency Response Analysis and Partial Discharge Measurement"***

Satoru Miyazaki 1, Takashi Kuraishi 1

(1 Central Research Institute of Electric Power Industry, Japan)

A2-4 ***"Influence of Temperature and Moisture Content on Conductivity of Synthetic Ester"***

Rui Yu 1, Shanika Matharage 1, Shuhang Shen 1, Zhongdong Wang 1

(1 University of Exeter, United Kingdom)

A2-5 ***"Study of the Thermal Degradation of Different Insulating Papers Impregnated with a Natural Ester"***

Cristina Méndez Gutiérrez 1, Cristian Olmo Salas 1, Carlos Javier Renedo Estébanez 1, Masahiro Kozako 2, Masayuki Hikita 2, Alfredo Ortiz Fernández 1

(1 Universidad de Cantabria, Spain, 2 Kyushu Institute of Technology, Japan)

A2-6 ***"The Influences of Cellulose Bridging on the Electrical Field Strength and Thermal Profile of PFAE under Lightning Impulse Stress with DC Superimposed"***

S. Saaidon 1,2, M. A. Talib 3, M.N.K.H. Rohani 4, N. A. Muhamad 1,5, M. Kamarol 1

(1 Universiti Sains Malaysia, Malaysia, 2 Centre for Instructor and Advanced Skill Training, Malaysia, 3 TNB Research Sdn. Bhd. Research Institution Area, Malaysia, 4 Universiti Malaysia Perlis, Malaysia, 5 Universiti Teknologi Brunei, Brunei)

A2-7 ***"Prediction of dissolved gas in transformer oil based on SSA-LSTM model"***

Yuchuan Zhang 1, Didi Liu 1, Huiqian Liu 1, Yuhang Wang 1, Yang Wang 1,Qingdong Zhu 2

(1 Xi'an Polytechnic University, China, 2 State Grid Shandong Electric Power Company Electric Power Research Institute, China)

Nov. 16th (Wed.), 15:30 - 17:30

Oral Session B2: Diagnosis Techniques (GIS etc.)

Chair: Prof. June-Ho Lee (Hoseo University, Korea)

Co-chair: Dr. Takashi Kurihara (Central Research Institute of Electric Power Industry, Japan)

B2-1 ***"Noise-robust Early Detection of Cooling Fan Deterioration with a Variational Autoencoder-based Method"***

Hiroyuki Yanagihashi 1, Takashi Sudo 1

(1 Toshiba Corporation, Japan)

B2-2 ***"Application of TEV Sensors to PD Measurement for Capacitor Voltage Transformers"***

Yuya Nagaki 1, 2, Hiroki Kojima 1, Masanobu Yoshida 3, Naoki Hayakawa 1

(1 Nagoya University, Japan, 2 Chubu Electric Power Grid Co., Inc., Japan, 3 Chubu Electric Power Co., Inc., Japan)

B2-3 ***"Partial Discharge Pattern Recognition Based on Kolmogorov-Smirnov Cluster Analysis of Discharge Pulse Sequences"***

Bingshu Chen 1, 2, Yue Hu 1, 2, Wencong Xu 3, Xiao Jiang 4

(1, 3 Shanghai Jiao Tong University, China, 2 Key Laboratory of Control of Power Transmission and Conversion (SJTU), China, 4 Shanghai University of Electric Power, China)

B2-4 ***"Partial Discharge Measurement for GIS and Classification of Deterioration ID due to Clustering Analysis"***

Takashi Yamamoto 1, Wataru Ishikawa 1, Keisuke Yokohata 1, Toshihiro Hoshino 2

(1 TEPCO Power Grid, Inc., Japan, 2 Toshiba Energy Systems & Solutions Corp., Japan)

B2-5 ***"Influence of Mixing Ratio Change of SF_6 Alternative Gas Mixtures Considering Synergy Effect of Critical Electric Field Strength"***

Shinya Ohtsuka 1, Takumi Matsuoka 1, Masaharu Shintake 1, Kiyoshi Inami 2, Hiroyuki Hama 2, Youji Nakadai 3

(1 Kyushu Institute of Technology, Japan, 2 Mitsubishi Electric Corporation, Japan, 3 Tokyo Electric Power Company, Japan)

B2-6 ***"Partial Discharge Detection Method for High Voltage Converter System Using Wavelet Transformation and Convolutional Neural Network"***

Tomoki Kamiya 1, Yusuke Nakamura 1, Hiroaki Cho 1, Yusuke Ishida 2, Hajime Shiraishi 2

(1 Toshiba Infrastructure Systems & Solutions Corporation, Japan, 2 Toshiba Mitsubishi-Electric Industrial Systems Corporation, Japan)

Nov. 16th (Wed.), 15:30 - 17:30

Oral Session C2: Diagnosis and Asset Management

Chair: Dr. Simon Sutton (Altanova, UK)

Co-chair: Prof. Naohiro Hozumi (Toyohashi University of Technology, Japan)

C2-1 ***"Prognostics and Health Management for Power Electronics and Electrical Power Systems"***

Robert Ross 1

(1 IWO, Netherlands)

C2-2 ***"Multi-Class Support Vector Machine for Classifying Defect Types of High Voltage Stator Windings"***

Hyun Bin Jo 1, Hong Je Ryoo 1, Jae Beom Ahn 1, Ki Duk Lee 2, Jin Lee 2, Yong Joo Kim 2, Chae Woong Lim 3

(1 Chung Ang University, Korea, 2 Research & Development Centre, O&M Korea, Korea, 3 SN Heavy Industry Co. Ltd., Korea)

C2-3 ***"Observation of Post-Reclamation Ethylene Production in Transmission Power Transformers"***

Thathsara Herath 1,2, Zhongdong Wang 1,2, Qiang Liu1, Gordon Wilson 3, Ruth Hooton 3, Timothy Raymond 4, Shengji Tee 5

(1 The University of Manchester, UK, 2 University of Exeter, UK, 3 National Grid Electricity Transmission (NGET), UK, 4 Electric Power Research Institute (EPRI), US, 5 SP Energy Network, UK)

C2-4 ***"HVDC GIS/GIL – Machine Learning Algorithms for Online PD Classification at DC Voltage"***

B. Schober 1, U. Schichler 1

(1 Graz University of Technology, Austria)

C2-5 ***"Performance Evaluation of AI-based Algorithms for Condition Assessment of Power Components"***

Haresh Kumar 1, Muhammad Shafiq 2, Kimmo Kauhaniemi 1

(1 University of Vaasa, Finland, 2 Tallinn University of Technology, Estonia)

C2-6 ***"About the Approach and the On-Field Validation of an Innovative Algorithm for the Online Partial Discharge Monitoring"***

Andrea Caprara 1, Giacomo Ciotti 1, Simon Sutton 2, Lorenzo Paschini 1

(1 Techimp – Altanova group, Italy, 2 Doble Engineering Company, United Kingdom)

C2-7 ***"Fundamental Study on Condition Assessment of Insulating Material using Deep Learning based on Waveform Characteristics of Partial Discharge"***

Quang Ho 1, Tomohiro Kawashima 1, Yoshinobu Murakami 1, Naohiro Hozumi 1

(1 Toyohashi University of Technology, Japan)

Nov. 15th (Tue.), 13:00 - 15:00

Poster Session P1

P1-1 ***"Cleaning Method of Equipment Fault Database Based on ISOMAP Equidistant Mapping Clustering"***

ZHOU Jiayu 1, HOU Huijuan 1, SHENG Gehao 1

(1 Shanghai Jiao Tong University, China)

P1-2 ***"Optical Spectra Analysis for Transformer Insulation Exposed to Thermal and Electrical Stresses"***

Eman G. Atiya 1, Ahmed E. Elesawy 1, Diaa-Eldin A. Mansour 1, 2, Mohsen Ghali 3, 4

(1 Tanta University, Egypt, 2 Egypt-Japan University of Science and Technology, Egypt, 3 Egypt-Japan University of Science and Technology, Egypt, 4 Kafrelsheikh University, Egypt)

P1-3 ***"Application of Infrared Spectroscopy for Discrimination Between Electrical and Thermal Faults in Transformer Oil"***

Mohamed M. F. Darwish 1, 2, Mohamed H. A. Hassan 1, Nagat M. K. Abdel-Gawad 1, Diaa-Eldin A. Mansour 3, 4

(1 Benha University, Egypt, 2 Aalto University, Finland, 3 Tanta University, Egypt, 4 Egypt-Japan University of Science and Technology, Egypt)

P1-4 ***"Data Quality Assessment for Electrical Equipment Condition Monitoring"***

Rong Ji 1, Huijuan Hou 1, Gehao Sheng 1, Xiuchen Jiang 1

(1 Shanghai Jiao Tong University, China)

P1-5 ***"Comparison Between Semiconducting Glaze and Glass Insulators With Various Levels of Contaminants and Fog"***

Adjie Bagaskara 1, Muhammad R. Fabio 1, Suwarno 1

(1 Institute Teknologi Bandung, Indonesia)

P1-6 ***"Correlation between Polarization-depolarization Current and Interface Barrier in Oil-paper Insulation"***

Yun-tong Ma 1, Kai Wu 1, Ze-peng Lv 1, Jin-yang Peng 1, Chen Zhang 1, Bing-jie Wang 1

(1 Xi'an Jiaotong University, China)

P1-7 ***"Electrical Strength Tests of a Self-healable Copolymer Based on Ethylene and Anisylpropylene"***

Valentino Nikolić 1, Petr Kadlec 1, Radek Polanský 1, Masayoshi Nishiura 2, 3, Zhaomin Hou 2, 3

(1 University of West Bohemia, Czech Republic, 2 RIKEN Center for Sustainable Resource Science, Japan, 3 RIKEN Cluster for Pioneering Research, Japan)

P1-8 ***"A Novel Framework for Power Transformer Fault Diagnosis Based on KPCA-SMOTE"***

Yanan Liu 1, Huaqiang Li 1, Chen Zhang 1, Lisheng Zhong 1

(1 Xi'an Jiaotong University, China)

P1-9 ***"Typical Mechanical Defect Vibration Characteristics under Operating Condition for 550 kV GIS Equipment"***

Jian Hao 1, Yao Zhong 1, Xu Li 1, Yilin Ding 1, Hui Xu 2, Zongqing Jia 3

(1 Chongqing University, China, 2 Wuhan NARI Co Ltd., State Grid Electric Power Research Institute, China, 3 Shandong Taikai High-Volt Switchgear Co., Ltd., China)

P1-10 ***"Neural Network for Estimating the Technical Age of Power Transformers"***

Henning Schnittker 1, Peter Werle 1, Tobias Münster 2, Matthias Lottner 2

(1 Leibniz University Hannover, Germany, 2 Tennet TSO GmbH, Germany)

P1-11 ***"Utilization of UCD Matrix through Hierarchy Priority Analysis of VLF Tanδ"***

Keonhee Park 1, Jeaseong Im 1, Woosung Jung 2, Jangseob Lim 1

(1 Mokpo National Maritime University, Korea, 2 Gana Construction, Korea)

P1-12 ***"Estimation of Replacement Priority by the Degradation Factor of Health Index of OF Cable"***

Jangseob Lim 1, Keonhee Park 1, Jeaseong Im 1, Suhwan Kim 2, Jiwon Kang 2

(1 Mokpo National Maritime University, Korea, 2 Power Transmission Laboratory in KEPCO, Korea)

P1-13 ***"Statistical Estimation Oil-filled Cable Using Health and Risk Index by the Monte Carlo Simulation"***

Keonhee Park 1, Sehee Park 1, Jeaseong Im 1, Jangseob Lim 1

(1 Mokpo National Maritime University, Korea)

P1-14 ***"A Study on the Monitoring Parameters for Power Asset Management of Switchgear"***

Seunghee O 1, Afif Bimaridi 1, Jinhyung Park 1, Woochur Shin 1, Uhyeon Jo 1, Ragil Handito 1, Seongkeon Park 2, Seyong Choi 2, Hyoungku Kang 1

(1 Korea National University of Transportation, Korea, 2 Kangwon National University, Korea)

P1-15 ***"Lifetime Estimation of Transmission Line Based on Health Index and Normal Distribution Technique"***

Cattareeya Suwanasri 1, Ittiphong Yongyee 1, Thanapong Suwanasri 2

(1, 2 King Mongkut's University of Technology North Bangkok, Thailand)

P1-16 ***"Condition Monitoring on Railway Construction Site using Timelapse Videos"***

Claire NICODEME 1

(1 Innovation and Research, SNCF, France)

P1-17 ***"Operation Characteristics of ±35 kV MVDC Pilot System Based on PSCAD/EMTDC"***

Hu-Dong Lee 1, Seong-Hyun Kang 1, Dong-Hun Oh 1, Seong-Doo Lee 1, Soo-Man Park 1, Byeong-Seok Park 1

(1 KEPCO Research Institute, Korea)

P1-18 ***"A Study for Actual Operation of Voltage Estimation in Distribution Systems Using Smart Meters"***

Ikki Shinozaki 1, Masahiko Hasegawa 1, Toshifumi Karasawa 1

(1 Tokyo Electric Power Company Holdings, Inc., Japan)

P1-19 ***"Determining the Appropriate Values, Including the Upper and Lower Voltage Limits for Centralized Voltage Control, Taking into Account the Low Voltage Distribution System"***

Haruna INOUE 1, Masahiko HASEGAWA 1, Toshifumi KARASAWA 1, Takaki YASUI 2

(1 TEPCO Holdings, Inc., Japan, 2 TEPCO Power Grid, Inc., Japan)

P1-20 ***"A study on the performance of Porcelain Insulators through visual inspection"***

Jabin Koo 1, JungWook Woo 1, InHyuk Choi 1, KyungOh Kim 2, SeungKyun Lee 2, SuYoung Cho 2

(1 KEPCO RESERCH INSTITUE, Korea, 2 KEPCO, Korea)

P1-21 ***"Development of Partial Discharge Diagnostic Method for Switchgears with Noise Reduction and Classification Technology"***

Hiroaki Cho 1, Yuuki Fujii 1, Yusuke Nakamura 1

(1 Toshiba Infrastructure Systems & Solutions Corporation, Japan)

P1-22 ***"State Estimation of Lithium-Ion battery using Radius of Curvature based on Electrochemical Impedance Spectroscopy"***

Young Soo Kim 1, Hyeong Min Lee 1, Seon Hyeog Kim 2, Yong-June Shin 1

(1 Yonsei University, Korea, 2 Electronics and Telecommunications Research Institute (ETRI), Korea)

P1-23 ***"Life Cycle Cost Comparison of Three Online Dissolved Gas Analysers"***

Simon Sutton 1, John Skog 2

(1 Altanova, United Kingdom, 2 Maintenance and Test Engineering LLC, United States of America)

P1-24 ***"Practical Condition Monitoring: Experiences with Large Power Transformers"***

T. McGrail 1, P. Boreham 1, S. Sutton 1, M. Rowbottom 2, J. Beardsall 2, P. Prout 3, S. Rhoads 3

(1 Doble Engineering Company, USA, 2 Drax Power, UK, 3 National Grid, USA)

P1-25 ***"Changes in Electric Power Demands of Mongolian and Japanese Local Areas in 2020 and Discussion on Seasonal Electricity Usage Based on the Temperature Dependence"***

Tsolmon Myagmarjav 1, Tuvshinbayar Bandi 1, Bat-Erdene Bayar 2, Shinya Ohtsuka 1

(1 Kyushu Institute of Technology, Japan, 2 Mongolian University of Science and Technology, Mongolia)

P1-26 ***"Development of deterioration assessment method for oil-filled transformer sealant by impact test"***

Y. Konishi 1, G. Sato 1, T. Gotoh 1, T. Yanagi 2

(1 Yuka Industries Co., Ltd., Japan, 2 Tohoku Electric Power Network Co., Inc., Japan)

P1-27 ***"Superposition of Time-dependent Data for Accelerated Aging of Nuclear Power Plant Cables and Its Validity"***

Y. Ohki 1, N. Hirai 1, S. Okada 2

(1 Waseda University, Japan, 2 Chiyoda Technol Corporation, Japan)

P1-28 ***"Measurement Conditions of Conduction Current for Diagnosis of HVDC Power Cables"***

Seung-Won Lee 1, Ik-Su Kwon 1, Byung-Bae Park 1, Jin-Wook Choe 1, Jeon-Wook Cho 1, Hae-Jong Kim 1

(1 Korea Electrotechnology Research Institute, Korea)

P1-29 ***"Development of Transformer Bushing Diagnosis System based on High Frequency PD Measurement"***

Jong Geon Lee 1, Jae-Hong Koo 1, Ki-Sun Han 1, Won Choi 2

(1 KEPCO Research Institute, Korea, 2 SMND, Korea)

P1-30 ***"Development of A Portable Instrument for Detecting Partial Discharge by Ultrasonic Beamforming Technique"***

Masahiro ODA 1, Mizuki GOTO 1, Yui TAMURA 1, Norio NAKATA 1

(1 JFE Advantech Co., Ltd., Japan)

P1-31 ***"Degradation Monitoring of Silicone Rubber Used for Insulators"***

May Thin Khaing 1, Kosei Yoshimura 1, Tatsuya Sakoda 1, Junki Oasa 2, Shoichi Higashiyama 2, Yuko Inaoka 2

(1 University of Miyazaki, Japan, 2 Kansai Transmission and Distribution, Inc., Japan)

P1-32 ***"Aging Diagnosis of Water Tree using VLF Tanδ Database based on 10 years Record in Korea"***

Jeaseong Im 1, Sanga Ryu 1, Keonhee Park 1, Jangseob Lim 1

(1 Mokpo National Maritime University, Korea)

P1-33 ***"Dielectric Spectroscopy under Extremely High Voltages"***

Keigo Yata 1, Masaki Utagawa 1, Tomohiro Kawashima 1, Yoshinobu Murakami 1, Naohiro Hozumi 1

(1 Toyohashi University of Technology, Japan)

P1-34 ***"Insulation Diagnosis of Distribution Class Metal Oxide Surge Arrester Using Polarization and Depolarization Techniques"***

S. Turatham 1, P. Pannil 2, S. Maneeroj 3, W. Methavithit 4, M. Zinck 5, N. Pattanadech 1

(1, 2 King Mongkut's Institute of Technology Ladkrabang, Thailand, 3 Tesla Power Co., Ltd, Thailand, 4 Rajamangala University of Technology Krungthep, Thailand, 5 Paralec Energy Co., Ltd, Thailand)

P1-35 ***"Proposal of a Diagnostic Method on Insulating Materials for Cables using a Partial Heating Technique in Current-Integral Charge Method"***

Kosuke Sato 1, Hiroaki Miyake 1, Yasuhiro Tanaka 1

(1 Tokyo City University, Japan)

P1-36 ***"Vacuum Pressure Impregnated High Voltage Motor Embedded with Capacitive Slot Couplers"***

Ki Duk Lee 1, Yong Joo Kim 1, Su In Jeon 1, Hyun Bin Jo 2, Hong Je Ryoo 2

(1 O&M Korea, Korea, 2 Chung-Ang University, Korea)

Nov. 15th (Tue.), 15:30 - 17:30

Poster Session P2

P2-1 ***"Finite Element Simulation on Irreversible Demagnetization of Permanent Magnet Synchronous Generator"***

Yonggang Jia 1, Yan Du 1, Yang Wang 1, Bo Zhang 1, Wen Cao 1, Yuanyang Ren 2, Chong Li 3

(1 Xi'an Polytechnic University, China, 2 Xi'an Jiaotong University, China, 3 Xi'an Thermal Power Research Institute Co., LTD, China)

P2-2 ***"Differences Between Partial Discharge Tests on Air-Cooled and Hydrogen-Cooled Rotating Machines"***

H. G. Sedding 1, M. Sasic 1, V. Warren 1, G.C. Stone 2

(1 Qualitrol - Iris Power, Canada, 2 Stone Dielectrics, Canada)

P2-3 ***"A Defect Monitoring Method for Power Cables Based on EWT in Frequency Domain"***

Fan Yazhou 1, Yu Xin 1, Yu Shihu 1, Peng Xiangyang 1, Wu Ji 1

(1 Guangdong Power Grid Corp Electric Power Research Institute, China)

P2-4 ***"Comparative Study of Epoxy Resin Insulating Material Fillers For FGM Spacers - GIS"***

Satia Zaputra 1, Muhammad R Fabio 1, Syarif Hidayat 1, Suwarno 1

(1 Bandung Institute of Technology, Indonesia)

P2-5 ***"Study on Discharge Mode and Characteristics of Insulation Defects in GIS Equipment"***

Haonan Shi 1, Yi Tian 1, Yanru Wang 1, Guixin Zhu 1, Shuai Wang 1, Zhiwei Li 1, Xinbo Huang 1

(1 Xi'an Polytechnic University, China)

P2-6 ***"Preparation and Corona Aging Studies on Nano alumina/Micro ATH Co-Filled HTV Silicone Rubber Composites"***

Ashitha P. N. 1, Akhil S. 1, Meena K. P. 1

(1 Insulation Laboratory, Central Power Research Institute, India)

P2-7 ***"Review of Lifetime Models for Electrical Insulation Applications With an emphasis on the inverse power model"***

Chang-Yeong Cheon 1, Kwang-Jae Park 1, Myungchin Kim1

(1 Chungbuk National University, Korea)

P2-8 ***"Application of a Novel Type of UHF Antenna for Partial Discharge Detection in Power Transformers Oil Insulation"***

Jean Pierre Uwiringiyimana 1, Umar Khayam 1, Suwarno 1

(1 Bandung Institute of Technology, Indonesia)

P2-9 ***"Influence of Low Temperature Plasma Treatment on Surface Insulation Performance of Polyimide Film"***

He Minheng 1, Wu Jiang 1, Li Shuaiqiang 1, Wang Tingyu 1, Zhang Bo 1
(1 Xi'an Polytechnic University, China)

P2-10 ***"The Effect of Various Flame Retardants on Thermal Properties of Cable Insulation"***

Prosr P. 1, Polanský R. 1, Chudobe V. 2, Leńczyk L. 3
(1, 3 University of West Bohemia, Czech Republic, 2 Kablo Vrchlabí s.r.o., Czech Republic)

P2-11 ***"Investigating the Frequency Spectrum of Incoming Waveform in the Transformer Terminal Considering the Voltage Distribution Characteristics"***

Sriyono 1, Umar Khayam 2, Suwarno 2
(1PLN Research Institute, PT PLN (Persero), Indonesia, 2 Institut Teknologi Bandung, Indonesia)

P2-12 ***"Studies on Non-contact Voltage Measurement in a Spacer of GISs"***

Dong-Eon Kim 1, Nam-Hoon Kim 1, Seon-Gyu Kim 1, Gyung-Suk Kil 1, Sung-Wook Kim 2
(1 Korea Maritime and Ocean University, Korea, 2 Silla University, Korea)

P2-13 ***"Deterioration Evaluation of Irradiated Insulation Materials used for Power Electronics"***

Yoshitaka Miyaji 1, Hirotaku Ishikawa 1, Kunihiko Tajiri 1, Hiroki Shiota 1, Kaisei Enoki 2, Kazuki Endo 2, Hiroaki Miyake 2, Yasuhiro Tanaka 2
(1 Mitsubishi Electric Corp., Japan, 2 Tokyo City University, Japan)

P2-14 ***"Characterization of Polyurethane Potting Compounds with Semiconductor Coating for Explosive Atmosphere Applications"***

David Kalaš 1, Petr Kadlec 1, Silvan Pretl 1, Radek Soukup 1, Radek Polanský 1
(1 University of West Bohemia, Czech Republic)

P2-15 ***"Effects of Addition Amount of Non-Ionic Thickening Polymer on Resistivity of Pure Water"***

Kazuki Tsuchiya 1, Norimitsu Takamura 1, Nobutaka Araoka 1, Masahiro Hanai 1
(1 Fukuoka University, Japan)

P2-16 ***"Electrical Conduction Properties of Titanium Added Aluminum Nitride Substrates at High Temperatures and Electric Fields"***

Daigo Okumura 1, Kyouhei Hamasuna 1, Masahiro Kozako 1, Masayuki Hikita 1, Tomohito Nagami 2, Kouichi Yamamoto 2
(1 Kyushu Institute of Technology, Japan, 2 Tokuyama Corp., Japan)

P2-17 ***"Frequency Domain Spectroscopy of Pressboard Impregnated with Natural Ester under Thermal Stress"***

K. Chumpiboon 1, W. Vittayakorn 2, Y. Kittikhuntharadol 1, S. Maneerot 3, N. Pattanadech 1, P. Chancharoensook 1

(1 King Mongkut's Institute of Technology Ladkrabang, Thailand, 2 King Mongkut's Institute of Technology Ladkrabang College of Nanotechnology, Thailand, 3 TESLA Power CO., LTD., Thailand)

P2-18 ***"Detection of Electrical and Optical Discharge Signals Generated from Metal Objects Placed inside the Microwave Oven Cabinet during Microwave Oven Operation"***

Shinya Ohtsuka 1, Tatsuki Fujimoto 1, Iori Hisatsune 1

(1 Kyushu Institute of Technology, Japan)

P2-19 ***"Discharge Developing Time of Surface Flashover on Solid Dielectrics around Impulse Test Voltage of Vacuum Interrupters"***

Ryohei Watarai 1, Hiroki Kojima 1, Taiki Donen 2, Shinichi Yamaguchi 2, Naoki Hayakawa 1

(1 Nagoya University, Japan, 2 Mitsubishi Electric Corporation, Japan)

P2-20 ***"Optical Emission Technique for Understanding the Pollution Performance of Silicone Rubber Nanocomposites under Different Voltage Profiles"***

Manoj Dhivakar J 1, Myneni Sukesh Babu 1, Stefan Kornhuber 2, Ramanujam Sarathi 1

(1 Indian Institute of Technology Madras, India, 2 University of Applied Sciences, Zittau/Görlitz, Germany)

P2-21 ***"A Study on Switching Control Strategy of Circuit Breaker under Capacitive Load"***

Jae-Hong Koo 1, Seung-Ryle Oh 1, Seong-Tae Kim 1, Jong-Geon Lee 1, In-Young Jun 1, Ki-Sun Han 1

(1 KEPCO Research Institute, Korea)

P2-22 ***"Off-line Partial Discharge Measurement and Localization for a 33/6.9 kV In-Service Transformer"***

A. M. Selva 1, N. Azis 2, M. F. M. Yousof 3, N. Sallehuddin 4, A. B. Tadam 4, A. D. Saliang 4

(1 Xair Energy Sdn. Bhd., Malaysia, 2 Universiti Putra Malaysia, Malaysia, 3 Universiti Tun Hussein Onn Malaysia, Malaysia, 4 Malaysia LNG Sdn Bhd, Malaysia)

P2-23 ***"Balanced Magnetic Antenna for Partial Discharge Measurements in Gas-Insulated Substations"***

Christian Mier Escurra 1, Armando Rodrigo Mor 2

(1 Delft University of Technology, Netherlands, 2 Universitat Politècnica de València, Spain)

P2-24 ***"A Study on the Automatic PD Diagnosis Method for Gas Insulated Load Break Switches"***

Ji-Seon Gong1, In-Jin Seo 1, Han-Byul Lee 1

(1 Korea Electric Power Corporation (KEPCO), Korea)

P2-25 ***"Discharge Characteristics of an Insulator Creepage Surface under Various Humidity Conditions"***

Kenichiro Takagi 1, Tetsuya Yamada 1, Daisuke Suzuki 1

(1 SOKEN Inc., Japan)

P2-26 ***"Classification of Insulation Defect Type in Power Apparatus Based on Partial Discharge Signals by CNN"***

Kotaro Matsuyama 1, Yasutomo Otake 1, Takahiro Umemoto 1

(1 Mitsubishi Electric Corporation, Japan)

P2-27 ***"Comparison of DC PDIV and BDV of GIS defects between SF6 gas and C4F7N/CO2 gas mixture"***

Hyeon-Su Song 1, Ho-Seung Kim 1, Bang-Wook Lee 1

(1 Hanyang University, Korea)

P2-28 ***"Detection of Partial Discharge and Investigation for AC 22.9kV Power Cable Termination"***

Hyeonseok Lee 1, Sungyun Kim 1, Bum An 1, Jungji Kwon 1, Heejoon Jung 1, Sangwoo Lee 1

(1 LS Cable and System, Korea)

P2-29 ***"Partial Discharge Characteristics of Void Defects in an Epoxy Insulation"***

Nam-Hoon Kim 1, Dong-Eon Kim 1, Seon-Gyu Kim 1, Gyung-Suk Kil 1, Sung-Wook Kim 2

(1 Korea Maritime and Ocean University, Korea, 2 Silla University, Korea)

P2-30 ***"A Sensitivity Comparison of Low Cost Rogowski Coil Sensors for Partial Discharge Measurement of Molded Power Transformers"***

Sung-Wook Kim 1, Nam-Hoon Kim 2, Gyeong-Yeol Lee 2, Gyung-Suk Kil 2

(1 Silla University, Korea, 2 Korea Maritime and Ocean University, Korea)

P2-31 ***"A Statitical Analysis of Partial Discharge Measured in MI-PPLP Sheet According to Temperature and Voltege"***

Suhwan KIM 1, Chaekyun JUNG 1, Minju KIM 1, Heungseok PARK 1, Kisun HAN 1, Jiwon KANG 1

(1 KEPCO Research Institute, Korea)

P2-32 ***"Calibration Methods of Partial Discharge Measuring for Online Insulation Diagnosis"***

Akira Fujimoto 1, Takashi Harakawa 1, Makoto Takanezawa 1, Hirotaka Tsubakihara 1

(1 Toshiba Energy Systems & Solutions Corporation, Japan)

P2-33 ***"Study of Bubble-generating Mechanism for Overloaded Transformer Winding Model in Esters"***

Katsunori Miyagi 1, Ryoichi Hanaoka 1, Keiichiro Matsushita 2, Kiyoshi Wakimoto 2
(1 Kanazawa Institute of Technology, Japan, 2 Meidensha Corporation, Japan)

P3-34 ***"The Bandwidth Verification of VHF Antenna and Apply for Partial Discharge Measurement"***

Kittisak Thungsook 1, Norasage Pattanadech 1, Phethai Nimsanong 2, Chissanupong Srinangyam 1
(1 EKing Mongkut's Institute of Technology Ladkrabang, Thailand, 2 Metropolitan Electricity Authority, Thailand)

Nov. 17th (Thu.), 13:00 - 15:00

Poster Session P3

P3-1 ***"The Effects of Nano-TiO_2 Coupling Agents on the Diffusion Behavior of Water Molecules in Transformer Oil"***

Jianfei Li 1, Qiankai Zhang 1, Bo Zhang 1, Manqing Zhao 1, Qingdong Zhu 2, Yang Wang 1

(1 Xi'an Polytechnic University, China, 2 State Grid Shandong Electric Power Company Electric Power Research Institute, China)

P3-2 ***"Dielectrically Graded Insulation Using Lattice Material: Concept and Numerical Exemplification"***

Wen-Dong Li 1, Peng Sun 1, Jun-Bo Deng 1, Guan-Jun Zhang 1

(1 Xi'an Jiaotong University, China)

P3-3 ***"Research on MUSIC Focusing Algorithm of Partial Discharge Broadband Pulse Signal"***

Hao Wu 1, Zhongyi Wan 1, Yue Hu 2

(1 Shanghai Jiao Tong University, China, 2 Key Laboratory of Control of Power Transmission and Conversion (SJTU), Ministry of Education, China)

P3-4 ***"On-line Diagnosis of Pollution Flashover Modes of Short Gap Insulators"***

Yuwei Wang 1, Jinying Xie 2

(1 State Grid Hunan Electric Power Company Limited Research Institute, China, 2 State Grid Changsha Electric Power Company, China)

P3-5 ***"Design of a Multi-channel PD Detector for Improve Common-mode Noise Reduction Performance in Measuring and Monitoring System"***

N. Tongchim 1, N. Phansiri 1, S. Jeenmuang 2, N. Pattanadech 2

(1 Ubon Ratchathani University, Thailand, 2 King Mongkut's Institute of Technology Ladkrabang, Thailand)

P3-6 ***"Towards Partial Discharge Automatic and Unsupervised Monitoring: A Technological Breakthrough for MV Electrical Asset Condition Monitoring and Diagnostics"***

G.C. Montanari 1, S. Schwartz1, 2, Q. Yang 1, D. Nath 1, R. Ghosh 1, R. Cuzner 2

(1 CAPS- Florida State University, USA, 2 University of Wisconsin-Milwaukee, USA)

P3-7 ***"Failure Investigation of Metal/PET Hybrid Buffer Layer in 500 kV Extra-high Voltage XLPE Cable"***

Yidong Chen 1, Kai Zhou 1

(1 Sichuan University, China)

P3-8 ***"Simulation Study of Capacitor Voltage Transformer based on Overvoltage Measurement Technology"***

Feng Zhang 1, Wei Shen 2, Wen Cao 1,Yasen Wu 1, Dezhi Xu 1, Shenjian Huang 1, Yang Wang 1
(1 Xi'an Polytechnic University, China, 2 Electric Power Research Institute of State Grid Shaanxi Electric Power Company Limited, China)

P3-9 ***"Accelerated Life Estimation of XLPE Model Cable for Power Transmission by the Time-Dependant Cumulative Stress Level"***

Ju Hong Eom 1, Hyeon-Sang Ko 1, Tae-ho Choi 1, Ji-won Kang 1
(1 KEPCO, Korea)

P3-10 ***"Propagation characteristics of partial discharge and noise for distribution-grade gas insulated switches"***

Geonhyuk Park 1, Sungho Yoon 1, Beom An 1, Sanggoon Lee 1, Jeongtae Kim 1, Injin Seo 2, Moonho Kang 2
(1 Daejin university, Korea,2 KEPCO Research Institute, Korea)

P3-11 ***"A study on the control of PDIV and magnitude for partial discharge models"***

Chanyeong Lee 1, Sungho Yoon 1, Geonhyuk Park 1, Jeongtae Kim 1
(1 Daejin University, Korea)

P3-12 ***"Monitoring and Diagnosis of Electrical Equipment Insulation with the Support of Combined Conventional and Alternative Partial Discharge Methods"***

Bogdan Gorgan 1, Wojciech Koltunowicz 1, Johannes Ohde 1, Patrick Zander 1
(1 OMICRON Energy Solutions GmbH, Germany)

P3-13 ***"Reconstruction of Partial Discharge Waveform in Mock Simulated of Insulation Joint by Deconvolution Processing"***

Kanta Yoshikawa 1, Kanata Takeda 1, Tomohiro Kawashima 1, Yoshinobu Murakami 1, Naohiro Hozumi 1
(1 Toyohashi University of technology, Japan)

P3-14 ***"Partial Discharge Characteristics of Aluminum Foil/Oil-impregnated Paper Insulation System for Insulation Diagnosis of Capacitor Voltage Transformers"***

Kyohei Hayashi 1, Shuta Wakita 1, Yuya Nagaki 1,2, Hiroki Kojima 1, Masanobu Yoshida 3, Naoki Hayakawa 1
(1 Nagoya University, Japan, 2 Chubu Electric Power Grid Co., Inc., Japan, 3 Chubu Electric Power Co., Inc., Japan)

P3-15 ***"Impulse Pre-stress Effect on AC Partial Discharge Inception Characteristics of Winding Model Sample"***

Yuki Zenda 1, Masahiro Kozako 1, Masayuki Hikita 1, Yuuki Fujii 2, Hiroaki Cho 2, Yusuke Nakamura 2

(1 Kyushu Institute of Technology, Japan, 2 Toshiba Infrastructure Systems & Solutions Corporation, Japan)

P3-16 ***"Partial Discharge Measurements in Substation with Synchronised Power Quality Measurements"***

Shekhar Mahmud 1, Faisal. P. Mohamed 1, Md Saiful Islam 2, Saleh Hassan Elkelani Babaa 1, George Chen 3

(1, 2 Military Technological College, Oman, 3 University of Southampton, UK)

P3-17 ***"Investigation of Microvoid Detection in Insulating Resin Substrates Based on Partial Discharge Characteristics"***

Kyouhei Hamasuna 1, Daigo Okumura 1, Masahiro Kozako 1, Masayuki Hikita 1

(1 Kyushu Institute of Technology, Japan)

P3-18 ***"Identification of Gas Compartment Existing PD Defect in a Series Three Phase-Type GIS Considering Propagation Properties of PD-Emitted Electromagnetic Wave by FDTD Analysis"***

Yuki Taketomi 1, Tatsuki Fujimoto 1, Shinya Ohtsuka 1, Tatsuyuki Shikura 2

(1 Kyusyu Institute of Technology, Japan, 2 Fuji Electric Co., Ltd., Japan)

P3-19 ***"Partial Discharge Current and Electromagnetic Wave Properties in Gas Mixtures of Electronegative Gas and Natural-origin Gases - Study on Applicability of UHF Method"***

Masaharu Shintake 1, Takumi Matsuoka 1, Kiyoshi Inami 2, Hiroyuki Hama 2, Youji Nakadai 3, Shinya Ohtsuka 1

(1 Kyushu Institute of Technology, Japan, 2 Mitsubishi Electric Corporation, Japan, 3 Tokyo Electric Power Company, Japan)

P3-20 ***"Long term on-line PD monitoring using power line communication in a distribution substation"***

Akito Houdai 1, Lunnetta Safura Lumba 1, Toshiyuki Wakisaka 1, Masahiro Kozako 1, Masayuki Hikita 1, Hidefumi Sato 2, Masahiro Soeda 2

(1 Kyushu Institute of Technology, Japan, 2 Kyushu Electric Power Co., Inc., Japan)

P3-21 ***"Investigation on Dominant Frequency of Partial Discharge Current in 6.6 kV Cast Resin Voltage Transformer"***

Ryota Koresawa 1, Masahiro Kozako 1, Masayuki Hikita 1, Yusuke Aoki 2, Kazuo Iida 2, Tokihiro Umemura 2, Tetsuo Nakamae 3, Teruhiko Maeda 3 Tamon Ozaki 3

(1 Kyushu Institute of Technology, Japan, 2 Mie University, Japan, 3 Toshiba Industrial Products and Systems Co, Ltd., Japan)

P3-22 ***"Establishment of Partial Discharge Database for Identification of Winding Problem of Hydropower Generator"***

Takashi Kuraishi 1, Satoru Miyazaki 1

(1 Central Research Institute of Electric Power Industry, Japan)

P3-23 ***"Detection Properties of Partial Discharge-emitted Electromagnetic Waves in Silicone Gels during the Electric Trees Development to Breakdown"***

Shingo Kinoshita 1, Yusuke Oishi 1, Shinya Ohtsuka 1

(1 Kyushu Institute of Technology, Japan)

P3-24 ***"A Study of PRPD Statistics to Improve the Performance of PD Detection and Defect Type Identification"***

Ryota Kai 1, Toru Yamanoue 1, Hiromu Tanaka 1, Hideaki Kawano 1, Masahiro Kozako 1, Masayuki Hikita 1

(1 Kyushu Institute of Technology, Japan)

P3-25 ***"Partial Discharge Degradation Analysis from Light Emission Observation and Partial Discharge Characteristic Measurement by Partial Discharge in Artificial Defects Using Transparent Electrodes"***

Yusuke Aoki 1, Yuki Takeuchi 1, Takato Sakakihara 1, Kazuo Ida 1, Tokihiro Umemura 1, Masahiro Kozako 2, Masayuki Hikita 2, Tetsuo Nakamae 3, Teruhiko Maeda 3, Tamon Ozaki 3

(1 Mie University, Japan, 2 Kyushu Institute of Technology, Japan, 3 Toshiba Industrial Products and Systems Co., Japan)

P3-26 ***"Detection of Breakages of Shielding Copper Tapes and Investigation of Its Causes by Performing Accelerated Degradation Test for Shielding Copper Tapes in Extruded Three-layer 6.6 kV XLPE Cables"***

Takashi Kurihara 1, Kenichi Kimura 2, Takuya Watanabe 2, Tomoyuki Sato 2

(1 Central Research Institute of Electric Power Industry, Japan, 2 Tohoku Electric Power Network Co., Inc., Japan)

P3-27 ***"A Study on the Evaluation Factors of Degradation Characteristics of Polypropylene Insulation Materials for Power Cable"***

Jihyeok Heo 1, Jaecheol Jeong 1, Gunoh Bae 1, Dongseok Hong 1, MinWook Choi 2, Wonhee Lee 2

(1 Taihan cable & solution, Korea, 2 Hwaseung Material, Korea)

P3-28 ***"Investigation on Influences of Electricmagnetic Fields and Causes of Breakdown in MVDC System"***

Donguk Kim 1, Minah Kim 1, Seungyeop Lee 1, Yongwook Lee 1, Youngkwan Kim 1
(1 ILJIN ELECTRIC Co., LTD., Korea)

P3-29 ***"Frequency Domain Spectroscopy Analysis of the Water Tree XLPE Cable"***

Whichakorn Sawatdimongkol 1, Phop Chancharoensook 1, Worachai Sawatdimongkol 2, Alisala Taylim 3, Amata Luangpol 4, Norasage Pattanadech 1
(1, 4 King Mongkut's Institute of Technology Ladkrabang, Thailand, 2 TIS Engineering and Service Co., Ltd, Thailand, 3 Burapha University, Thailand)

P3-30 ***"Evaluation of mechanical and electrical characteristics of 6.6 kV AC XLPE cable according to thermal aging"***

Hoseung Kim 1, Hyeon-su Song 1, Bang-wook Lee 1
(1 Hanyang University, Korea)

P3-31 ***"The Effects of Thermal Stress on Electrical Conduction of Thermoplastic Polymers for Eco-Friendly Power Cables"***

Kim Chul-Ho 1, Ha Na Kim 1, June-Ho Lee 1
(1 Hoseo University)

P3-32 ***"On-line PD monitoring system (PDLOOK) for XLPE Cables"***

Shigeru Akaiwa 1, Koji Miyagawa 1, Takayuki Nakashima 1, Tatsuya Sakoda 2, Takuma Miyake 2, Akira Takayama 3
(1 Kyushu Electric Power Co., Inc, Japan, 2 University of Miyazaki, Japan, 3 Kyuden Business Solutions Co., Inc., Japan)

P3-33 ***"Study on Decomposition Gases by Partial Discharge in Insulation System for Self-contained Fluid Filled Cables"***

Yuta Makino 1, Takashi Kurihara 1, Takahashi Toshihiro 1
(1 Central Research Institute of Electric Power Industry, Japan)

Nov. 17th (Thu.), 16:00 - 18:00

Poster Session P4

P4-1 ***"Measurement of the Internal Charge Distribution of HVDC Full-size Joint"***

Youngil Cho 1, Yoon-hyung Kim 1, Woo-kyung Lee 1, Sun-kak Kim 1, P. H. Morshuis 2, Naohiro Hozumi 3

(1 LS Cable & System, Korea, 2 Solid Dielectric Solutions, Netherlands, 3 Toyohashi University of Technology, Japan)

P4-2 ***"Evaluation of Deep Charging Phenomenon of 3-D Solar Array Driving Assembly under Space Radiation Environment"***

Yibo Zhi 1, Jiang Wu 1, Shuaiqiang Li 1, Tingyu Wang 1, Jiayi Luo 1, Bo Zhang 1, Penghui Shang2, 3

(1 Xi'an Polytechnic University, China, 2 University of Electronic Science and Technology of China, China, 3 Xi'an Jiaotong University, China)

P4-3 ***"Research on Measures of Grounding Resistance Reduction for Substation Based on CDEGS"***

Sigeng Chen 1, Wei Shen 2, Wen Cao 1, Haoming Miao 1, Siqi Du 1, Yicheng Fan 1

(1 Xi'an Polytechnic University, China, 2 Electric Power Research Institute of State Grid Shaanxi Electric Power Company Limited, China)

P4-4 ***"Study on Electrothermal Characteristics of Oil-Immersed Transformers in Incipient Stage of Inter-Turn Faults"***

Lijing Zhang 1, Gehao Sheng 1, Xiuchen Jiang 1

(1 Shanghai Jiao Tong University, China)

P4-5 ***"Effects of harmonics on temperature rise and power loss of a distribution transformer"***

Soumya Thakur 1, Nipun Monica Butlero 1, Joachim Holbøll 1

(1 Technical University of Denmark, Denmark)

P4-6 ***"Study on Electromagnetic-Mechanical Coupling Effect of Transformer Winding under Short Circuit"***

Cheng Ma 1, Fan Zhang 1, Jiangyang Zhan 2, Lingfeng Jin 2, Zhi Yang 2, Suning Liang 2

(1 Xi'an Jiaotong University, China, 2 Electric Power Research Institute of State Grid Zhejiang Electric Power Co. Ltd., China)

P4-7 ***"Device design for the study of radial short-circuit withstand ability of transformer windings for epoxy bonded continuously transferred conductors"***

Xiaoyu Zhu 1, Zhengyu Xu 2, Zhigang Zhao 2, Hongliang Liu 3, Fan Zhang 1, Shengchang Ji 1
(1 Xi'an Jiaotong University, China)

P4-8 ***"Study on Unstable Temperature Rise of Slightly Heating Composite Insulator Based on Infrared Detection"***

Zhentao Li 1, Wei Shen 2, Wen Cao 1, Shenjian Huang 1, Yicheng Fan 1, Hao Yang 1
(1 Xi'an Polytechnic University, China, 2 Electric Power Research Institute of State Grid Shaanxi Electric Power Company Limited, China)

P4-9 ***"Intelligent Wedge Tightness Evaluation System"***

Su-Ji Han 1, Jong-Duk Son 1, Jae-Dong Kim 1, hee-soo Kim 1, Han-Sang Lee 1, Doo-Soo Kim 1
(1 KEPCO Research Institute, Korea)

P4-10 ***"Four-Channel DC Arc Fault Detector for 100 kW Combiner Box"***

Jin Han Lee 1, Jin Lee 1, Yong Joo Kim 1, Jae Bum Ahn 2, Hong Je Ryoo 2
(1 O&M Korea, Korea, 2 Chung-Ang University, Korea)

P4-11 ***"Control Strategy of 4-terminal Multi-DC Link Hardware-in-the-loop (HIL) Simulator for Offshore Wind farms"***

Hyunmin Kim 1, Jongsu Yoon 1, Kisun Han 1
(1 KEPCO Research Institute, Korea)

P4-12 ***"Investigation of saturation moisture in the PD behavior in the biodegradable ester oil"***

Mrutyunjay Maharana 1, 2, 3, Kyouhei Hamasuna 2, Masahiro Kozako 2, Masayuki Hikita 2, Motoo Tsuchie 2 and Kai Wu 1
(1 Xi'an Jiaotong University, China, 2 Kyushu Institute of Technology, Japan, 3 DRIEMS Cuttack, Odisha, India)

P4-13 ***"A Battery-free Wireless Sensor Module for Dynamic Power Line Rating System"***

Towoo Lim 1, Youngmin Kim 1
(1 Hongik University, Korea)

P4-14 ***"Development of a Smart IoT Sensor for Detecting Four Major Types of Partial Discharge"***

Uhyeon Jo 1, Seunghee O 1, Bimaridi Afif 1, Jinhyung Park 1, Woochur Shin 1, Handito Ragil 1, Seongkeon Park 2, Younghwa Kim 3, Dong-Myung Kim 4, Hyoungku Kang 1
(1 Korea National University of Transportation, Korea, 2 Kangwon National University, Korea, 3 ASSEMBBLE Co., Ltd., Korea, 4 DAE YOUNG General Industrial Equipment Co., Ltd., Korea)

P4-15 ***"Distribution Islanding Detection Using Status and Topology of PMU Phase Signals"***

Sang-keun Moon 1, In-yeong Choi 1, Chan-ho Kang 1, Jong-man Joung 1, Byung-sung Lee 1
(1 KEPCO (Korea Electric Power Corporation), Korea)

P4-16 ***"Investigating the Effect of Aging on Space Charge Dynamics in Oil-impregnated Paper Insulation"***

Chinmay Y. Jani 1, Santosh C. Vora 2
(1 Sardar Vallabhbhai Patel Institute of Technology, India, 2 Institute of Technology, Nirma University, India)

P4-17 ***"Effect of Pre-stressed Thermal Ageing and Electric Field during Measurement on Space Charge Distribution of HVDC Insulating Materials"***

Ik-Su Kwon 1, Byung-Bae Park 1, Seong-Won Lee 1, Jin-Wook Choe 1, Jeon-Wook Cho 1, Hae-Jong Kim 1, In-Sung Kim 1
(1 Korea Electrotechnology Research Institute, Korea)

P4-18 ***"Space Charge Behaviors of Thermally Aged Kraft Paper impregnated with Synthetic Ester Liquid"***

Abdelrahman M. Alshehawy 1, 2, Shanika Matharage 1, Zhongdong Wang 1
(1 University of Exeter, UK, 2 Tanta University, Egypt)

P4-19 ***"Investigation of reliability of the calculated surface potential by the non-contact type space charge distribution measuring electrode using the pulsed electroacoustic method"***

Kaisei Enoki 1, Hiroaki Miyake 1, Yasuhiro Tanaka 1
(1 Tokyo City University, Japan)

P4-20 ***"100MVA Non-Uniform Heat Losses Study"***

Ramazan Altay 1, Pedro Jose Quintanilla Cavia 2, Alfredo Ortiz Fernandez 2, Fernando Delgado San Roman 2, Ahmet Kerem Koseoglu 1
(1 BEST Transformer A.S., Turkey, 2 University of Cantabria, Spain)

P4-21 ***"Identification of Sulphide Content in Pressboard Insulation in Transformer Adopting LIBS and Wavelet Technique"***

Stanzin Gyatso 1, BN Shivananju 1, R Sarathi 1
(1 Indian Institute of Technology Madras, India)

P4-22 ***"Three-dimensional Space Charge Microscopy Using a Focused Ultrasound Transducer"***

Kana Yasuda 1, Xiaoxin Li 1, Masaki Utagawa 1, Tomohiro Kawashima 1, Yoshinobu Murakami 1, Naohiro Hozumi 1
(1 Toyohashi University of Tchnology, Japan)

P4-23 ***"Signal Processing for Space Charge Measurement Using Laplace Deconvolution"***

An Yeongguk 1, Xiaoxin Li 1, Tomohiro Kawashima 1, Yoshinobu Murakami 1, Naohiro Hozumi 1
(1 Toyohashi University of Technology, Japan)

P4-24 ***"Investigation into Factors of Surface Charge on Insulating Materials in the Space Charge Distribution Measurement by Applying Voltage through Space Capacitance"***

Kazuki Endo 1, Shunya Tanaka 1, Hiroaki Miyake 1, Yasuhiro Tanaka 1
(1 Tokyo city university, Japan)

P4-25 ***"AC Partial Discharge Measurements of Aged Cast Resin Transformers after Multiple Impulse Voltage Applications"***

Yuanhang Yao 1, Masahiro Kozako 1, Ryota Koresawa 1, Hideaki Kawano 1, Masayuki Hikita 1, Katsutoshi Takei 2, Masaharu Sato 2, Kazuhiro Futakawa 2, Hideaki Sato 2
(1 Kyushu Institute of Technology, Japan, 2 TEPCO Power Grid, Inc., Japan)

P4-26 ***"Thermo-fluid analysis on forced air cooling of increase transmission capacity in underground pipeline section"***

Dong-Kyu Kim 1, Yeon-Wook Kang 1, Ji-Won Kang 1, Hye-Rin Jo 1, Min-Woo Lee 2, Sang-Hyun Lee 3
(1 Korea Electric Power Research Institute, Korea, 2 Hanbat National University, Korea, 3 Pusan National University, Korea)

P4-27 ***"Development of Dynamic Line Rating Sensor for Capacity Estimation of Overhead Transmission Lines"***

Seungwoo Lee 1, Younghong Kim 1, Jung-Wook Woo 1, Jungho Lee 1, Ho-Sung An 1, Sang-Beom Kim 1, Kooyong Shin 1, Yunseog Lim 1
(1 KEPCO Research Institute, Korea)

P4-28 ***"Artificial Intelligence failure diagnosis when inspecting power transmission lines"***

Tomoaki KAWAMURA 1, Kentaro ISHIKAWA 1, Toshiyuki SAITO 1, Tomonori SHIRAISHI 1
(1 TEPCO Power Grid, Inc., Japan)