



22nd International Symposium on High Voltage Engineering

Symposium Program

November 21-25, 2021

Hybrid Online/Offline Symposium



ISH

22nd International Symposium
on High Voltage Engineering

2021

Xi'an, China
Capital for
1,120 years

Faculty of Electrical
Engineering
Xi'an Jiaotong University



November 21-25, 2021

The Western China Science & Technology
Innovation Harbor, Xi'an, China

ISH 2021

22nd International Symposium on High Voltage Engineering

November 21-25, 2021

Hybrid Online/Offline Symposium

Symposium Program

Welcome Message from the Symposium Chair

Dear ISH 2021 participants,

On behalf of the Executive Committee, it is my great honour to welcome you to attend the International Symposium on High Voltage Engineering (ISH 2021). ISH 2021 will be held in Xi'an, China from 21-25 November 2021. ISH 2021 is organized by Xi'an Jiaotong University, State Key Laboratory of Electrical Insulation and Power Equipment, Chinese Society for Electrical Engineering, Chinese National Committee of CIGRE, High Voltage Technical Committee, China Electrotechnical Society, Engineering Dielectrics Technical Committee, and The International Council on Large Electric Systems.

The ISH series was founded by Professor Hans Prinz in 1972. The symposia have been successfully held in Munich, Germany (1972), Zurich, Switzerland (1975), Milan, Italy (1979), Athens, Greece (1983), Braunschweig, Germany (1987), New Orleans, USA (1989), Dresden, Germany (1991), Yokohama, Japan (1993), Graz, Austria (1995), Montreal, Canada (1997), London, United Kingdom (1999), Bangalore, India (2001), Delft, Netherlands (2003), Beijing, China (2005), Ljubljana, Slovenia (2007), Cape Town, South Africa (2009), Hannover, Germany (2011), Seoul, South Korea (2013), Pilsen, Czech (2015), Buenos Aires, Argentina (2017), and Budapest, Hungary (2019).

ISH is one of the most influential international conferences with large scale and high academic level in the field of high voltage and insulation technology. After the vigorous review process, 466 papers of high quality from scientists, researchers, and engineers in the field of high voltage engineering from different countries have been accepted. In addition, in order to provide a better platform for scientists, researchers and engineers to exchange ideas and enlighten new research directions, the academic committee of ISH 2021 already invited top experts in the field of high voltage engineering to give plenary and invited presentations.

I believe ISH 2021 will provide an excellent forum to present results, advances and discussions among engineers, researchers and scientists, and to share ideas, knowledge and expertise on high voltage engineering. At ISH 2021, the tradition will meet the challenges of the twenty-first century such as HVDC transmission, distributed generations, smartening of power networks, and integration of renewable energies, etc.

The success of the symposium depends on your active participation and engagement with scientific and technical discussions. We sincerely welcome you to participate in the Symposium on November 21-25, 2021 via online conference based on the Covid-19 pandemic situation. We can discuss scientific issues in the field of high voltage engineering together, exchange the latest research results, and inspire new academic ideas through brainstorming. I hope you will enjoy the program prepared for you and look forward to greeting you all at the virtual conference!

Shengtao Li
Chair of ISH 2021
Xi'an Jiaotong University, China

Conference Information

Official Language

The official language of ISH 2021 is English, which will be used in all presentations and materials.

Hans Prinz Memorial Lecture

The Hans Prinz Memorial Lecture is named in honor of Professor Hans Prinz, a pioneer in high voltage engineering and the founder of the ISH. ISH 2021 will open with the Lecture as the keynote session of the symposium. The award committee of ISH 2021 selects Professor J. Y. Koo to give the Hans Prinz Memorial Lecture at the opening ceremony. The duration of the Hans Prinz Memorial Lecture is about 1 hour, including 10 minutes for questions.

The Hans Prinz Memorial Lecture will be postponed to the next ISH.

Guidelines for Plenary Presentations

Each plenary speech is allocated 40 minutes, including about 5–10 minutes for questions.

Guidelines for Oral Presentations

Each invited speech is allocated 25 minutes, including about 5 minutes for questions. Each paper in an oral session is allocated 15 minutes, including about 3 minutes for questions. The PPT template of ISH 2021 can be downloaded from the website www.ish2021.org. Please send the PPT or PDF version of PPT file named with the paper ID to our Email: ish2021@xjtu.edu.cn by the 20th of November 2021. This is only to enable the session chairs to show the presentation slides via Zoom, in case there are technical issues preventing any authors to show their PPT slides. Only session chairs and co-chairs will have access to presentation files, and the files will be deleted after the symposium.

Guidelines for Semi-oral Presentations

In order to ensure the quality of the hybrid online/offline conference, the executive committee decided to change all poster sessions to semi-oral sessions. Each paper in a semi-oral session is allocated 5 minutes, including about 1–2 minutes for questions. Please send the PPT or PDF version of PPT file named with the paper ID to our Email: ish2021@xjtu.edu.cn by the 20th of November 2021. This is only to enable the session chairs to show the presentation slides via Zoom, in case there are technical issues preventing any authors to show their PPT slides. Only session chairs and co-chairs will have access to presentation files, and the files will be deleted after the symposium.

Virtual venue

All sessions will be held with Zoom. Please download the Zoom software at the website <https://zoom.us/> and familiarize yourself with the software. Sessions will typically open 20–30 minutes before the start to

allow presenters to test their microphones and/or camera are working. The conference Zoom ID will be posted on the website www.ish2021.org. Please pay attention to the information on the ISH 2021 website before the start of the conference. The Password of Zoom conference is ISH2021.

Registration

All symposium attendees must register for the symposium. Registration is online via: <https://www.ish2021.org/col.jsp?id=104>

Registration includes downloads of the proceedings and access to all Zoom live sessions.

Best Paper Awards

Prizes of \$500USD each will be awarded to the 15 (8 oral and 7 poster) best papers of the Conference. To be eligible for consideration, the papers must be orally or poster presented by the first author who is a full-time graduate student.

Technical Tours

According to the requirements of pandemic prevention, there are no technical tours planned in 2021.

Conference Committees

General Chair: Shengtao Li, Xi'an Jiaotong University, China

Co-Chair: Guanjun Zhang, Xi'an Jiaotong University, China

Co-Chair: Keli Gao, China Electric Power Research Institute, China

Co-Chair: Mingli Fu, Electric Power Research Institute, CSG, China

Co-Chair: Jiansheng Wang, Xi'an High Voltage Apparatus Research Institute Co., Ltd., China

General Secretary: Daomin Min, Xi'an Jiaotong University, China

International Steering Committee

M. Babuder (Slovenia)

M. Muhr (Austria)

E. G. da Costa (Brazil)

G. R. Nagabhushana (India)

R. Diaz (Argentina)

H. Okubo (Japan)

I. Fofana (Canada)

T. Phung (Australia)

E. Gockenbach (Germany)

J. Reynders (South Africa)

Z. C. Guan (China)

F. Rizk (Canada)

R. Haller (Czech Republic)

J. Smit (The Netherlands)

I. Kiss (Hungary, Chair)

M. Szechtman (CIGRE)

J. Y. Koo (South Korea)

S. Tenbohlen (Germany)

J. Li (China)

R. Waters (United Kingdom)

S. T. Li (China)

National Scientific Committee

Shengtao Li (China)

Jiansheng Wang (China)

Guanjun Zhang (China)

Yang Xu (China)

Keli Gao (China)

Shengchang Ji (China)

Mingli Fu (China)

Organizing Committee

Shengtao Li (China, Chair)

Jiaying Li (China)

Guanjun Zhang (China, Co-Chair)

Wenfeng Liu (China)

Keli Gao (China, Co-Chair)

Man Xu (China)

Mingli Fu (China, Co-Chair)

Weiwang Wang (China)

Jiansheng Wang (China, Co-Chair)

Liuqing Yang (China)

Yang Xu (China)

Shihang Wang (China)

Shengchang Ji (China)

Yang Feng (China)

Daomin Min (China)

Kangning Wu (China)

Jianjun Zhao (China)

Zhen Li (China)

Yuhang Chang (China)

Jiaofeng Li (China)

International Reviewing Committee

M. Babuder (Slovenia)

T. Phung (Australia)

E. G. da Costa (Brazil)

J. Reynders (South Africa)

R. Diaz (Argentina)

F. Rizk (Canada)

I. Fofana (Canada)

J. Smit (The Netherlands)

E. Gockenbach (Germany)

M. Szechtman (CIGRE)

Z. C. Guan (China)

S. Tenbohlen (Germany)

R. Haller (Czech Republic)

I. Kiss (Hungary, Chair)

J. Y. Koo (South Korea)

J. Li (China)

S. T. Li (China)

M. Muhr (Austria)

G. R. Nagabushana (India)

H. Okubo (Japan)

R. Waters (United Kingdom)

Guanjun Zhang (China)

Keli Gao (China)

Mingli Fu (China)

Jiansheng Wang (China)

Yang Xu (China)

Shengchang Ji (China)

Publication & Publicity Committee

Liuqing Yang (China)

Kangning Wu (China)

Yuhang Chang (China)

Treasurer

Shihang Wang (China)

Schedule

Time	November 21	November 22	November 23	November 24	November 25		
08:30-11:00	Registration	Registration	Oral Sessions 1-4 Halls 1-4	Oral Sessions 9-12 Halls 1-4	Oral Sessions 17-20 Halls 1-4		
11:00-12:00					Poster Sessions 17-20 Halls 1-4		
12:00-14:00	Lunch (Dining Hall)						
14:00-17:15	Registration	Opening Ceremony Plenary Session	Oral Sessions 5-8 Halls 1-4	Oral Sessions 13-16 Halls 1-4	Plenary Session Closing Ceremony & Promotions		
17:15-18:30		Venue: 5-W201, Hanying Building, Iharbour, Xi'an Jiaotong University	Poster Sessions 1-4 Halls 1-4	Poster Sessions 9-12 Halls 1-4	Venue: 5-W201, Hanying Building, Iharbour, Xi'an Jiaotong University		
18:30-19:30	Dinner	Welcome Reception	Dinner	Dinner	Dinner		
19:30-21:00			Poster Sessions 5-8 Halls 1-4	Poster Sessions 12-16 Halls 1-4			
Hall 1: 3-5001, Building 3, Iharbour, Xi'an Jiaotong University		Hall 2: 3-5003, Building 3, Iharbour, Xi'an Jiaotong University		Hall 3: 3-5005, Building 3, Iharbour, Xi'an Jiaotong University		Hall 4: 3-5011, Building 3, Iharbour, Xi'an Jiaotong University	

Zoom Information

Offline Venue: 5-W201-Iharbour

Time: 12:00–19:00, November 22, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/8037582259?pwd=Q3ZPL2dJVWNqdjBUakhYUHhScUFsZz09>

Zoom ID: 803 758 2259

Password: ISH2021

Offline Venue: 3-5001-Iharbour

Time: 07:30–21:30, November 23, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/6418605670?pwd=aFZBUC96b210M05DY1h6MENSTFB2QT09>

Zoom ID: 641 860 5670

Password: ISH2021

Offline Venue: 3-5001-Iharbour

Time: 07:30–21:30, November 24, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/6418605670?pwd=aFZBUC96b210M05DY1h6MENSTFB2QT09>

Zoom ID: 641 860 5670

Password: ISH2021

Offline Venue: 3-5001-Iharbour

Time: 07:30–21:30, November 25, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/6418605670?pwd=aFZBUC96b210M05DY1h6MENSTFB2QT09>

Zoom ID: 641 860 5670

Password: ISH2021

Offline Venue: 3-5003-Iharbour

Time: 07:30–21:30, November 23, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/7355758176?pwd=V3hoWEgzYVV0TU15NzhMZER6eDdKdz09>

Zoom ID: 735 575 8176

Password: ISH2021

Offline Venue: 3-5003-Iharbour

Time: 07:30–21:30, November 24, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/7355758176?pwd=V3hoWEgzYVV0TU15NzhMZER6eDdKdz09>

Zoom ID: 735 575 8176

Password: ISH2021

Offline Venue: 3-5003-Iharbour

Time: 07:30–21:30, November 25, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/7355758176?pwd=V3hoWEgzYVVoTU15NzhMZER6eDdKdz09>

Zoom ID: 735 575 8176

Password: ISH2021

Offline Venue: 3-5005-Iharbour

Time: 07:30–21:30, November 23, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/6082026644?pwd=bHAwdFJPazZFTG45SU1BSzBRMzNyQT09>

Zoom ID: 608 202 6644

Password: ISH2021

Offline Venue: 3-5005-Iharbour

Time: 07:30–21:30, November 24, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/6082026644?pwd=bHAwdFJPazZFTG45SU1BSzBRMzNyQT09>

Zoom ID: 608 202 6644

Password: ISH2021

Offline Venue: 3-5005-Iharbour

Time: 07:30–21:30, November 25, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/6082026644?pwd=bHAwdFJPazZFTG45SU1BSzBRMzNyQT09>

Zoom ID: 08 202 6644

Password: ISH2021

Offline Venue: 3-5011-Iharbour

Time: 07:30–21:30, November 23, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/5330068298?pwd=QXBPNzc5S0dRdXpva0RCU1lBa3lNZz09>

Zoom ID: 533 006 8298

Password: ISH2021

Offline Venue: 3-5011-Iharbour

Time: 07:30–21:30, November 24, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/5330068298?pwd=QXBPNzc5S0dRdXpva0RCU1lBa3lNZz09>

Zoom ID: 533 006 8298

Password: ISH2021

Offline Venue: 3-5011-Iharbour

Time: 07:30–21:30, November 25, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/5330068298?pwd=QXBPNzc5S0dRdXpva0RCU1lBa3lNZz09>

Zoom ID: 533 006 8298

Password: ISH2021

Zoom ID for International Steering Committee: ISC-ISH2021

Time: 13:00–18:30, November 24, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/9301432061?pwd=ZVVwSUpCNTdtZWVh3ZTZPWUNjVkJVRdz09>

Zoom ID: 930 143 2061

Offline Venue: 5-W201-Iharbour

Time: 12:00–19:00, November 25, 2021, Beijing Time

Zoom meeting link

<https://us02web.zoom.us/j/8037582259?pwd=Q3ZPL2dJVWVWdWVh3ZTZPWUNjVkJVRdz09>

Zoom ID: 803 758 2259

Password: ISH2021

November 22, 2021 (Monday)

Time	Item
08:30-12:00	Registration
12:00-14:00	Lunch (Dining hall)
14:00-14:05	Opening Ceremony Chair: Professor Guanjun Zhang, Xi'an Jiaotong University, China Venue: 5-W201, Hanying Building, Iharbour, Xi'an Jiaotong University
14:05-14:10	Opening Ceremony: Welcome speech 1, Professor Zhaohong Bie, Xi'an Jiaotong University
14:10-14:15	Opening Ceremony: Welcome speech 2, Associate General Secretary Yunxi Wu, Chinese Society for Electrical Engineering, China
14:15-14:20	Opening Ceremony: Welcome speech 3, General Secretary Yi Han, China Electrotechnical Society, China
14:20-14:25	Opening Ceremony: Welcome speech 4, Professor Istvan Kiss, Chair of International Steering Committee of ISH 2021
14:25-14:30	Opening Ceremony: Welcome speech 5, Professor Shengtao Li, General Chair of ISH 2021, Xi'an Jiaotong University
14:30-15:00	Group Photo Online and Offline In this session, please turn on the camera of your computer or mobile phone, and we will take a screenshot to make a group photo of the conference. Coffee Break
15:00-15:40	Plenary Session Chair: Professor Mingli Fu, Electric Power Research Institute, CSG, China Venue: 5-W201, Hanying Building, Iharbour, Xi'an Jiaotong University Plenary Speaker: Professor Akiko Kumada, The University of Tokyo, Japan (1 hour ahead of Beijing Time)
15:40-16:20	Plenary Speaker: Professor Christian Franck, Swiss Federal Institute of Technology Zurich, ETH Zurich, Switzerland (7 hours behind Beijing Time)
16:20-17:00	Plenary Speaker: Professor Peng Li, China Electric Power Research Institute, Beijing, China
18:00-21:00	Welcome Reception

November 23, 2021 (Tuesday)

Time	Item			
08:30-08:55	Oral Session 1 Chairs: Prof. Bo Qi, North China Electric Power University, China Prof. Jun Deng, China Southern Power Grid, China Venue: 3-5001, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 6418605670 Password: ISH2021	Oral Session 2 Chairs: Prof. Mingli Fu, Electric Power Research Institute, CSG, China Prof. Xingyi Huang, Shanghai Jiao Tong University, China Venue: 3-5003, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 7355758176 Password: ISH2021	Oral Session 3 Chairs: Dr. Tsuguhiro Takahashi, Central Research Institute of Electric Power Industry, Japan Prof. Guanjun Zhang, Xi'an Jiaotong University, China Venue: 3-5005, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 6082026644 Password: ISH2021	Oral Session 4 Chairs: Prof. Jianying Li, Xi'an Jiaotong University, China Prof. Xiangrong Chen, Zhejiang University, China Venue: 3-5011, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 5330068298 Password: ISH2021
	Session Invited Speaker 1-1: Prof. Fan Yang, Chongqing University, China	Session Invited Speaker 2: Prof. Naoki Hayakawa, Nagoya University, Japan	Session Invited Speaker 3: Dr. Tsuguhiro Takahashi, Central Research Institute of Electric Power Industry, Japan	Session Invited Speaker 4: Prof. Wenxia Sima/Potao Sun, Chongqing University, China
08:55-09:10	Oral Session 1:	Oral Session 2:	Oral Session 3:	Oral Session 4:
09:10-09:25	High voltage and high	Advanced materials	Monitoring and	Transient voltages
09:25-09:40	current testing	and insulation systems	diagnostics	
09:40-09:55	techniques			
09:55-10:15	Coffee Break			
10:15-10:30	Oral Session 1: High	Oral Session 2:	Oral Session 3:	Oral Session 4:
10:30-10:45	voltage and high current	Advanced materials	Monitoring and	Transient voltages
10:45-11:00	testing techniques	and insulation systems	diagnostics	
11:00-11:15	Session Invited			
11:15-11:30	Speaker 1-2: Prof.			
11:30-11:45	Chengrong Li, North			
11:45-12:00	China Electric Power			
	University, China			
12:00-14:00	Lunch (Dining hall)			
14:00-14:25	Oral Session 5 Chairs: Prof. Michael Hartje, Hochschule Bremen --	Oral Session 6 Chairs: Assoc. Prof. Jiandong Wu, Shanghai Jiao	Oral Session 7 Chairs: Dr. David Gopp, OMICRON electronics	Oral Session 8 Chairs: Dr. Senja Leivo, Vaisala Oyj, Finland;

	University of Applied Sciences, Germany; Prof. Feng Wang, Hunan University, China Venue: 3-5001, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 6418605670 Password: ISH2021	Tong University, China Assoc. Prof. Daomin Min, Xi'an Jiaotong University, China Venue: 3-5003, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 7355758176 Password: ISH2021	GmbH, Austria; Professor Xiaohua Wang, Xi'an Jiaotong University, China Venue: 3-5005, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 6082026644 Password: ISH2021	Assoc. Prof. Chijie Zhuang, Tsinghua University, China Venue: 3-5011, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 5330068298 Password: ISH2021
	Session Invited Speaker 5: Dr. M. Tariq Nazir, University of New South Wales, Australia	Session Invited Speaker 6: Prof. Uwe Schichler /Ms. Sahar Estahbanati, Graz University of Technology, Austria	Session Invited Speaker 7: Dr. David Gopp, OMICRON electronics GmbH, Austria	Session Invited Speaker 8: Dr. Senja Leivo, Vaisala Oyj, Finland
14:25-14:40	Oral Session 5: High voltage and high current testing techniques	Oral Session 6: Advanced materials and insulation systems	Oral Session 7: Monitoring and diagnostics	Oral Session 8: Other related issues
14:40-14:55				
14:55-15:10				
15:10-15:25				
15:25-15:40				
15:40-15:55				
15:55-16:15	Coffee Break			
16:15-16:30	Oral Session 5: High voltage and high current testing techniques	Oral Session 6: Industrial applications of high voltage/High voltage engineering problems in future power grids	Oral Session 7: Monitoring and diagnostics	Oral Session 8: Other related issues
16:30-16:45				
16:45-17:00				
17:00-17:15				
17:15-17:20	Coffee Break			

17:20-18:30	<p>Poster Session 1: High voltage and high current testing techniques</p> <p>Session Chairs: Dr. Lin Cheng, Shannxi Electric Power Research Institute, China Assoc. Prof. Yuan Li, Xi'an Jiaotong University, China</p> <p>Venue: 3-5001, Building 3, Iharbour, Xi'an Jiaotong University</p> <p>Zoom ID: 6418605670 Password: ISH2021</p>	<p>Poster Session 2: Advanced materials and insulation systems / Industrial applications of high voltage / High voltage engineering problems in future power grids</p> <p>Session Chairs: Assoc. Prof. Xuotong Zhao, Chongqing University, China Dr. Lu Cheng, Xi'an Jiaotong University, China</p> <p>Venue: 3-5003, Building 3, Iharbour, Xi'an Jiaotong University</p> <p>Zoom ID: 7355758176 Password: ISH2021</p>	<p>Poster Session 3: Monitoring and diagnostics</p> <p>Session Chairs: Prof. Jiawei Zhang, Xi'an University of Technology, China Assoc. Yushun Zhao, Hefei University of Technology, China</p> <p>Venue: 3-5005, Building 3, Iharbour, Xi'an Jiaotong University</p> <p>Zoom ID: 6082026644 Password: ISH2021</p>	<p>Poster Session 4: Other related issues</p> <p>Session Chairs: Assoc. Prof. Zhengshi Chang, Xi'an Jiaotong University, China Assoc. Prof. Yongsen Han, Harbin University of Science and Technology, China</p> <p>Venue: 3-5011, Building 3, Iharbour, Xi'an Jiaotong University</p> <p>Zoom ID: 5330068298 Password: ISH2021</p>
18:30-19:30	Dinner (Dining Hall)			
19:30-21:00	<p>Poster Session 5: High voltage and high current testing techniques</p> <p>Session Chairs: Assoc. Prof. Meng Huang, North China Electric Power University, China Assoc. Prof. Weiwang Wang, Xi'an Jiaotong University, China</p> <p>Venue: 3-5001, Building 3, Iharbour, Xi'an Jiaotong University</p> <p>Zoom ID: 6418605670 Password: ISH2021</p>	<p>Poster Session 6: Advanced materials and insulation systems</p> <p>Session Chairs: Dr. Zhaoliang Xing, Global Energy Interconnection Research Institute co. Ltd., China Dr. Shihang Wang, Xi'an Jiaotong University, China</p> <p>Venue: 3-5003, Building 3, Iharbour, Xi'an Jiaotong University</p> <p>Zoom ID: 7355758176 Password: ISH2021</p>	<p>Poster Session 7: Monitoring and diagnostics</p> <p>Session Chairs: Assoc. Prof. Haibao Mu, Xi'an Jiaotong University, China Assoc. Prof. Cheng Pan, Wuhan University, China</p> <p>Venue: 3-5005, Building 3, Iharbour, Xi'an Jiaotong University</p> <p>Zoom ID: 6082026644 Password: ISH2021</p>	<p>Poster Session 8: Transient voltages</p> <p>Session Chairs: Assoc. Prof. Hengxin He, Huazhong University of Science and Technology, China Assoc. Prof. Ming Yang, Chongqing University, China</p> <p>Venue: 3-5011, Building 3, Iharbour, Xi'an Jiaotong University</p> <p>Zoom ID: 5330068298 Password: ISH2021</p>

November 24, 2021 (Wednesday)

Time	Item			
08:30-08:55	Oral Session 9 Chairs: Prof. Junhao Li, Xi'an Jiaotong University, China Prof. Guoqiang Gao, Southwest Jiaotong University, China Venue: 3-5001, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 6418605670 Password: ISH2021	Oral Session 10 Chairs: Prof. Ricardo Diaz, National University of Tucuman, Argentina Assoc. Prof. Yu Chen, Xi'an Jiaotong University, China Venue: 3-5003, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 7355758176 Password: ISH2021	Oral Session 11 Chairs: Prof. Jun Hu, Tsinghua University, China Prof. Peng Liu, Xi'an Jiaotong University, China Venue: 3-5005, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 6082026644 Password: ISH2021	Oral Session 12 Chairs: Assoc. Prof. Qi Li, Tsinghua University, China Prof. Yang Xu, Xi'an Jiaotong University, China Venue: 3-5011, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 5330068298 Password: ISH2021
	Session Invited Speaker 9: Prof. Chen Liu, Xi'an High Voltage Apparatus Research Institute Co., Ltd., China	Session Invited Speaker 10: Prof. Ricardo Diaz, National University of Tucuman, Argentina	Session Invited Speaker 11: Prof. Yi Yin, Shanghai Jiao Tong University, China	Session Invited Speaker 12: Prof. Xingyi Huang, Shanghai Jiao Tong University, China
08:55-09:10	Oral Session 9: High voltage and high current testing techniques	Oral Session 10: Electromagnetic fields	Oral Session 11: HVDC technologies and systems	Oral Session 12: Advanced materials and insulation systems
09:10-09:25				
09:25-09:40				
09:40-09:55				
09:55-10:15	Coffee Break			
10:15-10:30	Oral Session 9: High voltage and high current testing techniques	Oral Session 10: Electromagnetic fields	Oral Session 11: HVDC technologies and systems	Oral Session 12: Advanced materials and insulation systems
10:30-10:45				
10:45-11:00				
11:00-12:00				
12:00-14:00	Lunch (Dining hall)			
14:00-14:25	Oral Session 13 Chairs: Professor Yi Wu, Xi'an Jiaotong University, China; Dr. M. Tariq Nazir, University of New South Wales, Australia Venue: 3-5001,	Oral Session 14 Chairs: Prof. Jiangtao Li, Xi'an Jiaotong University, China; Dr. Zoltán Tóth, Budapest University, Hungary Venue: 3-5003,	Oral Session 15 Chairs: Professor Jiansheng Wang; Dr. Caterina Toigo, SuperGrid Institute, France Venue: 3-5005, Building 3, Iharbour,	Oral Session 16 Chairs: Prof. Junwei Zha, University of Science and Technology Beijing; Prof. Qiang Liu, The University of Manchester, UK

	Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 6418605670 Password: ISH2021	Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 7355758176 Password: ISH2021	Xi'an Jiaotong University Zoom ID: 6082026644 Password: ISH2021	Venue: 3-5011, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 5330068298 Password: ISH2021
	Session Invited Speaker 13: Prof. Michael Hartje, Hochschule Bremen -- University of Applied Sciences, Germany	Session Invited Speaker 14: Professor István Kiss, Budapest University of Technology and Economics, Hungary	Session Invited Speaker 15: Dr. Caterina Toigo, SuperGrid Institute, France	Session Invited Speaker 16: Prof. Qiang Liu, The University of Manchester, UK
14:25-14:40	Oral Session 13: High voltage and high current testing techniques	Oral Session 14: Transient voltages	Oral Session 15: HVDC technologies and systems	Oral Session 16: Advanced materials and insulation systems
14:40-14:55				
14:55-15:10				
15:10-15:25				
15:25-15:40				
15:40-15:55				
15:55-16:15	Coffee Break			
16:15-16:30	Oral Session 13: High voltage and high current testing techniques	Oral Session 14: Transient voltages	Oral Session 15: HVDC technologies and systems	Oral Session 16: Advanced materials and insulation systems
16:30-16:45				
16:45-17:00				
17:00-17:15				
17:15-17:20	Coffee Break			
17:20-18:30	Poster Session 9: High voltage and high current testing techniques Session Chairs: Assoc. Prof. Junping Zhao, Xi'an Jiaotong University, China Dr. Yu Deng, China Electric Power Research Institute, China Venue: 3-5001, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 6418605670 Password: ISH2021	Poster Session 10: Transient voltages / Monitoring and diagnostics Session Chairs: Prof. Junbo Deng, Xi'an Jiaotong University, China Assoc. Prof. Pengfei Meng, Sichuan University, China Venue: 3-5003, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 7355758176 Password: ISH2021	Poster Session 11: HVDC technologies and systems / Monitoring and diagnostics Session Chairs: Prof. Jinhui Gao, Xi'an Jiaotong University, China Dr. Kangning Wu, Xi'an Jiaotong University, China Venue: 3-5005, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 6082026644 Password: ISH2021	Poster Session 12: Advanced materials and insulation systems Session Chairs: Prof. Zepeng Lv, Xi'an Jiaotong University, China Prof. Pengfei Cheng, Xi'an Polytechnic University, China Venue: 3-5011, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 5330068298 Password: ISH2021
18:30-19:30	Dinner (Dining Hall)			

19:30-21:00	<p>Poster Session 13: High voltage and high current testing techniques</p> <p>Session Chairs: Assoc. Prof. Ming Ren, Xi'an Jiaotong University, China; Assoc. Prof. Xi Yang, Hefei University of Technology, China</p> <p>Venue: 3-5001, Building 3, Iharbour, Xi'an Jiaotong University</p> <p>Zoom ID: 6418605670 Password: ISH2021</p>	<p>Poster Session 14: Electromagnetic fields</p> <p>Session Chairs: Assoc. Prof. Jun Guo, Xi'an Jiaotong University, China Assoc. Prof. Hailiang Lu, Wuhan University, China</p> <p>Venue: 3-5003, Building 3, Iharbour, Xi'an Jiaotong University</p> <p>Zoom ID: 7355758176 Password: ISH2021</p>	<p>Poster Session 15: Advanced materials and insulation systems</p> <p>Session Chairs: Assoc. Prof. Yu Gao, Tianjin University, China; Assoc. Prof. Guodong Meng, Xi'an Jiaotong University, China</p> <p>Venue: 3-5005, Building 3, Iharbour, Xi'an Jiaotong University</p> <p>Zoom ID: 6082026644 Password: ISH2021</p>	<p>Poster Session 16: Advanced materials and insulation systems</p> <p>Session Chairs: Assoc. Prof. Zhonglei Li, Tianjin University, China Assoc. Prof. Yu Feng, Harbin University of Science and Technology, China</p> <p>Venue: 3-5011, Building 3, Iharbour, Xi'an Jiaotong University</p> <p>Zoom ID: 5330068298 Password: ISH2021</p>
-------------	--	--	--	---

November 25, 2021 (Thursday)

Time	Item			
08:30-08:55	Oral Session 17 Chairs: Dr. Diego Robalino, Megger Group, USA Prof. Yanpeng Hao, South China University of Technology, China Venue: 3-5001, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 6418605670 Password: ISH2021	Oral Session 18 Chairs: Prof. Masahiro Kozako, Kyuhsu Institute of Technology, Japan Prof. Wenfeng Liu, Xi'an Jiaotong University, China Venue: 3-5003, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 7355758176 Password: ISH2021	Oral Session 19 Chairs: Prof. Ji Liu, Harbin University of Science and Technology, China Assoc. Prof. Yang Wang, Xi'an Polytechnic University, China Venue: 3-5005, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 6082026644 Password: ISH2021	Oral Session 20 Chairs: Prof. Fan Yang Chongqing University, China Prof. Akiko Kumada, The University of Tokyo, Japan Venue: 3-5011, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 5330068298 Password: ISH2021
	Session Invited Speaker 17: Dr. Diego Robalino, Megger Group, USA	Session Invited Speaker 18: Prof. Masahiro Kozako, Kyuhsu Institute of Technology, Japan	Session Invited Speaker 19: Professor Ming Dong, Xi'an Jiaotong University, China	Session Invited Speaker 20: Prof. Jun Deng, China Southern Power Grid, China
08:55-09:10	Oral Session 17: High voltage and high current testing techniques	Oral Session 18: High voltage and high current testing techniques	Oral Session 19: Monitoring and diagnostics	Oral Session 20: Electromagnetic fields
09:10-09:25				
09:25-09:40				
09:40-09:55				
09:55-10:15	Coffee Break			
10:15-10:30	Oral Session 17: High voltage and high current testing techniques	Oral Session 18: High voltage and high current testing techniques	Oral Session 19: Monitoring and diagnostics	Oral Session 20: Electromagnetic fields
10:30-10:45				
10:45-11:00				
11:00-11:05	Coffee Break			
11:00-12:00	Poster Session 17: High voltage and high current testing techniques Session Chairs: Assoc. Prof. Hongwei Mei, Tsinghua Shenzhen International Graduate School,	Poster Session 18: High voltage and high current testing techniques Session Chairs: Assoc. Prof. Potao Sun, Chongqing University, China; Assoc. Prof. Song Xiao,	Poster Session 19: Monitoring and diagnostics Session Chairs: Prof. Guoming Ma, North China Electric Power University, China Assoc. Prof. Aijun	Poster Session 20: Electromagnetic fields Session Chairs: Assoc. Prof. Chuang Wang, Xi'an University of Technology, China Assoc. Prof. Tianyu Dong, Xi'an Jiaotong University, China

	China; Assoc. Prof. Jian Hao, Chongqing University, China Venue: 3-5001, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 6418605670 Password: ISH2021	Wuhan University, China Venue: 3-5003, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 7355758176 Password: ISH2021	Yang, Xi'an Jiaotong University, China Venue: 3-5005, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 6082026644 Password: ISH2021	Venue: 3-5011, Building 3, Iharbour, Xi'an Jiaotong University Zoom ID: 5330068298 Password: ISH2021
12:00-14:00	Lunch (Dining hall)			
	Plenary Session Chair: Professor Kai Wu, Xi'an Jiaotong University, China Venue: 5-W201, Hanying Building, Iharbour, Xi'an Jiaotong University Zoom ID: 8037582259 Password: ISH2021			
14:00-14:40	Plenary Speaker: Professor Stefan Tenbohlen, University of Stuttgart, Germany (7 hours behind Beijing Time)			
14:40-15:20	Plenary Speaker: Professor Myriam Koch, Technical University of Munich, Germany (7 hours behind Beijing Time)			
15:20-16:00	Plenary Speaker: Professor Gang Li, Xi'an High Voltage Apparatus Research Institute Co., LTD, China			
16:00-16:40	Plenary Speaker: Professor Ronald Plath, Technical University Berlin, Germany (7 hours behind Beijing Time)			
16:40-17:00	Coffee Break			
	Closing Ceremony & Promotions Chair: Professor Jiansheng Wang, Xi'an High Voltage Apparatus Research Institute Co., LTD, China Venue: 5-W201, Hanying Building, Iharbour, Xi'an Jiaotong University Zoom ID: 803 758 2259 Password: ISH2021			
17:00-17:20	Excellent Paper Awards & Volunteer Certificates			
17:20-17:30	Closing speech, Professor Shengtao Li, Xi'an Jiaotong University, China			
17:30-17:50	Promotion of ISH 2023 by Professor WH Siew, University of Strathclyde, United Kingdom (20 minutes)			
17:50-18:00	Promotion of CMD 2022 by Professor Naoki Hayakawa, Nagoya University, Japan (10 minutes)			
18:30-21:00	Dinner (Dining Hall)			

ISH SC Meeting

Subject: International Steering Committee Meeting

Chair: Professor I. Kiss

Time: 15:00-18:00, November 24, 2021

Zoom ID: 930 143 2061

List of all participants

M. Babuder (Slovenia)

M. Muhr (Austria)

E. G. da Costa (Brazil)

G. R. Nagabhushana (India)

R. Diaz (Argentina)

H. Okubo (Japan)

I. Fofana (Canada)

T. Phung (Australia)

E. Gockenbach (Germany)

J. Reynders (South Africa)

Z. C. Guan (China)

F. Rizk (Canada)

R. Haller (Czech Republic)

J. Smit (The Netherlands)

I. Kiss (Hungary, **Chair**)

M. Szechtman (CIGRE)

J. Y. Koo (South Korea)

S. Tenbohlen (Germany)

J. Li (China)

R. Waters (United Kingdom)

S. T. Li (China), participate online

W. H. Siew (United Kingdom)

Participants who are not on the list should get permission from the chairman of the ISC to enter the meeting.

INVITED SPEAKER



Recent Advance in Optical Measurement Techniques for Elucidation of High Voltage Phenomena

Professor Akiko Kumada
The University of Tokyo, Japan

Synopsis

The remarkable development of optical measuring technology in recent years enables the better understanding of high voltage phenomena. In this talk, the optical sensors for measuring the electric field and voltage are reviewed. Pockels sensors, which utilize the first-order electro-optical effect, are often used to measure electric fields and voltages by inserting the sensor into the space to be measured. While unique sensors have been developed at the laboratory level and are being used to measure high voltages and electric fields, venture companies launched commercial sensors, and they are now being actively used in the field of electrical discharge applications. In the IEC, SC86C has been working on the standardization of optical fiber sensors in recent years, and the standardization of the Pockels electric field sensor is expected to progress following to that of the Faraday current sensor. The ideal electric field measurement method should be sensitive with high temporal and spatial resolution without disturbing the field. Many studies have been conducted to realize such ideal sensor using the 3rd order susceptibility of measured medium itself: sensing techniques based on Kerr effect of the medium and those based on electric field induced second harmonic generation (E-FISHG). The electric field sensing using the Kerr effect of the medium enables non-invasive probing especially in liquid, but it sacrifices time and spatial resolution in applying to gas due to its low sensitivity. On the other hand, although the E-FISHG method requires an intense, short-pulse laser, it has extensively attracted much attention in recent years because of its high sensitivity and the applicability of non-invasive electric field measurement in gas.

Biography

She received the B.Eng., M.Eng., and Dr. degrees in electrical engineering from the University of Tokyo in 1994, 1996, and 1999, respectively. After working as a research associate in the same university from 1999 to 2001, she joined the Tokyo Electric Power Company as a researcher from 2001 to 2003. Since April 2003, she has been with the Department of Electrical Engineering and Information Systems of the University of Tokyo and is now a professor and directs high voltage laboratory. Her research area covers the insulation of power apparatus, the current interruption, the development of advanced optical/electrical sensors for measuring high voltage phenomena and clarification of discharge phenomena, and the computational approach for understanding dielectric properties.

INVITED SPEAKER



Electric Performance of New Non-SF₆ Gases and Gas Mixtures for Gas-insulated Systems

Professor Christian M. Franck

Swiss Federal Institute of Technology Zurich, ETH Zurich, Switzerland

Synopsis

Sulfur hexafluoride (SF₆) is widely used for decades as insulation and switching medium in electrical equipment. However, due to the extremely high global warming potential (GWP), its use and handling is strongly regulated in most countries, and revisions of the legislation in some countries are even aiming at phasing out the use in electric power equipment completely. Several alternative insulation technologies exist, such as air insulation, solid insulation, liquid insulation, or gas insulation with natural-origin and/or new molecules.

In the last years, new gases or gas mixtures, based on fluorinated molecules, were identified for their good electric properties and potential to be used in electrical equipment in real operating conditions. However, it is still difficult to judge the true potential of these new gases and it is even more difficult to compare the different solutions. With the aim of working towards a comparative technical assessment of the new F-gas proposals, a Cigre WG (D1.67) was founded in 2017. The summary of the state-of-the-art in literature revealed that such a comparison is incomplete and not possible based on publicly available information, partly the information is even contradictory. The working group thus decided to actively work on this topic and go beyond the state-of-the-art by collecting information on what needs to be known for designing gaseous insulation systems in practice, by proposing a set of tests and test procedures that can serve as the basis for a more holistic comparison and finally also by performing and evaluating a large number of tests in a round-robin test campaign. In addition, a round-robin test campaign was also conducted with respect to measuring the concentration of the fluorinated compounds in these mixtures.

This plenary talk will give an overview on the current legal and technical status of SF₆ alternatives in electric power equipment, together with details of the preparations, results and analysis of the round-robin campaigns in working group D1.67.

Biography

Christian M. Franck studied physics at the Universities of Bonn (Germany), Edinburgh (Scotland), and Kiel (Germany) where he graduated 1999 with a diploma. Afterwards he worked at the Max-Planck-Institute for Plasma Physics in Greifswald (Germany) in the area of electromagnetic wave propagation in magnetized plasmas, receiving his Ph.D. in experimental physics in 2003. Then he worked at the ABB Research Centre in Baden (Switzerland) in the area of current interruption, limitation and high voltage insulation. In January 2010 he joined ETH Zurich as Professor for high-voltage engineering. He is married and has three children.

His current research and teaching is in the area of “technologies for future electric energy transmission systems” with focus in the areas of High-Voltage Gaseous and Solid Insulation Systems as well as Current Interruption. Christian Franck acted as the convenor for Cigre WG D1.67.

INVITED SPEAKER



The Technologies of On-line Monitoring and Operation of UHV Transformer Kind Equipment

Dr. Peng Li

Chief Engineer, China Electric Power Research Institute, Beijing, China

Synopsis

Due to huge transmission capacity of UHV projects and high voltage level of power equipment, when some faults occur like internal discharge and breakdown of ground insulation, they could be very destructive and produce huge instantaneous energy. Till now, several major industrial accidents have taken place owing to the fault in OLTC or bushing, some of which even escalated into substation fire disasters. These accidents lead to serious economic losses and pose great threats to power grid. The existing on-line monitoring technologies used in UHV transformer equipment face many bottleneck problems, such as insufficient quantity of monitoring states, separate design of each monitoring quantity, insufficient reliability of monitoring system, and data chimney. Aiming at above problems, a systematic solution has been proposed in this paper with the development of the integrated monitoring terminal. The solution uses a variety of measurements to improve the monitoring system reliability and accuracy of fault detection via the standardization of hardware interface, uniform communication protocols, uniform high standard protection and uniform data compacting processing. Considering the integrated design of primary equipment, this solution is capable of doing flexibly scalable calculation and thus dramatically enhances the accuracy of fault detection. Multi-means integrated online monitoring technology is deemed as a future trend, but there are still many problems to be solved. The concepts of standardization, modularization and openness mentioned in this paper is a kind of attempt, which is a supplement to the existing series of standards as well as a strong support for the introduction of more effective new monitoring technologies.

Biography

Dr. Li Peng received his B.S. and Ph.D. degrees in electrical engineering from Xi'an Jiaotong University (XJTU) in 1997 and 2016 respectively. After two years' work in an electric power company, he received his M.S. degree from North China Electric Power University (NCEPU) in 2002. He is currently Chief Engineer of China Electric Power Research Institute (CEPRI), head of National Field Scientific Observation and Research Station for Tibet High Altitude Electromagnetic Environment and Electromagnetic Safety and deputy director of State Key Laboratory of Power Grid Environmental Protection. He is also Member of CIGRE A3 and was awarded as the Excellent Researcher on Electric Power Science and Technology in China. He has gained over 18 years' experience from the academy, utility and consultancy in the fields of power transmission and transformation, and engaged for long in researches on the test and insulation characteristics of power transmission and transformation equipment, as well as the insulation and operation characteristics of power transformers, with major research interests in UHVAC, UHVDC Transmission, main equipment operation and evaluation of substations. He engaged in the localization study of $\pm 800\text{kV}$ converter transformer and led the research on $\pm 1100\text{kV}$ DC transmission key technology, the fault analysis of OLTC in converter transformer, the grain-oriented silicon steel used for UHV Transformer and the UHV AC GIL key technology. He can be contacted at lipeng@epri.sgcc.com.cn.

INVITED SPEAKER



High Voltage Goes Green – New Requirements for a Sustainable Future

Professor Stefan Tenbohlen
University of Stuttgart, Germany

Synopsis

The effects of climate change show us almost every day that measures to reduce CO₂ emissions are of enormous importance. The European Commission has announced a Green Deal, which contains a number of political initiatives with the overarching goal of making Europe climate neutral by 2050. In the future, the energy system will be heavily dependent on renewable energies, in particular wind, photovoltaics and hydropower. The power grid and its high-voltage components will therefore be confronted with considerable new requirements.

In recent years science, research and industry have developed new materials and devices that enable low-emission or emission-free production and operation. Based on the requirements presented, this keynote shows new developments in the field of power transformers, power cable systems and switchgear. The greenhouse gas sulfur hexafluoride SF₆ can be replaced by various environmentally friendly alternatives. The controversial topic of the new construction of high voltage lines is supplemented by new perspectives. Vegetable oil as an insulating liquid can replace fossil mineral oil. The knowledge of the overload capacity of transformers is of great interest to network operators, especially with heavily fluctuating load profiles. Short-term and long-term economic aspects must be considered. The thermal modeling enables a quantitative recording of the overload potential.

Biography

Stefan Tenbohlen received his Diploma and Dr.-Ing. degrees from the Technical University of Aachen, Germany, in 1992 and 1997, respectively. 1997 he joined ALSTOM Schorch Transformatoren GmbH, Mönchengladbach, Germany, where he was responsible for basic research and product development. From 2002 to 2004 he was the head of the electrical and mechanical design department. 2004 he was appointed to a professorship and head of the Institute of Power Transmission and High Voltage Technology of the University of Stuttgart, Germany. In this position his main research fields are high voltage technique, power transmission and electromagnetic compatibility (EMC). Prof. Tenbohlen holds several patents and published more than 500 papers. He is member of the IEEE, CIGRE study committee A2 (power transformers), german committees of A2 (Power Transformers and Reactors), D1 (Materials and Emerging Test Techniques), C4 (Power System Technical Performance), several international working groups. Furthermore, he is convenor of Cigre WG A2.62 “Analysis of Transformer Reliability”.

INVITED SPEAKER



Consideration of Uncertainties in Experiment and Simulation

Professor Myriam Koch

Technical University of Munich, Germany

Synopsis

Experimental investigations in high-voltage technology commonly involve statistical analyses to evaluate device failure processes. The statistical nature of typical failure processes, such as electric discharges, is known as aleatoric uncertainty. Besides epistemic, also known as systematic, uncertainty arises due to different batches of materials, varying process parameters, or the uncertainty of measurement devices themselves, to name just a few.

Today, high-voltage engineers increasingly apply numerical field simulation tools in the research and development of high-voltage equipment. Thus, simulation can be seen as the third pillar of science alongside theory and experiment. On the one hand, simulation allows for a deeper understanding of the physical phenomena. On the other hand, simulation analysis reduces the necessary experimental effort in industry development processes, where the demands on compactness and reliability of the devices rise and thus, the applicable safety margins shrink. Therefore, numerical field simulations must be accurate, fast and reliable. To achieve this, first, the practical application has to be modeled as a mathematical problem. Second, the solution has to be approximated by simulation aiming for an optimal tradeoff between accuracy and computational costs. Recently, in the field of numerical simulation, the focus is set on uncertainty quantification and sensitivity analysis to cover the statistical nature of high-voltage phenomena. The talk will give an introduction into this topic and discuss possible attempts based on practical examples.

Biography

Myriam Koch received a diploma degree in the field of electrical engineering and information technology from the RWTH Aachen University, Germany, and a Ph.D. degree from ETH Zurich, Switzerland, in 2015. From 2015 to 2020 she worked as research engineer at Pfisterer Kontaktsysteme GmbH, Germany. In addition, she was a guest professor at the High Voltage Laboratories of TU Darmstadt, Germany, in 2018/2019. Since 2020 she has been professor for High-Voltage Engineering and Switchgear Technology at the Technical University of Munich, Germany.

INVITED SPEAKER



Frontier Outlook: Technology Development in the Power Transmission and Transformation Equipment Industry in China

Gang Li

Xi'an High Voltage Apparatus Research Institute Co., LTD, China

Synopsis

Power equipment is the foundation of safe and stable energy supply, and power transmission and transformation equipment manufacturing industry is the core of power equipment industry.

At present, China has made a commitment to reach a carbon peak and be carbon neutral, which will bring about a new change in the energy structure. In this speech, the current situation of the technology development of the power transmission and transformation equipment industry, the opportunities and challenges brought by the policies of carbon peak and carbon neutral, and the development direction and suggestions of the power transmission and transformation equipment industry in the future will be discussed.

Biography

Gang Li received his Master degree in Electrical Engineering from Xi'an Jiaotong University (XJTU), Xi'an, China, in 2013. He is now serving as the secretary of technical committee of China High Power Testing Liaison (CHPTL), and the member of UHV AC Transmission Standardization Technical Committee.

Over the past 19 years, he has been focusing on test technology and standard research in the fields of the test of high-voltage apparatus and the development of oscillating circuit and synthetic test. During this period, he undertook many important research projects and technical work. He has won nine of various Ministerial and Provincial-level science and technology awards. He has published more than 10 technical papers and has led the drafting of several national and industry standards in the fields of high-power test technology.

INVITED SPEAKER



After-installation Testing and PD Monitoring of HVAC and HVDC Polymeric Land Cable Systems

Professor Ronald Plath

Technical University Berlin, Germany

Synopsis

The installation of power cable systems inevitably requires the installation of cable accessories (terminations, joints) on site. Although cables and active paths of cable accessories (stress cones for field control) are already routine tested at the factory, on-site installation carries a remaining risk of assembly faults. Even weak defects inside cable accessories may lead to breakdown much later in operation, causing unplanned outages. In order to detect and, if necessary, eliminate critical assembly faults prior to the commissioning of cable systems, the relevant international standards (IEC 60840, IEC 62067 and IEC 62895) prescribe after-installation voltage tests. Accordingly, HVAC cable systems have to withstand an 1h AC voltage test and HVDC cable systems to withstand an 1h DC voltage test. In general, voltage tests can only end with "passed" or "failed". However, weak but critical defects can remain undetected if they do not lead to breakdown during the 1-hour test period. This applies in particular to DC voltage tests, where field-enhancing defects in polymeric insulation cause increased space charge injection that effectively "shields" the defect from detection by greatly reducing the maximum electric field stress (compared to space-charge free Laplace field). For HVAC equipment, it is well known that the limitations of voltage-only testing can be overcome to a good extent by partial discharge (PD) measurements during AC testing. This is reflected in the corresponding recommendations of IEC 60840 and IEC 62067. Both standards recommend to (optional) combine after-installation AC voltage tests with on-site PD measurements. For HVDC polymeric cables, however, the situation is not so straightforward. IEC 62895 (as of May 2017) does not currently recommend on-site PD measurements, only DC voltage tests. After a lengthy discussion among German cable experts, an additional recommendation for after-installation tests was included in the corresponding German standard DIN IEC 62895, VDE 0276-2895 (as of February 2019): AC voltage tests, if possible combined with PD measurements, should (also) be performed on HVDC polymeric cable systems.

This presentation will provide an overview of on-site PD measurements and monitoring on HVAC and HVDC polymeric cable systems and discuss some issues arising from ever-increasing cable length.

Biography

Ronald Plath was born in Berlin, Germany in 1962. He received the M.S. and Ph.D. degrees in electrical engineering from the Technische Universität Berlin in 1987 and 1994, respectively. He is a member of DKE K124 (German mirror committee of IEC TC42), of CIGRE DAK B1 (German mirror committee of CIGRE SC B1) and of CIGRE B1 and D1 working groups. Prof. Plath is currently convenor of the Cigre WG D1.63 "Partial discharge detection under DC stress". He is author of several international reports. Prof. Plath has over 30 years of experience in high voltage testing, especially in on-site testing of high voltage cable systems combined with PD measurements. In 2013, he returned to the Technische Universität Berlin as a full professor of high voltage engineering.

Oral Sessions

Oral Session 1

November 23, 2021 (Tuesday)

Session 1: High voltage and high current testing techniques: test procedures, measurements, evaluation, partial discharges, space charges, dielectric characteristics, emerging test techniques

Chairs: Prof. Bo Qi, North China Electric Power University, China

Prof. Jun Deng, China Southern Power Grid, China

Venue: Hall 1

- 08:30-08:55 Invited Speaker: Professor Fan Yang/Ruijin Liao, Chongqing University, China
Invited Influence of Box-in Structure and Environmental Wind Velocity on Top Oil Temperature of the Converter Transformer (NO.786)
Xianliang Zhang, Cong Liu, Jian Hao, Jie Wu, Ying Li, Ruijin Liao (State Key Laboratory of Power Transmission Equipment & System Security and New Technology, Chongqing University, Chongqing, China)
- 08:55-09:10 Novel Fiber Optic Sensing and Denoising Technology in Transformer Partial Discharge Monitoring (NO. 671)
Xipeng Li^{1,2}, Hua Lu², Fengfeng Zhou³, Vahid Behjat², Peter Kung^{1} (¹QPS Photonics Inc, 217 St.Louis Ave, Pointe Claire, Quebec, H9R5L7, Canada, ²Department of Mechanical and Industrial Engineering, Ryerson University, 350 Victoria Street, Toronto, ON M5B 2K3, Canada, ³School of Mechanical Engineering, Purdue University, 585 Purdue Mall, West Lafayette 47907-2088, USA, ⁴Department of Mechanical and Industrial Engineering, Ryerson University, 350 Victoria Street, Toronto, ON M5B 2K3, Canada & QPS Photonics Inc, 217 St.Louis Ave, Pointe Claire, Quebec, H9R5L7, Canada)*
- 09:10-09:25 Influence of SF₆ Gas Mixture Ratio in SF₆/Dry Air Mixtures on Detection Properties of PD-Emitted Electromagnetic Wave with UHF and VHF Band Antennas (NO. 881)
T. Matsuoka¹, S. Ohtsuka¹, K. Inami², H. Hama² and Y. Nakadai³ (¹Kyushu Institute of Technology, 1-1, Sensui-cho, Tobata-ku, 804-8550, Kitakyushu, Japan, ²Mitsubishi Electric Corporation, 8-1-1, Tsukaguchi-Honmachi, Amagasaki, Hyogo, 661-8661, Japan, ³Tokyo Electric Power Company, 4-1, Egasaki-cho, Tsurumi-ku, Yokohama, Kanagawa, 230- 8510, Japan)
- 09:25-09:40 High Voltage Dielectric Response Characteristics of Oil-Paper Insulation with Different Moisture Content (NO. 1345)
Zheng Jian¹, Jian Hao^{1}, Xiaodong Shen¹, Qiang Liu², Yu Shang², Yong Liang² (¹State Key Laboratory of Power Transmission Equipment & System Security and New Technology Chongqing University, Chongqing, China, ²State Grid Shaanxi Electric Power CO. Shaanxi Electric Power Research Institute, Xi'an, China)*
- 09:40-09:55 PD Characteristics and Defect Type Identification of Typical Defects in Oil-pressboard Insulation (NO. 190)
Minghe Chi^{1,2,3}, Ruochun Xia¹, Qinglin Luo², Chaohai Zhang³, Jinming Cao¹, Yi Guan¹, Qingguo Chen¹ (¹MOE Key Laboratory of Engineering Dielectrics and Its Application, Harbin University of Science and Technology, Heilongjiang Province, Harbin 150080, China, ²TBEA, Xinjiang*

Province, Changji 750306, China, ³Harbin Institute of Technology, Heilongjiang Province, Harbin 150006, China)

09:55-10:15

Coffee Break

10:15-10:30

Impact of Base Oil Composition and Additives on Gassing Characteristics of Oil-Paper Insulation (NO. 808)

Huijuan Wang^{1,2}, Hua Chen², Shengtao Li^{1*}, Huimin Yu², Shujie Ma², Yu Zhang², Hai Zhang¹ (¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China, ²PetroChina Lanzhou Lubricant R&D Institute, Lanzhou, China, ³PetroChina Karamay Lubricant Plant, Karamay, China)

10:30-10:45

The Influence of Low Temperature on Surface Discharge Characters of Oil-Pressboard Insulation (NO. 1486)

Bo Gao, Rui Yu, Peng Zhou, Xin Zhuang, Cheng Liu, Guangcai Hu (School of Electrical Engineering, Southwest Jiaotong University, Chengdu 611756, China)

10:45-11:00

The Effect of Annular Sector Pollution on the DC Icing Flashover Performance of LXY₄-160 Insulators Based on Natural Ice Test Station (NO. 126)

Caijin Fan^{1,2*}, Xingliang Jiang² (¹State Key Laboratory of HVDC, Electric Power Research Institute, CSG, Guangzhou, 510080, China, ²State Key Laboratory of Power Transmission Equipment & System Security and New Technology, Chongqing University, Shapingba District, Chongqing 400044, China)

11:00-11:15

Experimental Practice Implemented to Improve Meaningfulness of Prequalification Tests for Extruded HVDC 525 kV Land and Submarine Cables (NO. 399)

Shuai Hou^{1*}, Yuantao Zhao², Yifan Zhang¹, Zewei Zhou², Guojun Yu², Mingli Fu¹, Baojun Hui¹, Wenbo Zhu¹ (¹China Southern Power Grid Electric Power Research Institute, Guangzhou, China, ²Ningbo Orient Wires & Cable Co., LTD, Ningbo, China)

11:15-11:30

Design of Corona Aging Test Device for Silicone Rubber Based on Finite Element Electric Field Simulation (NO. 448)

Kai Ning^{1*}, Pengkang Xie², Zhuang Tang³, Zhaoqi Yin¹ (¹School of Electrical & Information Engineering, Changsha University of Science & Technology, Changsha, 410114, China, ²State Key Laboratory of Disaster Prevention & Reduction for Power Grid Transmission and Distribution Equipment, State Grid Hunan Electric Company Disaster Prevention and Reduction Center, Changsha, 410129, China, ³College of Electrical and Information Engineering, Hunan University, Changsha, 410082, China)

11:30-12:00

Invited

Invited Speaker: Professor Chengrong Li, North China Electric Power University, China

Calculating Algorithm for the Interface Charge Density of Oil-pressboard Insulation Considering the Scale-effect under DC voltage (NO. 1471)

Chunjia Gao, Congcong Chen, Haozhi Shi, Qing Yuan, Bo Qi, Chengrong Li, Meng Huang (State Key Laboratory of Alternate Electrical Power System with Renewable Energy Sources, North China Electric Power University, Beijing, 102206, P.R. China)

Oral Session 2

November 23, 2021 (Tuesday)

Session 2: Advanced materials and insulation systems: outdoor, indoor, solid, liquid and gas insulated, nanodielectrics, eco-friendly and other new materials, novel insulation system

Chairs: Prof. Mingli Fu, China Electric Power Research Institute, China Southern Power Grid, China

Prof. Xingyi Huang, Shanghai Jiao Tong University, China

Venue: Hall 2

- 8:30-8:55 Invited Speaker: Professor Naoki Hayakawa, Nagoya University, Japan
Invited Flashover Voltage Estimation of Cone-type GIS Spacer with Permittivity Graded Materials (ϵ -FGM) by Volume-Time Theory in Consideration with Conductor Surface Roughness in SF₆ Gas (NO. 705)
Naoki Hayakawa, Yusaku Miyazaki, Hiroki Kojima, Katsumi Kato, Hitoshi Okubo, Kazuo Adachi, Kenji Okamoto, Naoki Hayakawa (Nagoya University, Japan)
- 8:55-9:10 Comparative Study on the Performance of Itaconic Acid-based Epoxy Resin and Bisphenol A Epoxy Resin (NO. 566)
Zhanpeng guo, Hechen Liu, Le Li, Xuan Wu, Yu Sun, (North China Electric Power University, Baoding, China)
- 9:10-9:25 CO₂ Adsorption Effect on Breakdown Strength of Cellulose Paper (NO. 1485)
Jiachen Yu, Huize Cui, Liuqing Yang, Shengtao Li, Feng Zhao (Xi'an Jiaotong University, China)
- 9:25-9:40 Dielectric Strength and Conductivity Improvements of Voltage-Stabilizer Modified EPDM materials Used for Cable Accessory Insulation (NO. 1442)
Hong Zhao, Zhongyuan Li, Weifeng Sun, Chunyang Li, Junqi Chen (Harbin University of Science and Technology, China)
- 9:40-9:55 Improvement of Interface Adhesion Property of Contaminated RTV Silicone Rubber by Plasma Jet (NO.502)
Jianjun Li, Shuang Li, Ruobing Zhang (Tsinghua Shenzhen International Graduate School, China)
- 9:55-10:15 **Coffee Break**
- 10:15-10:30 RESEARCH ON MECHANICAL PROPERTIES OF CABLE TERMINALS FOR HIGH SPEED TRAINS AT EXTREME TEMPERATURE (NO. 1334)
Chao Wu, Xunzhi Ye, Xia Wang (Xi'an Jiaotong University, China)
- 10:30-10:45 IMPROVEMENT OF ENERGY STORAGE DENSITY OF P(VDF-TrFE-CFE) COMPOSITES BY FILLING WITH TWO DIMENSIONAL BNNS NANOSHEETS (NO. 1293)
Yanan Shang, Yu Feng, Changhai Zhang, Tiandong Zhang, Qingguo Chi (Harbin University of Science and Technology, China)
- 10:45-11:00 A New Method to Detect Corona Discharge in Power Equipment (NO.1226)
Yongjie Nie, Yu Jing, Meng Zhang, Haopeng Chen, Xianping Zhao, Tengfei Zhao, Guanghao Lu, Yuanwei Zhu, Shengtao Li (Electric Power Research Institute, Yunnan Power Grid Co., Ltd. China)
- 11:00-11:15 Partial Discharge Characteristics of Nano-TiO₂ Modified OIP Bushing Capacitor Core Based on Equal Margin Design (NO. 641)
Daosheng Liu, Xingrong Chen, Tengxiao Niu, Yahui Zhao, (Jiangxi University of Science and Technology, China)
- 11:15-11:30 TEST AND OPERATION ANALYSIS OF NATURAL ESTER RETROFILLED 110KV

- MOBILE TRANSFORMER (NO. 626)
Ruifeng Wang, Weiping Zhang, Kevin JRapp, Lingfeng Wei, Yunpeng Liu (Dongguan Power Supply Bureau, Guangdong Power Grid Co., Ltd., China)
- 11:30-11:45 EFFECT OF ADDITIVES ON MELT VISCOELASTICITY OF INSULATING MATERIALS USED IN HIGH VOLTAGE CROSSLINKED POLYETHYLENE CABLES (NO. 478)
Jiacai Li, Hongjian Liu, Hao Liu, Shengtao Li, Shenghe Wang, Dong Pan (Xi'an Jiaotong University, China)
- 11:45-12:00 STUDY ABOUT ANTI-ICING EFFECT OF WEATHERPROOF SUPER-HYDROPHOBIC COATING ON WIND TURBINE (NO. 269)
Hang Yang, Qin Hu, Lichun Shu, Xingliang Jiang, Xin Yang (Chongqing University, China)

Oral Session 3

November 23, 2021 (Tuesday)

Session 3: Monitoring and diagnostics: intelligent sensing, big data, artificial intelligence, asset management, live-line working, maintenance and repair, safety considerations

Chairs: Dr. Tsuguhiro Takahashi, Central Research Institute of Electric Power Industry, Japan
Prof. Guanjun Zhang, Xi'an Jiaotong University, China

Venue: Hall 3

- 8:30-8:55 Invited Speaker: Dr. Tsuguhiro Takahashi, Central Research Institute of Electric Power Industry, Japan
Invited
Study of Hierarchical Support Technique for Managing Assets - development of support program for substation equipment - (NO. 1422)
Tsuguhiro Takahashi (Central Research Institute of Electric Power Industry)
- 8:55-9:10 Research on Application of Distributed FBG in On-Line Temperature Sensing of Power Transformer (No. 1359)
Chengjun Wang¹, Ning Ding¹, Jiangyang Zhan², Haibao Mu¹, Guanjun Zhang¹, Ping Qian¹ (¹Department of Electrical Engineering, Xi'an Jiaotong University, Xi'an, China, ²State Grid Zhejiang Electric Power Research Institute, Hangzhou, China)
- 9:10-9:25 Nonlinear Characteristics of High-Voltage Frequency Domain Spectroscopy of 500 kV Submarine Cable (NO. 1332)
Xize Dai, Zheng Jian, Jian Hao, Ruijin Liao, Qingsong Liu (State Key Laboratory of Power Transmission Equipment & System Security and New Technology, Chongqing University, Chongqing, China)
- 9:25-9:40 Defects Location of Multi-impedance Mismatched of Power Cables Based on FDR method with Dolph-Chebyshev window (No. 1159)
Yating Cao¹, Pengfei Meng¹, Kai Zhou¹, Yu Jin², Tao Zhou², Jin Yang², Weimin Wu² (¹College of Electrical Engineering, Sichuan University, Chengdu, Sichuan, China, ²Kunming Power Supply Bureau of Yunnan Power Grid Co. LTD, Kunming, Yunnan, China)
- 9:40-9:55 Study on Fitting and Prediction of Metallized Film Capacitor'S Voltage Drop (No. 1133)
Yong-Xin Zhang, Shao-Long Zhong, Qi-Kun Feng, Di-Fan Liu, Jiang-Bo Ping, Zhi-Min Dang

(State Key Laboratory of Power Systems, Department of Electrical Engineering, Tsinghua University, Beijing, China)

09:55-10:15

Coffee Break

9:55-10:15

Optimisation of Built-in UHF Conical Monopole Antenna Sensors for Partial Discharge Detection in High Voltage Switchgear (No. 208)

Yunpeng Di, Yanchao Wang, Yincheng Gao, Penglei Xu (Xi'an Jiaotong University, School of Electrical Engineering, Xi'an, China)

10:15-10:30

Distributed Temperature Sensing for Ultra-High Voltage GIL Spacer Based on Improved Optical Frequency Domain Reflectometer (No. 906)

Weiqi Qin¹, Meng Zhang¹, Yabo Li², Ce Xu¹, Yuan Wang¹, Guoming Ma¹ (¹State Key Laboratory of Alternate Electrical Power System with Renewable Energy Sources, North China Electric Power University, Beijing, China, ²State Grid Hangzhou Power Supply Company, Hangzhou, China)

10:30-10:45

Transformers Fault Identification by Frequency Response Analysis using Intelligent Classifiers (NO.965)

Regelii SA Ferreira¹, Hassan Ezzaidi¹, Issouf Fofana¹, Patrick Picher² (¹Research Chair on the Aging of Power Network Infrastructure (ViAHT), Université du Québec à Chicoutimi, Saguenay, Canada, ²Institut de recherche d'Hydro-Québec (IREQ), Varennes, Canada)

10:45-11:00

Evaluation of the Metal Oxide Surge Arresters Degradation Based on the loss tangent (NO.495)

Vandilson RN Barbosa¹, Edson G Costa², Antônio F Leite Neto¹, Itaiara F Carvalho¹, Patrício F Castro¹, João PC Souza¹, João VJ Melo¹, George RS Lira² (¹Electrical Engineering, Graduate Program, Campina Grande, Brazil, ²Department of Electrical Engineering, Federal, University of Campina Grande, Campina Grande, Brazil)

11:00-11:15

Condition Assessment of Power Equipment with UV, IR and Multispectral Imaging (No. 187)

Oliver Pischler¹, Uwe Schichler¹, Bin Wang², Changjie Xia², Ming Ren², Ming Dong² (¹Institute of High Voltage Engineering and System Performance, Graz University of Technology, Graz, Austria, ²State Key Laboratory of Electrical Insulation for Power Equipment, Xi'an Jiaotong University, Xi'an, PR China)

11:15-11:30

Simulation of Electrical Performance of Algae Contaminated Silicone Rubber (NO. 150)

Shifang Yang¹, Haocheng Yi¹, Yunpeng Liu^{1,2} (¹Hebei Provincial Key Laboratory of Power Transmission Equipment Security Defense, North China Electric Power University, Baoding 071003, China ²State Key Laboratory of Alternate Electrical Power System with Renewable Energy Sources, North China Electric Power University, Beijing 102206, China)

Oral Session 4

November 23, 2021 (Tuesday), 08:30-12:00

Session 4: Transient voltages: lightning, switching, repetitive impulses, surge arresters, insulation coordination, over-voltage protection, EMC

Chairs: Prof. Jianying Li, Xi'an Jiaotong University, China

Prof. Xiangrong Chen, Zhejiang University, China

Venue: Hall 4

- 08:30-08:55
Invited
Invited Speaker: Professor Wenxia Sima/Potao Sun, Chongqing University, China
Research on Insulation Failure Characteristics of Encapsulated Insulating Resin Under Impulse Electric (No. 1438)
Xinyu Tang¹, Wenxia Sima¹, Yazhou Chen², Potao Sun¹, Jianwei Xu¹, Yuhang Huang¹ (¹Chongqing University, China; ²Army Engineering University, Shijiazhuang Campus, China)
- 08:55-09:10
Impact of Stratified Frequency-Dependent Soils with Variable Water Content on Transmission Power Lines (No. 966)
Anderson R. J. Araújo, Walter L. M. Azevedo, José Pissolato Filho (State University of Campinas, Brazil)
- 09:10-09:25
Analysis of the Application of the Rod-rod Gap Structure in the Protection of Power Transformers (No. 874)
João Victor J Melo, Edson G Costa, João Pedro C Souza, Vandilson Rodrigo N. Barbosa, Antonio F Leite Neto, Lenilson A Barbosa, Iago B Oliveira (Federal University of Campina Grande, Brazil)
- 09:25-09:40
A Self-consistent Approach for Modeling the Transient Ground Resistance of Rods (No. 963)
Ricardo R. Diaz^{1,2}, Jose N. Silva¹, Adolfo Parellada¹ (¹National University of Tucuman, Argentina; ²CONICET, Argentina)
- 09:40-09:55
Review of Line Protection of Transmission Lines in AC/DC Hybrid System (No. 1255)
Jiandong Duan, Zhenghao Qi, Hao Li, Zainan Li (Xi'an University of Technology, China)
- 09:55-10:15
Coffee Break
- 10:15-10:30
Analysis of Lightning Protection Performance of 110 kV Transmission Line Canceling Lightning Wire (No. 1303)
Jianlin Hu¹, Ruihe Zhang¹, Jianping Hu², Fang Zhen², Xiaofeng Wang¹, Keer Sun¹, Xingliang Jiang¹ (¹Chongqing University, China; ²Disaster Prevention and Reduction Center of State Grid Hunan Electric Power Corporation, China)
- 10:30-10:45
Differential Lightning Protection Assessment of Transmission Lines (No. 605)
Jiangong Ma¹, Bo Zhang², Hao Fu², Lifu Wang², Jian Wang¹ (¹State Grid Xinjiang Company Limited Electric Power Research Institute, China; ²State Grid Xinjiang Electric Power Co., Ltd, China)
- 10:45-11:00
Partial Discharge Analysis of Power Electronic Transformer Under High Frequency Pulse Voltage (No. 1223)
Bendong Zhang¹, Jun Jiang¹, Li Zhi¹, Xiaohan Li², Prem Ranjian³, Chaohai Zhang¹ (¹Nanjing University of Aeronautics and Astronautics, China; ²State Grid Jiangsu Electric Power Co., Ltd, China; ³The University of Manchester, UK)
- 11:00-11:15
Fault Analysis and Comprehensive Improvement of Xinjiang Power Grid Transmission Lines Easy to Ice (No. 831)
Mingguan Zhao, Xincheng Dong, Wei Liu, Yunkai Yue, Hai Yu, Ziliang Zheng, Zeyang Lei (State Grid Xinjiang Company Limited Electric Power Research Institute, China)
- 11:15-11:30
Research on Protection Characteristics of ZnO Arrester Under Very-fast-front Impulse Voltage (No. 281)
Wen Liu¹, Weidong Ding¹, Zhenyu Wang¹, Gang Tang² (¹Xi'an Jiaotong University, China; ²Jiangnan Design Institute of Machinery & Electricity, China)

Oral Session 5

November 23, 2021 (Tuesday)

Session 5: High voltage and high current testing techniques: test procedures, measurements, evaluation, partial discharges, space charges, dielectric characteristics, emerging test techniques

Chairs: Prof. Michael Hartje, Hochschule Bremen – University of Applied Sciences, Germany

Prof. Feng Wang, Hunan University, China

Venue: Hall 1

- 14:00-14:25 Invited Speaker: Dr. M. Tariq Nazir, University of New South Wales, Australia
Invited Modeling of Multilayer Coated Polyimide Graphene Nanocomposite Films and Thermal Conductivity (NO. 186)
Shakeel Akram¹, Kai Zhou¹, Pengfei Meng¹, Chen Yidong¹, Xiancheng Ren², M. Tariq Nazir³
(¹College of Electrical Engineering, Sichuan University, Chengdu, China; ²College of Polymer Science and Engineering, Sichuan University, Chengdu, China; ³School of Mechanical and Manufacturing Engineering, University of New South Wales, Sydney, Australia)
- 14:25-14:40 Service Experience with a novel DC Current Injection Generator for HVDC Long-term Tests – 3150 A at 422 kV DC potential (NO. 8)
Martin Hallas, Thomas Wietoska and Volker Hinrichsen (Technical University of Darmstadt, High Voltage Laboratories, Fraunhoferstraße 4, Darmstadt, 64283, Germany)
- 14:40-14:55 HVDC Insulation Systems: Effect of Voltage Polarity Inversion Slew Rate on Partial Discharge Phenomenology and Harmfulness (NO. 9)
Hadi Naderiallaf^{1}, Riddhi Ghosh², Paolo Seri¹ and Gian Carlo Montanari²* (*¹Department of Electrical, Electronic and Information Engineering (DEI), University of Bologna, Bologna, Italy, ²Center for Advanced Power Systems (CAPS), Florida State University, Tallahassee, USA*)
- 14:55-15:10 Evaluation of Transformer Insulation with Different PD Methods Using a Synchronous Multi-Channel Technique (NO. 36)
Bogdan Gorgan^{1}, Wojciech Koltunowicz¹, Tomasz Bednarczyk²* (*¹OMICRON Energy Solutions GmbH, Lorenzweg 5, 12099 Berlin, Germany, ²OMICRON Energy Solutions Polska Sp.z.o.o., ul. Kosynierow 44, 41-219 Sosnowiec, Poland*)
- 15:10-15:25 Study of Effect of Core Magnetisation on FRA by Using Duality-Derived Nonlinear Transformer Model in ATP-EMTP (NO. 127)
Yaoxian Yang^{1,2}, Zhongdong Wang^{2}, Peter Crossley², Gordon Wilson³, Andrew Fieldsend-Roxborough³* (*¹Department of Electrical and Electronic Engineering, The University of Manchester, Manchester, United Kingdom, ²Department of Engineering, University of Exeter, Exeter, United Kingdom, ³National Grid Company, Warwick, United Kingdom*)
- 15:25-15:40 Prequalification of Capacitors for High-Precision Voltage Dividers (NO. 188)
*Hai Jiang¹, Oliver Pischler^{*1}, Uwe Schichler¹, Jussi Havunen², Jari Hällström², Ahmet Merveç³, Serkan Dedeoglu³, Sami Özer³, Johann Meisner⁴, Stephan Passon⁴, Frank Gerdinand⁴* (*¹Institute of High Voltage Engineering and System Performance, Graz University of Technology, Inffeldgasse 18, 8010 Graz, Austria, ²VTT Technical Research Centre of Finland Ltd, National Metrology Institute VTT MIKES, P.O. Box 1000, 02044 VTT, Espoo, Finland, ³TUBITAK National Metrology Institute (UME), Gebze, Kocaeli, Turkey, ⁴Physikalisch-Technische Bundesanstalt, Bundesallee 100, 38116 Braunschweig, Germany*)

- 15:40-15:55 Application of a Cluster-Algorithm for Partial Discharge Analysis at DC voltage under Practical Conditions (NO. 202)
Benedikt Hochbrückner^{1}, Felix Langer¹, Erik Winkelmann², Martin Spiertz¹, Markus H. Zink¹, Thomas Steiner², Karsten Backhaus³* (¹Institute of Power Engineering and High Voltage Technology, University of Applied Sciences Würzburg-Schweinfurt, Schweinfurt, Germany, ²HIGHVOLT Prüftechnik Dresden GmbH, Dresden, Germany, ³Institute for Electrical Power Systems and High Voltage Engineering, Technical University Dresden, Dresden, Germany)
- 15:55-16:15 **Coffee Break**
- 16:15-16:30 Combined Kerr-Effect and Polarization Current Measurements in Oil-Pressboard Barrier Systems (NO. 347)
Lisa Roth¹, Hans-Peter Öftering¹, Markus H. Zink¹, Andreas Küchler¹, Ronny Fritsche², Michael Geißler², Balz Schlittler³, Stefan Jaufer³, Christoph Krause³, Frank Berger⁴ (¹Hochschule für angewandte Wissenschaften Würzburg-Schweinfurt, Schweinfurt, Germany, ²Siemens Energy Global, Nürnberg, Germany, ³Weidmann Electrical Technology AG, Rapperswil, Switzerland, ⁴Technische Universität Ilmenau, Ilmenau, Germany)
- 16:30-16:45 Modelling of Partial Discharge Behavior at DC Applied Voltage by Using ABC Model (NO. 420)
O. Zidane, Rainer Haller (University of West Bohemia, Pilsen, Czech Republic)
- 16:45-17:00 Comparative Investigations of PD Behavior on an Artificial Accessory Failure under Medium Voltage AC, Damped AC (DAC), 0,1-Hz-VLF and 0,1-Hz-Rectangle (NO. 797)
Robert Bach¹, Christian Walter², Daniel Müller^{1}* (¹South Westphalian University of Applied Sciences, Lübecker-Ring 2, 59494 Soest, Germany, ²E.On. S.E., Bayreuth, Germany)
- 17:00-17:15 Comparative Investigations of PD Behaviour regarding the PD Detectability on an Artificial Accessory Failure under different On-Site Test Voltages 50-Hz-AC, Damped AC (DAC), 0,1-Hz-VLF-Sine and 0,1-Hz-VLF-Rectangle (NO. 806)
Robert Bach¹, Christian Walter², Daniel Müller^{1}, Niklas Peck¹* (¹South Westphalian University of Applied Sciences, Lübecker-Ring 2, 59494 Soest, Germany, ²E.On. S.E., Bayreuth, Germany)

Oral Session 6

November 23, 2021 (Tuesday)

Session 6: Advanced materials and insulation systems: outdoor, indoor, solid, liquid and gas insulated, nanodielectrics, eco-friendly and other new materials, novel insulation system / Industrial applications of high voltage: non-energy applications in different fields / High voltage engineering problems in future power grids: distribution generations, smartening of power networks, and integration of renewable energies

Chairs: Assoc. Prof. Jiandong Wu, Shanghai Jiao Tong University, China

Assoc. Prof. Daomin Min, Xi'an Jiaotong University, China

Venue: Hall 2

- 14:00-14:25 Invited Speaker: Professor Uwe Schichler/Ms. Sahar Estahbanati, Graz University of Technology, Austria
Beneficial Electrode Arrangement for Electroaerodynamic Propulsion (NO. 80)
Sahar Estahbanati, Uwe Schichler (Institute of High Voltage Engineering and System Performance, Graz University of Technology, Inffeldgasse 18, 8010 Graz, Austria)

- 14:25-14:40 Ramp sinusoidal breakdown of epoxy under high voltage waveforms at different frequencies (NO. 1413)
Weichuan Zhao, Tianming Luo, Mohamad Ghaffarian Niasar (Delft University of Technology, Netherlands)
- 14:40-14:55 HOW CONDUCTANCE CHARACTERISTICS OF NONLINEAR MATERIALS INFLUENCES THE PERFORMANCE OF ADJUSTING POTENTIAL DISTRIBUTION IN NEEDLE PLATE MODEL (NO.1222)
Zhiwen Huang, Jun Hu, Zhikang Yuan, JinzhongLi, Yu Yin, Hao Tang (Tsinghua University, China)
- 14:55-15:10 DIELECTRIC PROPERTIES IMPROVEMENT OF POLYPROPYLENE BY SILANE GRAFTING MODIFICATION FOR HVDC CABLE INSULATION (NO. 1107)
Shixun Hu, Linzhen Fan, Wei Wang, Qi Li, Jinliang He (North China Electric Power University, China)
- 15:10-15:25 The role of filler dissipation in material properties of Ethylene-Propylene-Diene Monomer for cable insulation (NO. 84)
Jing Xu, Xiangyu Fan, Jing Chen, Chongjun Tian, Jinghui Gao, Lisheng Zhong (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China)
- 15:25-15:40 LIGHTNING IMPULSE PERFORMANCE OF NATURAL ESTER OIL BASED NANOFLUID WITH MAGNESIUM OXIDE NANOPARTICLES (NO. 956)
Manal Emara, Georgios Peppas, Thomas Tsovilis, Eleftheria Pyrgioti, Ioannis Gonos (National Technical University of Athens, Greece)
- 15:40-15:55 DIELECTRIC STRENGTH OF ENVIRONMENTALFRIENDLY GAS MIXTURES OF C4H2F6/CO2 AND C4H2F6/AIR (NO. 912)
Nian Tang, Yuyang Yao, Jiayu Xiong, Boya Zhang, Xingwen Li, Mai Hao, Kai Wang, Dongwei Sun, Li Li (Electirc Power Research Insitute of Guangdong Power Grid Co. Ltd. China)
- 15:55-16:15 **Coffee Break**
- 16:15-16:30 Effect of the Power Supply Frequency on the Mode Transition of APPJ Plasma Bullet (NO. 539)
Dingyuan Peng, Li Chai, Xinzheng Guo, Ruobing Zhang (Engineering Laboratory of Power Equipment Reliability in Complicated Coastal Environments, Tsinghua Shenzhen International Graduate School, Shenzhen, China)
- 16:30-16:45 Calculation Model of Aerodynamic Parameters for Iced Wind Turbine (NO. 296)
Zhou Yu¹, Lichun Shu¹, Hantao Li², Qin Hu¹, Xingliang Jiang¹ (¹State Key Laboratory of Power Transmission Equipment & System Safety and New Technology, School of Electrical Engineering, Chongqing University, Chongqing, China, ²State Grid Tianfu New District Power Supply Company, Chengdu, Sichuan, China)
- 16:45:17:00 STUDY ON THE TEMPERATURE DISTRIBUTION OF COMPOSITE INSULATOR OF UHV-DC LINE CONSIDERING SOLAR RADIATION (NO. 915)
Longlong Li, Xiaoying Zhang, Hai Jin, Hongliang Zhang, Kejian Chen, Kun Li (College of Electrical and Information Engineering, Lanzhou University of Technology, Lanzhou, China)*
- 17:00-17:15 Perspectives of temperature assessment based on wave propagation for dynamic rating of medium-voltage power cables (NO. 170)
Peter A.A.F. Wouters¹, Yan Li² (¹Department of Electrical Engineering, Eindhoven University of Technology, Eindhoven, The Netherlands, ²School of Electrical and Electronic Engineering, North China Electric Power University, Baoding, China)

Oral Session 7

November 23, 2021 (Tuesday)

Session 7: Monitoring and diagnostics: intelligent sensing, big data, artificial intelligence, asset management, live-line working, maintenance and repair, safety considerations

Chairs: Dr. David Gopp, OMICRON electronics GmbH, Austria

Professor Xiaohua Wang, Xi'an Jiaotong University, China

Venue: Hall 3

- 14:00-14:25 Invited Speaker: Dr. David Gopp, OMICRON electronics GmbH, Austria
Invited Temperature dependency of the frequency response characteristic of high voltage inductive instrument transformers and RC dividers (No. 999)
David Gopp¹, Erik Sperling², Thomas Bischof¹, Michael Krüger¹ (¹OMICRON electronics GmbH, Austria, ²OMICRON electronics GmbH, Switzerland)
- 14:25-14:40 Application of Microstrip Filter for Multiple Narrow Band Antenna to Detection of Partial Discharge (No. 811)
Tuvshinbayar Bandi, Shinya Ohtsuka (Department of Electrical and Electronic Engineering Kyushu Institute of Technology, 1-1 Sensui-cho, Tobata-ku, Kitakyushu-shi, Japan)
- 14:40-14:55 Intelligent Recognition of Insulator Video Stream Based on Embedded Edge Computing (No. 708)
Yuntao Sun¹, Yong Zhang², Suhong Chen³, Yufeng Chen⁴, Kaixuan Sun⁵ (¹First State Grid Shandong Electric Power Research Institute, Shangdong, China, ²Second State Grid Shandong Electric Power Research Institute, Shangdong, China, ³Third State Grid Shandong Electric Power Research Institute, Shangdong, China, ⁴Fourth State Grid Shandong Electric Power Research Institute, Shangdong, China, ⁵Fifth Department of Electrical Engineering North China Electric Power University, Beijing, China)
- 14:55-15:10 On-Site Partial Discharge Diagnosis and Location of High Voltage Power Apparatuses and Case Study (No. 633)
Hongyu Wang¹, Yue Zhang², Zhiming Liang², Jin Zhou², Qiyu Xu¹, Lei Dong¹, Xiaosheng Peng¹ (¹Huazhong University of Science and Technology, Wuhan, China, ²Dongfang Electric Machinery CO., LTD., Deyang, China)
- 15:10-15:25 Successive Electromagnetic Transient Diagnosis Using Unsupervised Circulation-Learning Strategy (No. 501)
Han Zhang¹, Xuan Li², Bo Yue², SiminZhang³, He Zhang², Wenxia Sima¹, Ming Yang¹ (¹Chongqing University, No.174 Shazhengjie, Chongqing, China, ²State Grid Economic and Technological Research Institute Co., LTD, 102209, Beijing, China, ³Xi'an Xi Dian Transformer Co., Ltd, No.485 Daqing Road, Xi'an, China)
- 15:25-15:40 Long Term DGA Trend Evaluation of Transmission Power Transformers (No. 313)
Thathsara Herath^{1,2}, Zhongdong Wang^{1,2}, Qiang Liu¹, Gordon Wilson³, Ruth Hooton³, Shengji Tee⁴ (¹Department of Electrical and Electronic Engineering, The University of Manchester, Manchester, UK, ²College of Engineering, Mathematics and Physical Sciences, University of Exeter, Exeter, UK, ³National Grid Electricity Transmission, Warwick, UK, ⁴SP Energy Networks, Birkenhead, UK)
- 15:40-15:55 The Temperature Distribution Analysis of 220kV GIS with Different Structure (No. 264)
Song Wang¹, Junhao Li², Kai Liu¹, Zai Xing Peng¹ (¹Electric Power Research Institute, CSG, No.11, Kexiang Road, Huang Pu District, Guangzhou, China, ²Xi'an Jiaotong University, No.28,

Xianning West Road, Xi'an, China)

15:55-16:15

Coffee Break

16:15-16:30

Line Selection Strategy for A Beneficial DLR System Based on International Project Experience (No. 919)

Dávid Szabó, Levente Rácz, Gábor Gócsi, Bálint Németh (Department of Electric Power Engineering, Faculty of Electrical Engineering and Informatics, Budapest University of Technology and Economics, Budapest, Hungary)

16:30-16:45

Moisture Assessment of Oil-impregnated Pressboard by Switching Impulse Application (NO. 62)
Arpan Kumar Pradhan, Stefan Tenbohlen (University of Stuttgart, Institute for Energy Transmission and High Voltage Technology (IEH), Stuttgart, Germany)

16:45-17:00

Model-based Data Augmentation to Improve the Performance of Machine-Learning Diagnostic Systems (NO. 331)

Jannis Nikolas Kahlen^{1,2}, Andre Würde², Michael Andres¹, Albert Moser² (¹Fraunhofer Institute for Applied Information Technology FIT, Digital Energy, Schloss Birlinghoven 1, Sankt Augustin, Germany, ²RWTH Aachen University, Schinkelstraße 6, 52062 Aachen, Germany)

17:00-17:15

HVDC GIS/GIL – Classification of PD Defects Using NODI* Pattern and Machine Learning (No. 115)

Bernhard Schober, Uwe Schichler (Institute of High Voltage Engineering and System Performance, Graz University of Technology, Inffeldgasse 18, 8010 Graz, Austria)

Oral Session 8

November 23, 2021 (Tuesday)

Session 8: Other related issues

Chairs: Dr. Senja Leivo, Vaisala Oyj, Finland

Assoc. Prof. Chijie Zhuang, Tsinghua University, China

Venue: Hall 4

14:00-14:25

Invited Speaker: Dr. Senja Leivo, Vaisala Oyj, Finland

Invited

Determination of Gas Solubility Coefficients for DGA Analysis (NO. 866)

Senja Leivo, Mikko Aronniemi, Sami Virtanen, Nunu Nopakun-Borovska, Jarkko Larkio, Lydia Hyrsky, Toni Mellin (Vaisala Oyj, Helsinki, Finland)

14:25-14:40

Modular High Voltage Nanosecond Pulse Generator Composed of Avalanche Transistor-Based Marx Bank Circuit and Linear Transformer Driver (NO. 92)

Zichen Deng¹, Qi Yuan¹, Zihao Yang¹, Weidong Ding¹ (¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China)

14:40-14:55

Optimization and Simulation of Circuits for Dielectric Elastomer Flexible Generator (NO.1132)

Li-Juan Yin, Jia-Yao Pei, Qi-Kun Feng, Jing Zhu, Zhi-Min Dang (State Key Laboratory of Power Systems, Department of Electrical Engineering, Tsinghua University, Beijing, China)

14:55-15:10

Topological Research on Inductive Pulse Power Supply (NO. 138)

Yongjie Feng, Ling Dai, Zhi Liang, Fuchang Lin (State Key Laboratory of Strong Electromagnetic Engineering and New Technology, Huazhong University of Science and Technology, Wuhan Hubei, China)*

- 15:10-15:25 Cable Deformation and Electric Field Distortion of Submarine Cable Insulation Caused by Anchoring Impact (NO. 321)
Weiwang Wang¹, Xilin Yan¹, Hantao Wang¹, Yong Feng¹, Lina Zhang² (¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China, ²China National Offshore Oil Corporation (CNOOC) Research Institute Ltd, Beijing, China)
- 15:25-15:40 Dynamic Analysis of DC Gil Insulator Surface Charge Accumulation Based on Comsol and Matlab Co-Simulation (NO. 492)
Baojia Deng¹, Shiling Zhang¹, Zi Zhang², Wenyan Gan¹, Xiaoxiao Luo¹ (¹State Grid Chongqing Electric Power Company Chongqing Electric Power Research Institute, Chongqing, China, ²State Grid Chongqing Electric Power Company Bishan power supply company, Chongqing, China)
- 15:40-15:55 An Analysis Example of 220kV Cable Terminal Failure Caused by Low Temperature Environment (NO. 1074)
Pan Zehua¹, Zhou Shiyi¹, Ren Zhigang¹, Guo Wei¹, Li Huachun², Chen Ping¹ (¹Beijing Electric Power Research Institute, Beijing, China, ²Beijing Electric Power Corporation, Beijing, China)
- 15:55-16:15 **Coffee Break**
- 16:15-16:30 Grid-like Vibration Measurements on Power Transformer Tank During Open-Circuit and Short-Circuit Tests (NO. 414)
Karlo Petrović¹, Antonio Petošić², Tomislav Župan¹ (¹Končar-Electrical Engineering Institute Inc., Zagreb, Croatia, ²Faculty of Electrical Engineering and Computing, University of Zagreb, Zagreb, Croatia)
- 16:30-16:45 The Formation Mechanism of White Powder in Cable Water Blocking Tape and Its Influence on Volume Resistivity and Thermal Conductivity (NO. 1521)
Baojun Hui¹, Yanting Cheng¹, Jiasheng Huang², Shuai Hou¹, Wenbo Zhu¹, Peng Zhao¹ (¹Electric Power Research Institute, China Southern Power Grid, Guangzhou, China, ²Guangzhou Power Supply Bureau, Guangdong Power Grid Co., Ltd, Guangzhou, China)
- 16:45-17:00 Adsorption Properties of SO₂F₂ on A-Al₂O₃(0 0 0 1) Surface: A Dft Study (NO. 1393)
Yichun Bai¹, Guofang Gao¹, Gang Wei¹, Zhengqin Cao¹, Qilin Yi¹ (¹College of Electrical Engineering, Chongqing University of Science and Technology, East Daxuecheng Road, Chongqing, China)

Oral Session 9

November 24, 2021 (Wednesday)

Session 9: High voltage and high current testing techniques: test procedures, measurements, evaluation, partial discharges, space charges, dielectric characteristics, emerging test techniques

Chairs: Prof. Junhao Li, Xi'an Jiaotong University China

Prof. Guoqiang Gao, Southwest Jiaotong University, China

Venue: Hall 1

- 08:30-08:55 Invited Speaker: Professor Chen Liu, Xi'an High Voltage Apparatus Research Institute Co., Ltd., China
Invited
Test Technology and Challenges for VSC-HVDC Transmission
Chen Liu, (Xi'an High Voltage Apparatus Research Institute Co., Ltd., China)

- 08:55-09:10 Wind Speed and Direction Measurement Method and System Based on Different Wind Pressure (NO. 145)
Meilin Zhu^{1}, Xingliang Jiang¹, Jun Ma², Zhen Qin², Feng Bai² (¹State Key Laboratory of Power Transmission Equipment & System Security and New Technology, No.174 Shazheng stree, Shapingba District, Chongqing, China, ²Chongqing Electric Power Design Institute Co., Ltd, No.60, Shan'an street, Shapingba, Chongqing, China)*
- 09:10-09:25 Simulation Study of Space Charge Behavior Characteristics in XLPE Cable Insulation under Alternating Current Field (NO. 181)
Zhe Xu¹, Dongxin He^{1}, Kai Yang², Weijian Xue³, Qingjing Zang¹, Qingquan Li¹ (¹Shandong University, Jinan, China, ²State Grid Materials Co., Ltd., Beijing, China, ³State Grid Shandong Maintenance company, Beijing, China)*
- 09:25-09:40 Measurement of Electric Field Distribution in 2 μ m Thick Polyethylene Naphthalate Film (NO. 219)
Guanwen Chen, Feihu Zheng^{}, Yewen Zhang (Department of Electrical Engineering, Tongji University, Shanghai, China)*
- 09:40-09:55 Lightning Current Arc Channel Resistance and Optical Properties (NO. 317)
Yabei Fan, Xinrui Zuo, Chang He, Mi Zhou^{}, Jianguo Wang, Li Cai, Yadong Fan (School of Electrical Engineering and Automation, Wuhan University, Wuhan, China)*
- 09:55-10:15 **Coffee Break**
- 10:15-10:30 Research on a New Fiber Bragg Grating Partial Discharge Sensor Based on Coupling Cone and Diaphragm Packaging (NO. 330)
Yuxuan Song¹, Weigen Chen^{1}, Zhixian Zhang¹, Fan Liu², Kejie Wu¹, Jiali Lei³ (¹ State Key Laboratory of Power Transmission Equipment & System Security and New Technology, Chongqing, China, ²State Grid Hubei Electric Power Company Electric Power Research Institute, Wuhan, Hubei Province, China, ³State Grid Fujian Electric Power Company Electric Power Research Institute, Fuzhou, Fujian Province, China)*
- 10:30-10:45 Space Charge Dynamic Characteristics of Epoxy Material under Extreme Conditions (NO. 1381)
Kun Li, Hongliang Zhang^{}, Hai Jin, Ping Zhang, Longlong Li, Zhengqiang Liu, Xinhe Shen (College of Electrical and Information Engineering, Lanzhou University of Technology, Lanzhou, China)*
- 10:45-11:00 Identification Method of Turn-to-Turn Short Circuit Fault in Low Voltage Winding of 220kV Transformer (NO. 1357)
Jiexin Shen, Lei Liu, Dingqian Yang (State Grid Xinjiang Electric Power Research Institute, Urumqi, China)
- 11:00-11:15 Research on the Differences of Partial Discharge of Different Insulation Deffects under Special-SHaped Asymmetric Wave Voltage (NO. 396)
Changjiang Chen¹, Wen Cao^{1}, Qianwen Song¹, Wei Shen², Yan Du¹ (¹School of Electronic Information, Xi'an Polytechnic University, Xi'an, China, ²Electric Power Research Institute, State Grid, No. 669, Hangtian Middle Road, Chang'an District, Xi'an, China)*
- 11:15-11:30 Space Charge and Trap Characteristics of High Voltage Power Module Packaging Insulation Based on Simultaneous Measurement (NO. 1038)
Mingyu Zhou¹, Haitian Wang¹, Yalin Wang^{2,3}, Wenyi Li^{2,3}, Jiandong Wu^{2,3}, Tao Han⁴, and Yi Yin^{2,3} (¹Global Energy Interconnection Research Institute Europe GmbH, Berlin, Germany, ² Department of Electrical Engineering, School of Electronic Information and Electrical*

Engineering, Shanghai Jiao Tong University, Shanghai, China, 3 Key Laboratory of Control of Power Transmission and Conversion (SJTU), Ministry of Education, Shanghai, China, 4 Department of Instrument Science and Engineering, School of Electronic Information and Electrical Engineering, Shanghai Jiao Tong University, Shanghai, China)

Oral Session 10

November 24, 2021 (Wednesday)

Session 10: Electromagnetic fields: computation, measurements, environmental effects

Chairs: Prof. Ricardo Diaz, National University of Tucuman, Argentina

Assoc. Prof. Yu Chen, Xi'an Jiaotong University, China

Venue: Hall 2

- 08:30-08:55 Invited Speaker: Professor Ricardo Diaz, National University of Tucuman, Argentina
Invited An Innovative Solver for Electric Field Computing in Three-Phase Power Systems (NO. 676)
Adolfo Parellada¹, Ricardo R. Diaz^{1, 2}, José N. Silva¹ (¹Institute of High Voltage and Power Transmission, National University of Tucuman, S.M. Tucuman, Argentina, ²CONICET, Buenos Aires, Argentina)*
- 08:55-09:10 Analysis of the Relationship Between the Loss of the Three-Phase Five-Limb Transformer and GIC (NO. 376)
Yidan Hu¹, Yanping Liu², Pengfei Song², Zhaoyu Zhang¹, Junhao Li¹, Shaoxian Chu², Changchun Zhai² (¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, No. 28 West Xianning Road, Xi'an, People's Republic of China, ²China Nuclear Power Design Co. Ltd (Shenzhen), Shenzhen, People's Republic of China)
- 09:10-09:25 A Semi-Resolved Algorithm for Eulerlagrangian Model of Charged Particulate Flows Under Slightly Nonuniformed Electrical Field (NO. 1477)
Li Yang, Xi Yang, Lijuan Zhu, Yezhi Wu (School of Electrical Engineering and Automation, Hefei University of Technology, Hefei 230009, China)
- 09:25-09:40 Propagation Properties Of PD-emitted Electromagnetic Wave in Three Phase Encapsulated Type GIS With Series Arrangement and Relation Between Defect Position and Sensor Output (NO. 328)
Tatsuki Fujimoto¹, Shinya Ohtsuka¹, Tatsuyuki Shikura² (¹Electronic and Electrical engineering department, Kyushu Institute of Technology, Kitakyushu, Japan, ²Fuji Electric Co., Ltd., Ichihara, Japan)
- 09:40-09:55 Investigation on Loss Reduction Strategies of Single-Core HVAC Submarine Cables (NO. 29)
Xing Xu¹, Fanbo Meng¹, Ashish Paramene², Xiangrong Chen¹ (¹Zhejiang Provincial Key Laboratory of Electrical Machine Systems, College of Electrical Engineering, Zhejiang University, Hangzhou 310027, China, ²Department of Electrical Engineering, National Institute of Technology, Silchar, Assam, 788010, India)
- 09:55-10:15 **Coffee Break**
- 10:15-10:30 Vibration Simulation of High Voltage Parallel Reactor Based on Multi-physics Field (NO. 1367)
Qinqing Huang^{1,2}, Jing Zhang^{1,2}, Songhai Fan³, Zongxi Zhang³, Chuanxian Luo^{1,2} (¹Nari Group (State Grid Electric Power Research Institute) Co., Ltd., Wuhan, China, ²State Grid Electric Power Research Institute Wuhan Nari Co., Ltd., Wuhan, China, ³State Grid Sichuan Electric

- Power Company Electric Power Research Institute, Chengdu, China)*
- 10:30-10:45 Three-Dimensional Finite Element Modelling of Electrical Field Intensity Induced in Human Body with Pacemaker Implanted During Transient Processes in Power Network (No. 233)
Bingjie Wu, Ranran Ding, Wu Lu, Wenbin Zhao (College of Electrical Engineering, Shanghai University of Electric Power, No. 2588 Changyang Road, Yangpu District, Shanghai, China)
- 10:45-11:00 Transformer Electromagnetic Field Simulation and its Internal Sensor Arrangement Scheme (NO. 407)
Xingchen Tian¹, Jiangtao Li¹ (¹School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, China)
- 11:00-11:15 Distortion and Reduction Method of 3-D Total Electric Field on Buildings Near ± 800 kV Transmission Lines (NO. 427)
Jilai Xu¹, Yao Lu¹, Zheyuan Gan¹, Liang Zhang² (¹State Key Laboratory of Power Grid Environmental Protection, China Electric Power Research Institute, Wuhan, China, ²Heilongjiang Province Electric Power Research Institute, Harbin, China)
- 11:15-11:30 Testing Research on AC Interference of UHV AC GIL Test Line to Buried Metal Pipeline (NO. 128)
Ni Li¹, Yu-bing Qiu², Hua-gang Liu¹, Jian-gong Zhang¹, Hui-chun Xie¹, Bing Zhou¹ (¹China Electric Power Research Institute (State Key Laboratory of Power Grid Environmental Protection), Wuhan, China, ²School of Chemistry and Chemical Engineering, Huazhong University of Science and Technology (HUST), Wuhan, China)
- 11:30-11:45 Simulation Analysis of Electric Field Distribution for Terminal Ball in 750kV Substation (NO. 287)
Zhao Yalin^{1}, Wu Jian^{1, 2}, Geng Mingxin¹, Yang Bin¹, Shen Chen¹, Lei Meng³, Tian Xin¹ (¹ Shaanxi Electric Power Research Institute of SGCC, No.669, Hangtian Middle Road, Xi'an, China ² Xi'an Jiaotong University, No.28, Xianning West Road, Xi'an, China ³ State Grid Shaanxi Electric Power Company, No.218, Shiyuan Road, Xi'an, China)*

Oral Session 11

November 24, 2021 (Wednesday), 08:30-12:00

Session 11: HVDC technologies and systems: design problems, testing and measuring techniques, advanced HVDC systems

Chairs: Assoc. Prof. Jun Hu, Tsinghua University, China
Prof. Peng Liu, Xi'an Jiaotong University, China

Venue:

- 08:30-08:55 Invited Speaker: Professor Yi Yin, Shanghai Jiao Tong University, China
Invited Surface Charge Inversion Algorithm of Non-invasive Surface Potential Measurement (No. 701)
Lu Fan¹, Mingyu Zhou², Yifan Rui¹, Yi Yin¹, Yalin Wang¹ (¹Shanghai Jiaotong University, China; ²Global Energy Interconnection Research Institute Europe GmbH, Germany)
- 08:55-09:10 Design Optimization of DC Electrical Insulation Spacers: Highlighting the Contribution of the Conductivity Dependence on Temperature and Field (No. 142)
Robin Ramin, Riddhi Ghosh, Peter Cheetham, Gian Carlo Montanari (Florida State University,

- United States of America)*
- 09:10-09:25 Simulation of Electric Field and Space Charge of Typical Particle Defects of HVDC Cable (No. 724)
Ashfaque A Bhatti¹, Lei Dong¹, Lijun Li², Xiaosheng Peng¹, Bryan Malpartida³, Mingzhong Xu⁴, Fanwu Chu⁴, Hongyu Wang¹ (¹Huazhong University of Science and Technology, China; ²CNPC Electric Energy Co., Ltd, Power Supply Company, China; ³National University of Engineering, Peru; ⁴China Electric Power Research Institute, China)
- 09:25-09:40 Detection Scheme of Commutation Failure Based on Temporal Features of Thyristor Valve in the On-state and Off-state (No. 876)
Shanshan Yin¹, Xiaohua Li¹, Zexiang Cai¹, Shuyong Li^{1,2} (¹South China University of Technology, China; ²Electric Power Research Institute of China Southern Power Grid, China)
- 09:40-09:55 A Parallel Galerkin's Moment Based Method for Finding Resistance of HVDC Grounding Electrode (No. 158)
Ashiq Muhammed, Ankit Srivastava, Bidhan Biswas (Indian Institute of Science, India)
- 09:55-10:15 **Coffee Break**
- 10:15-10:30 Electromagnetic Transient Simulation Analysis on Electrical Fault of Vacuum Type On-load Tap Changer in Converter Transformer (No. 774)
Di Xiahou¹, Tong Zhao¹, Xiuqing Yi², Liang Zou¹, Li Zhang¹ (¹Shandong University, China; ²Shandong University of Traditional Chinese Medicine, China)
- 10:30-10:45 Simulation Analysis of Electric Field Changes During Low Temperature Start-up of Converter Transformer (No. 1466)
Minghe Chi^{1,2,3}, Qian Wang¹, Qinglin Luo², Chaohai Zhang³, Ji Liu¹, Yi Guan¹, Qingguo Chen¹ (¹Harbin University of Science and Technology, China; ²TBEA, China; ³Harbin Institute of Technology, China)
- 10:45-11:00 Influence of Oil-pressboard Combination on Electric Field Distribution of Main Insulation Structure on Valve-side Winding of HVDC Converter Transformer (No. 1483)
Xiying Wang, Zhidong Cheng, Li Cheng, Qiling Guo, Ruijin Liao (Chongqing University, China)
- 11:00-11:15 Simulation Study on Steady-State Ampacity of ± 400 kV DC Submarine Cable Under Different Laying Environments (No. 44)
Qiren Wu¹, Shujun Liu¹, Yuanpeng Lv¹, Defang Hu², Yu Liu², Bin Feng³, Shuai Hou³, Mingli Fu³ (¹China Three Gorges Renewables (Group) Co.,Ltd., China; ²China Three Gorges Renewables (Group) Co.,Ltd. (Zhejiang), China; ³Electric Power Research Institute, China Southern Power Grid, China)
- 11:15-11:30 Simulation Research on Commutation Failure in Fault Removal (No. 854)
Jingyi Zhang¹, Xiaohua Li¹, Yulin Wang¹, Jun Zhao¹, Shuyong Li^{1,2} (¹South China University of Technology, China; ²Electric Power Research Institute of China Southern Power Grid, China)
- 11:30-11:45 Research on Calculation Methods of Harmonic Parameters of XLPE HVDC Cable (No. 717)
Xiao Du¹, Xuezhong Liu¹, Yuhang Liu¹, Zhiyu Yan², Hongmiao Yu², Yan Yan² (¹Xi'an Jiaotong University, China; ²Zhongtian Technology Submarine Cable Co., Ltd., China)
- 11:45-12:00 The Influence of Geometry on the Surface Charge Characteristics of DC-GIL Insulator (No. 431)
Xin Wang¹, Zhimin Wang¹, Jieyuan Chen¹, Xiaofei Shi², Xiaolong Li³ (¹Electric Power Research Institute of State Grid Jilin Electric Power Co., Ltd, China; ²State Grid Jilin Electric Power Co. Ltd, China; ³Shenyang University of Technology, China)

Oral Session 12

November 24, 2021 (Wednesday)

Session 12: Advanced materials and insulation systems: outdoor, indoor, solid, liquid and gas insulated, nanodielectrics, eco-friendly and other new materials, novel insulation system

Chairs: Assoc. Prof. Qi Li, Tsinghua University, China

Prof. Yang Xu, Xi'an Jiaotong University, China

Venue: Hall 4

- 8:30-8:55 Invited Speaker: Professor Xingyi Huang, Shanghai Jiao Tong University, China
Invited Thermally conductive polymer composites for high voltage insulation (NO. 23)
Xingyi Huang, Pengli Li (Shanghai Jiao Tong University, China)
- 8:55-9:10 CALCULATION OF THE DIELECTRIC BREAKDOWN STRENGTH OF CO₂-O₂ MIXTURES BY CONSIDERING ION KINETICS (NO. 910)
Yuyang Yao, Jiayu Xiong, Boya Zhang, Xingwen Li (Xi'an Jiaotong University, China)
- 9:10-9:25 SURFACE DISCHARGE AGING CHARACTERISTICS OF GFRP AT LOW TEMPERATURES (NO. 716)
Zhibin ZHANG, Ming REN, Bo SONG, Boning YU, Wenjie FAN, Ming Dong (Xi'an Jiaotong University, China)
- 9:25-9:40 Effect of Silicone Grease on Surface Topography and Breakdown Characteristics of XLPE-SiR Interface (NO. 851)
Zerui Li, Kai Zhou, Pengfei Meng, Hao Yuan, Zikang Wang, Yao Fu (Sichuan University, China)
- 9:40-9:55 STUDY OF VACUUM THERMAL AGING ON THE MECHANICAL AND DIELECTRIC PROPERTIES OF LIQUID SILICONE RUBBER (NO. 802)
Zhe Xu, Lu Cheng, Wenfeng Liu, Hongbo Liu, Mengqi Wang, Shengtao Li, Ziqi Zhang, HaoZheng (Xi'an Jiaotong University, China)
- 9:55-10:15 **Coffee Break**
- 10:15-10:30 Molecular Dynamics Simulation of Electrical Properties and Surface Binding Energy of PVDF/BNNS Composites Based on ReaxFF (NO. 731)
Xiaosong Wang, Tong Zhao, Xiuqing Yi, Liang Zou, Li Zhang (School of Electrical Engineering, Shandong University, China)
- 10:30-10:45 Application of SiC-filled Permittivity and Conductivity Graded Material (ϵ/σ -FGM) in HVDC GIS Spacer (NO. 729)
Rachmawati Rachmawati, Hiroki Kojima, Katsumi Kato, Nabila Zebouchi, Naoki Hayakawa (Nagoya University, China)
- 10:45-11:00 Influence of Aging on Prebreakdown Characteristics of Ester Liquids with Experimental and Statistical Analysis (NO. 711)
T. Jayasree^{1}, U. Mohan Rao¹, I. Fofana¹, S. Brettschneider¹, E. M. Rodriguez Celis², P. Picher² (¹International Center for Research on Atmospheric Icing and Power Grid Engineering (CENGIVRE) Université du Québec à Chicoutimi, QC G7H 2B1, Canada; ²Institut de Recherche d'Hydro-Québec (IREQ), Varennes, QC J3X 1S1, Canada)*
- 11:00-11:15 Insulation Characteristics of Quasi-uniform Electric Field and Effect of Metallic Particle Contamination in Highly Compressed Dry Air (NO. 1018)
MAKOTO MIYASHITA, SHINICHIRO NAKAUCHI, YUJI YOSHITOMO, MOTOHIRO SATO

- (MITSUBISHI ELECTRIC Corporation, Japan)
- 11:15-11:30 Microstructure Design and Breakdown Improvement of PP Films for Capacitors Based on Nano-addition (NO. 473)
Zhaoyu Ran, Boxue Du, Meng Xiao, Jiwen Xing, (Tianjin University, China)
- 11:30-11:45 INFLUENCE OF TRACE SF6 ON STREAMER CORONA DEVELOPMENT IN SF6/N2 MIXTURES UNDER POSITIVE DC VOLTAGES (NO. 433)
Yanliang He, Wei Ding, Anbang Sun, Guanjun Zhang (State Key Laboratory of Electrical Insulation and Power Equipment, School of Electrical Engineering, Xi'an Jiaotong University, China)
- 11:45-12:00 EFFECTS OF TiO2 NANOPARTICLES AND ELECTRODE MATERIALS ON IMPULSE BREAKDOWN PERFORMANCE OF PROPYLENE CARBONATE UNDER UNEVEN ELECTRIC FIELD (NO. 329)
Shilin Wu, Qing Yang, Zhaotian Zhang, Wenkai He (State Key Laboratory of Power Transmission Equipment and System Security and New Technology, Chongqing University, China)

Oral Session 13

November 24, 2021 (Wednesday)

Session 13: High voltage and high current testing techniques: test procedures, measurements, evaluation, partial discharges, space charges, dielectric characteristics, emerging test techniques

Chairs: Professor Yi Wu, Xi'an Jiaotong University, China

Dr. M. Tariq Nazir, University of New South Wales, Australia

Venue: Hall 1

- 14:00-14:25 Invited Speaker: Professor Michael Hartje, Hochschule Bremen -- University of Applied Sciences, Germany
Invited
Reproducibility of Partial Discharge Measurement on Surface Discharges According to IEC 60270 at DC and AC Voltages (NO. 135)
Michael Hartje^{1}, Thomas Kumm¹, Bernhard Schober², Uwe Schichler², Javier Torres³, Peter Werle³ (¹High Voltage Laboratory, University of Applied Science Bremen, Neustadtswall 30, 28199 Bremen, Germany, ²Institute of High Voltage Engineering and System Performance, Graz University of Technology, Inffeldgasse 18, 8010 Graz, Austria, ³Institute of Electric Power Systems – Schering Institute for High Voltage Engineering, Leibniz University Hannover, Callinstraße 25a, 30167 Hannover, Germany)*
- 14:25-14:40 Experimental Research on the Arcing Characteristics of C₄F₇N/CO₂ Gas Mixtures (NO. 834)
Lei Han, Xin Lin, Jia Zhang, Jianyuan Xu, Yu Song, Ding Feng (School of Electrical Engineering, Shenyang University of Technology, Shenyang, China)*
- 14:40-14:55 Partial Discharge Measurements and Effects of Transients on Power Cables (NO. 961)
Jiayang Wu¹, Armando Rodrigo Mor², Johan J Smit² (¹DNV, Utrechtseweg 310, 6812 AR Arnhem, The Netherlands, ²Delft University of Technology, Faculty of Electrical Engineering, Mathematics and Computer Science Mekelweg 4, 2628CD Delft, The Netherlands)
- 14:55-15:10 Reliable Inter Turn Fault Detection on Low Voltage Motors Using SFRA Measurements and Comparison to Surge Testing (NO. 2)

Maximilian Mayer¹, Fabian Oettl², Lukas Ranzinger³, Weiqiang Jin⁴, David Gopp⁵ (¹Vienna technical University, ²Omicron Technologies Italia GmbH, ³Munich University of Applied Sciences, ⁴OMICRON Power Technologies Consulting (Shanghai) Co., Ltd., ⁵Omicron electronics GmbH Austria)

15:10-15:25 Investigation of the influence of interference pulses on the PD Detection and PD Localization with UHF Sensors (NO. 111)

Rouven Berkemeier^{1*}, Robert Bach², Stefan Tenbohlen³ (¹South Westphalia University of Applied Sciences, Soest, Germany, ²South Westphalia University of Applied Sciences, Lübecker Ring 2, 59494 Soest, Germany, ³University of Stuttgart, Pfaffenwaldring 47, 70569 Stuttgart, Germany)

15:25-15:40 Influence of Low Frequency Dielectric Relaxation on Electric Field Distribution of Epoxy Impregnated Paper (NO. 927)

Zhengqiang Liu¹, Hongliang Zhang^{1*}, Xiaohong Hao¹, Hai Jin¹, Kun Li¹, Lu Guo² (¹College of Electrical and Information Engineering and Lanzhou University of Technology, Lanzhou, China, ²Gansu Electric Power Research Institute, Lanzhou, China)

15:40-15:55 A Case Study to Investigate Transformer Winding Inter-Turn Short Circuit Faults Using FRA Measurements (NO. 1489)

Mehran Tahir*, Stefan Tenbohlen (Institute of Power Transmission and High Voltage Technology (IEH), University of Stuttgart, Germany)

15:55-16:15

Coffee Break

16:15-16:30 Short Circuit Protection of High-Voltage High-Power Three-Level Inverter System (NO. 582)

Yang Li, Jian Liu (Wuhan institute of technology, Wuhan, People's Republic of China)

16:30-16:45 Reference Calibrator for Combined and Composite High Voltage Impulse Tests (NO. 119)

Hanane Saadeddine^{1*}, Mohamed Agazar¹, Johann Meisner² (¹LNE Laboratoire national de métrologie et d'essais, 1 rue Gaston Boissier 75724 Paris cedex 15, France, ²PTB Physikalisch-Technische Bundesanstalt, Bundesallee 100 38116 Braunschweig, Germany)

16:45-17:00 Experimental Investigation on the Hysteresis Loop Effect of the Body Force Induced by DBD Plasma Actuation (NO. 993)

Yuanpeng Liu^{1*}, Minghao Yu¹, Borui Zheng¹, Qian Zhang¹, Yuanzhong Jin¹, Shulin Xu², Zhengzhong Sun³ (¹Xi'an University of Technology, Xi'an, China, ²The Green Aerotechnics Research Institute of Chongqing Jiaotong University, Chongqing, China, ³City, University of London)

Oral Session 14

November 24, 2021 (Wednesday), 14:00-17:15

Session 14: Transient voltages: lightning, switching, repetitive impulses, surge arresters, insulation coordination, over-voltage protection, EMC

Chairs: Prof. Jiangtao Li, Xi'an Jiaotong University, China

Dr. Zoltán Tóth, Budapest University of Technology and Economics, Hungary

Venue:

14:00-14:25 Invited Speaker: Dr. Zoltán Tóth, Budapest University, Hungary

Invited Cost-effective Lightning Protection of High-performance Photovoltaic Power Plants (No. 878)

György Kálec, Zoltán Tóth, Bálint Németh, István Kiss (Budapest University of Technology and Economics, Hungary)

- 14:25-14:40 Transport Behaviour of Residual Charges in Repetitively Pulsed Streamer Evolution in Gas Gap and Along Solid Surface (No. 96)
Zheng Zhao, Xinlei Zheng, Zhifeng Dai, Chenjie Li, Anbang Sun, Jiangtao Li (Xi'an Jiaotong University, China)
- 14:40-14:55 A New Single-phase Multi-winding Low Frequency Converter Transformer Model Based on the Design Parameters (No. 744)
Bingyang Zou¹, Bo Yue², Ke Wang³, Xuan Li², He Zhang², Gang Li³, Wenxia Sima¹, Ming Yang¹ (¹Chongqing University, China; ²State Grid Economic and Technological Research Institute Co., Ltd, China; ³China Electric Power Research Institute, China)
- 14:55-15:10 Grounding System of Medium Voltage Network with Integrated Distributed Generation: Short-Circuit Analysis and Calculation of the Developed Potentials (No. 418)
Emmanouil D. Ellinas, Katerina D. Damianaki, Christos A. Christodoulou, Emmanouil M. Voumvoulakis, Ioannis F. Gonos (National Technical University of Athens, Greece)
- 15:10-15:25 Effect of Soil Discharge Channels on Cables Under Lightning Strikes (No. 1261)
Xiaochuan Li, Wenxia Sima, Tao Yuan, Ming Yang, Jialun Li, Xiejun Du (Chongqing University, China)
- 15:25-15:40 Partial Discharge Statistical Characteristics of Oil-paper Insulation Under High Frequency Stress (No. 1007)
Xiaonan Li¹, Yan Yang¹, Kai Liu¹, Zihao Wu², Tong Liu², Minghui Zhu², Guangning Wu¹ (¹Southwest Jiaotong University, China; ²Electric Power Research Institute of State Grid Shaanxi Electric Power Company, China)
- 15:40-15:55 Development Approach of a Leader-Propagation-Model for the Discharge Process of Various Voltage Forms in Long Air Gap Rod-plane Electrode Configurations (No. 1384)
Uwe Schubert¹, Xiuyuan Yao², Ali Shirbani³, Ting Lei², Yujian Ding², Weidong Shi², Uwe Schmidt¹ (¹Zittau/Goerlitz University of Applied Science, Germany; ²China Electric Power Research Institute, China; ³E. cons GmbH, Germany)
- 15:55-16:15 **Coffee Break**
- 16:16-16:30 Discharge Development in Air During Lightning Impulse Stress in Uniform Electric Field with Rodshaped Protrusion (No. 591)
Michael Peiß, Thomas Spies, Myriam Koch (Technical University of Munich, Germany)
- 16:30-16:45 Transient Enclosure Voltage Measurement and Analysis of 1100 kV Disconnecter Bus-charging Current Switching Tests (No. 276)
Chen Liu¹, Qiang Li^{1,2}, Ni Yuan¹, Meng Shen¹, Chunqiang Su¹, Hao Sun¹, Yuhong Zheng³, Tao Jia¹, Weidong Ding² (¹Xi'an High Voltage Apparatus Research Institute, China; ²Xi'an Jiaotong University, China; ³New Northeast Electric Group High Voltage Switchgear Co., Ltd, China)
- 16:45-17:00 The Impact of Overhead Line Length on Ferroresonance in Low-loss Distribution Transformers (No. 630)
Abdullahi I Abdi, Jeremiah J Walker, Jules S Djeumen (Vaal University of Technology, South Africa)
- 17:00-17:15 The Effect of Frequency Dependent Soil Electrical Parameters on the Lightning Response of a "Y" Shaped Composite Pylon for 400 kV Transmission Lines (No. 1371)
Kai Yin, Mohammad Ghomi, Filipe FD Silva, Claus Leth Bak, Hanchi Zhang, Qian Wang (Aalborg

Oral Session 15

November 24, 2021 (Wednesday), 14:00-17:15

Session 15: HVDC technologies and systems: design problems, testing and measuring techniques, advanced HVDC systems

Chairs: Professor Jiansheng Wang, Xi'an High Voltage Apparatus Research Institute Co., LTD, China
Dr. Caterina Toigo, SuperGrid Institute, France

Venue: Hall 3

- 14:00-14:25 Invited Speaker: Dr. Caterina Toigo, SuperGrid Institute, France
 Invited Simulation Methodology for HVDC Cable Accessories: Focus on Oscillating Polarity Reversal and Temporary Overvoltages (No. 945)
 Caterina Toigo, Thanh Vu-Cong, Frank Jacquier, Alain Girodet (SuperGrid Institute, France)
- 14:25-14:40 Dielectric Long-term Behaviour of Gas-insulated HVDC Systems (No. 930)
 Uwe Riechert (Hitachi-ABB Power Grids, Switzerland)
- 14:40-14:55 A Method to Accurately Determine the Electric Field Strength in Prefabricated Joints for DC XLPE Cables (No. 184)
 Ying Liu, Yanjie Wei, Mingwei Zhao (Xi'an Jiaotong University, China)
- 14:55-15:10 Partial Discharge Characteristics of HVDC Cables Based on XLPE/EPDM Samples and Typical Artificial Defects (No. 685)
 Yuzhu Chen¹, Xiaosheng Peng¹, Hongyu Wang¹, Ashfaque Ahmed Bhatti¹, Mingzhong Xu², Fanwu Chu² (¹Huazhong University of Science and Technology, China; ²China Electric Power Research Institute, China)
- 15:10-15:25 DC Air Humidity Correction Factor for Air External Insulation Revisited (No. 97)
 Liliana Arevalo¹, Dong Wu¹, Mats Larsson² (¹Hitachi-ABB Power Grids-HVDC, Sweden; ²Second Hitachi-ABB Power Grids-Research, Sweden)
- 15:25-15:40 Signal Attenuation and Distortion in Coaxial Cables for High Voltage Measurements (No. 1347)
 Aderrahim Khamlichi^{1,2}, Fernando Garnacho^{1,2}, Jorge Rovira¹, Pascual Simon¹ (¹FFII-LCOE, Spain; ²Polytechnic University of Madrid, Spain)
- 15:40-15:55 DC Electric Fields in HVDC Stations (No. 77)
 Yury Solovyev, Liliana Arevalo (Hitachi Power Grids AB, Sweden)
- 15:55-16:15 **Coffee Break**
- 16:16-16:30 Qualification of MV AC XLPE Cables for DC Operation (No. 118)
 Patrik Alexander Ratheiser, Uwe Schichler (Graz University of Technology, Austria)

Oral Session 16

November 24, 2021 (Wednesday)

Session 16: Advanced materials and insulation systems: outdoor, indoor, solid, liquid and gas insulated, nanodielectrics, eco-friendly and other new materials, novel insulation system

Chairs: Prof. Junwei Zha, University of Science and Technology Beijing, China

Prof. Qiang Liu, The University of Manchester, UK

Venue: Hall 4

- 14:00-14:25 Invited Speaker: Professor Qiang Liu, The University of Manchester, UK
Invited Development of an Experimental Setup to Study Temperature Distribution of Liquid Natural Cooled Power Transformers (NO. 129)
Sicheng Zhao, Qiang Liu, Xiang Zhang, Mark Wilkinson, Massimo Negro, Muhammad Daghrah, Sicheng Zhao (The University of Manchester, United Kingdom)
- 14:25-14:40 EFFECT OF VOLTAGE & FOG APPLICATION ON AC FLASHOVER CHARACTERISTICS OF POLYMERIC INSULATORS UNDER ARTIFICIAL CLEAN FOG TEST (NO. 1440)
Mohammed El AmineSLAMA (Cardiff University, United Kingdom)
- 14:40-14:55 Simulation on Weibull-Distribution of PP Nanocomposites Modulated by Carrier Transport and Molecular Displacement (NO. 1243)
Shurao Cai, Ziwei Gao, Minzun Ji, Daomin Min, Shengtao Li, Qingzhou Wu, Jie Liu (School of electrical engineering, Xi'an Jiaotong University, China)
- 14:55-15:10 IMPROVED BREAKDOWN STRENGTH AND ENERGY DENSITY OF ALL-ORGANIC POLYMER DIELECTRICS AT ELEVATED TEMPERATURE (NO. 1121)
Qi-Kun Feng, Shao-Long Zhong, Li-Juan Yin, Jia-Yao Pei, Yong-Xin Zhang, Yan-Hui Song, Zhi-Min Dang (Tsinghua University, China)
- 15:10-15:25 Research on Detection Technology of Bubble Size Distribution in Transformer Oil Based on Mie Scattering Theory (NO. 1086)
Xiaohui He, Qiaogen Zhang, Rui Zhang, Chong Guo, Xingwang Wu (Xi'an Jiaotong University, China)
- 15:25-15:40 COMPATIBILITY TEST OF GASKETS AND COATINGS WITH ESTER INSULATING LIQUIDS AT ELEVATED TEMPERATURE (NO. 458)
Kexin Pan, Xiaojing Zhang, Haoyong Song, Wei Wang, Yang Xu (State Key Laboratory of Electrical Insulation and Power Equipment Xi'an Jiaotong University)
- 15:40-15:55 The Natural Concentration Gradient Distribution of ZnO- epoxy Composites in Preparation (NO. 456)
Xin Liu¹, Xiaolin Zhao², Xining Li², Hao Tang², Hanbing Hao¹, Zhiwen Huang³, Zhikang Yuan³, Jun Hu^{3} (¹State Grid Anhui Maintenance Company, Anhui, China; ²China Electric Power Research Institute, Beijing, China; ³Tsinghua University, Beijing, China)*
- 15:55-16:15 **Coffee Break**
- 15:55-16:10 Effect of micro-nano particles co doping in epoxy on surface flashover (NO. 422)
Xiang Gao, Bo Zhang, J in Huang, Huan Niu, Mingru Li, Shengtao Li (The Locomotive and Car Research Institute, China Academy of Railway Sciences, China)
- 16:10-16:25 INFLUENCE OF ZINC OXIDE NANOPARTICLES ON DIELECTRIC PERFORMANCE OF NATURAL ESTER OIL (NO. 251)
Konstantinos Koutras, Ioannis Naxakis, Eleftheria Pyrgioti, Vassilios Charalampakos, Georgios Peppas (University of Patras, Greece)
- 16:25-16:40 Investigation of Electrical and Thermal Behavior of Modified Epoxy Structures for DC and High Frequency Applications (NO. 196)
Muhammad Awais, Chao Dai, Fan-Bo Meng, Ashish Paramane, Xin Wang, Xiangrong Chen (Zhejiang University, China)

- 16:40-16:55 HYDROPHOBICITY AND DENSITY MEASUREMENTS ON NEW AND FIELD AGED MEDIUM VOLTAGE COMPOSITE INSULATORS (NO. 1058)
Christos-Christodoulos Kokalis, Kokalis Kokalis, Constantinos Giasafakis, Vassiliki Kontargyri (National Technical University of Athens, Greece)

Oral Session 17

November 25, 2021 (Thursday)

Session 17: High voltage and high current testing techniques: test procedures, measurements, evaluation, partial discharges, space charges, dielectric characteristics, emerging test techniques

Chairs: Dr. Diego Robalino, Megger Group, USA

Prof. Yanpeng Hao, South China University of Technology, China

Venue: Hall 1

- 08:30-08:55 Invited Speaker: Dr. Diego Robalino, Megger Group, USA
Invited Novel Approach for Insulation Condition Assessment of High Voltage Substation Equipment at 1 Hz (NO. 1054)
Diego M Robalino^{1}, Vince Oppedisano², Kenneth Petroff² (¹MEGGER Group, Dallas TX, USA, ²MEGGER, Norristown PA, USA)*
- 08:55-09:10 Correlation between Current and Light Intensity of M Composites in Triggered Lightning (NO. 325)
Yabei Fan¹, Chang He¹, Mi Zhou^{1}, Daohong Wang², Jianguo Wang¹, Li Cai¹, Yadong Fan¹ (¹School of Electrical Engineering and Automation, Wuhan University, Wuhan, China, ²Department of Electrical, Electronic and Computer Engineering, Gifu University, Gifu, Japan)*
- 09:10-09:25 Measurement Method for Physical Properties of an Arc Generates and Propagates over an Ice Surface (NO. 335)
MENG Wei, Jianlin Hu, Ruihe Zhang, Xiaofeng Wang, Keer Sun, Xingliang Jiang (Dept. of High Voltage and Insulation Technology, College of Electrical Engineering, Chongqing University Chongqing, China)*
- 09:25-09:40 F-P Ultrasonic Sensor Based on Four-Cantilever BeamSupported Structure (NO. 449)
Kejie Wu¹, Weigen Chen^{1}, Zhixian Zhang¹, Yuxuan Song¹, Jiali Lei², Fan Liu³ (¹State Key Laboratory of Power Transmission Equipment & System Security and New Technology, Chongqing University, Chongqing, China, ²State Grid Fujian Electric Power Research Institute, No. 48, Fuyuan Branch Road, Cangshan District, Fuzhou, China, ³State Grid Hubei Electric Power Research Institute, No. 101, Xudong Street, Hongshan District, Wuhan, China)*
- 09:40-09:55 DC Flashover Performance of Surface Fluorinated Alumina/Epoxy Resin Composite with Real Spacer Formulation (NO. 593)
Feiyue Ma¹, Zhonghua Xiang², Ying Wei¹, Wenbo Huang³, Zhenlian An^{3} (¹State Grid Ningxia Electric Power Corporation Research Institute, Yinchuan, China, ²State Grid Ningxia Electric Power Co., Ltd, Yinchuan, China, ³Department of Electrical Engineering, Tongji University, Shanghai, China)*
- 09:55-10:15 **Coffee Break**
- 10:15-10:30 A Degradation Detection Dase of Polarization-Depolarization Current on 110kV Submarine

Cables (NO. 712)

Shihu Yu^{1}, Xin Yu¹, Xiangyang Peng¹, Cuiru Yang¹, Ji Wu¹, Jixiang Wang², Kai Zhou²*
(¹Guangdong Key Laboratory of Electric Power Equipment Reliability, Electric Power Research Institute of Guangdong Power Grid Co., Ltd, Guangzhou 510080, China, ²School of Electrical Engineering and Information, Sichuan University, Chengdu 610065, China)

10:30-10:45

Application of PD Detection Technology in Withstand Voltage Test for Power Cable Lines (NO. 794)

Chen Min^{1}, Huang Jiasheng², Zhou Zhipeng¹, Lu Jingjing¹, Xie Yanting¹, Liu Yingying¹* (¹ZF Technology Ltd., Guangzhou, China, ²Guangdong Power Grid Corporation Guangzhou Power Supply Bureau., Guangzhou, China)

Oral Session 18

November 25, 2021 (Thursday)

Session 18: High voltage and high current testing techniques: test procedures, measurements, evaluation, partial discharges, space charges, dielectric characteristics, emerging test techniques

Chairs: Prof. Masahiro Kozako, Kyushu Institute of Technology, Japan

Prof. Wenfeng Liu, Xi'an Jiaotong University, China

Venue: Hall 2

08:30-08:55

Invited Speaker: Professor Masahiro Kozako, Kyushu Institute of Technology, Japan

Invited

Volume Effect on AC Dielectric Breakdown Strength of Ester Oil Compared with that of Mineral Oil (NO. 748)

Kyouhei Hamasuna¹, Takaaki Matsuki¹, Masahiro Kozako¹, Masayuki Hikita¹, Shigeyoshi Yoshida², Haruki Hamada², Takahiro Umemoto² (¹Electrical Energy Engineering Course, Kyushu Institute of Technology, Fukuoka, Japan; ²Electrical Systems Engineering Department, Mitsubishi Electric Corporation, Hyogo, Japan)

08:55-09:10

Arc Extinguishing Performance of Environmental-Friendly Gas Mixture C₄F₇N-CO₂ in a Disconnect Switch (NO. 900)

Kai Wang, Ran Zhou, Boya Zhang, Xingwen Li** (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, People's Republic of China)

09:10-09:25

Effect of Water Content on DC Conduction and Space Charge Characteristics of the Nanocomposites of Crosslinked Polyethylene (NO. 16)

Jinghao Wang¹, Jiixin Chen¹, Yifei He¹, Chu Wang¹, Meibing Liu², Wenqing Chen², Zepeng Lv¹, Kai Wu^{1}* (¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, P. R. China, ²Zhejiang Wanma Macromolecule Material Group Co., Ltd, Lin'an, P. R. China)

09:25-09:40

Analysis of Decomposition By-Products and Its Formation Mechanism of SF₆/N₂ Mixed Gases under Spark Discharge (NO. 1217)

Fengxiang Ma¹, Ding Feng^{2}, Xin Lin², Jianyuan Xu², Yanguo Ke³, Jia Zhang², Hengyang Zhao³* (¹State Grid Anhui Electric Power Company Limited Research Institute, Hefei 230601, China, ²School of Electrical Engineering, Shenyang University of Technology, Shenyang 110870, China, ³State Grid Anhui Electric Power Company Limited, Hefei 230061, China)

- 09:40-09:55 VLF Monitored Withstand Test for Distribution Cables (NO. 437)
Hao Ma, Yuan Tian, Gerhard Reimann, Markus Baur (Representative Office Shanghai BAUR GmbH Austria)
- 09:55-10:15 **Coffee Break**
- 10:15-10:30 Effect of Transformer Oil and Membrane of Extrinsic F+P Optical Fiber Sensor for PD Induced Acoustic Emission Detection and Signal Scaling (NO. 1434)
Hong Zhao, Weichao Zhang*, Qichao Chen, Jixian Qiao (Key Laboratory of Engineering Dielectrics and Its Applications Ministry of Education China and School of Electrical and Electronic engineering Harbin University of science and Technology, Harbin, China)*
- 10:30-10:45 Influence of Gas Flow on Surface Discharge Development under AC Voltage (NO. 1445)
Yan Du¹, Qing Dong Zhu², Chong Li³, Jingrui Zhang¹, Didi Liu¹, Manqing Zhao¹ (¹Xi'an Polytechnic University, Xi'an, China, ²State Grid Shandong Electric Power Research Institute, Jinan, China, ³Xian thermal power research institute co., LTD, Xi'an, China)*
- 10:45-11:00 The Influence of Degassing Time and Curing Time on Insulation Behaviors of Silicone Gel in IGBT Modules (NO. 922)
Kaixuan Li¹, Boya Zhang¹, Xingwen Li¹, Haotao Ke² (¹State Key Lab of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China, ²State Key Lab of Advanced Power Semiconductor Devices, Zhuzhou CRRC Times Electric, Zhuzhou China)*

Oral Session 19

November 25, 2021 (Thursday)

Session 19: Monitoring and diagnostics: intelligent sensing, big data, artificial intelligence, asset management, live-line working, maintenance and repair, safety considerations

Chairs: Prof. Ji Liu, Harbin University of Science and Technology, China

Assoc. Prof. Yang Wang, Xi'an Polytechnic University, China

Venue: Hall 3

- 08:30-08:55 Invited Speaker: Professor Ming Dong, Xi'an Jiaotong University, China
Invited Gas Generation in Environment-friendly Insulating Fluid Under Partial Discharge and Sparking Faults (NO.1474)
Yadong Xing, Yang Liu, Yingjie Xi, Yizhuo Hu, Ming Dong, Ming Ren (State Key Laboratory of Electrical Insulation and Power Equipment, School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, China)
- 08:55-09:10 Site Experimental Study on Smart De-Icing Device Based on The De-Icing Method by The Transferred Current of Bunfled Conductors (No. 146)
Guolin Yang¹, Xingliang Jiang¹, Xiaodog Ren¹, Wenxuan Zhou¹, Jun Ma², Zhen Qin² (¹State Key Laboratory of Power Transmission Equipment & System Security and New Technology, School of Electrical Engineering, Chongqing University No.174 Shazhengjie Shapingba, Chongqing, China, ²Chongqing Electric Power Design Institute Co., Ltd, No.60, Shan'an street, Shapingba, Chongqing, China)
- 09:10-09:25 A Method to Estimate Equivalent Air-core Inductance of a Uniform Winding as a Function of its length from Measured DPI Magnitude Data- Experimental Results (NO. 87)

- A Muhammed¹, L Satish¹, Udaya Kumar¹ (¹HV Lab, Indian Institute of Science, Bangalore-560012)*
- 09:25-09:40 Research on the Selection and Layout of Cantilever Sensors Based on Photoacoustic Spectroscopy Technology (NO.1484)
Fuping Zeng¹, Hongtu Cheng¹, Qiang Yao², Long Li², Shiling Zhang², Congdong She^{1} (¹Wuhan University, Wuhan, China; ²Chongqing Power Research Institute, Chongqing Power Company, Chongqing, China)*
- 09:40-09:55 SOC Estimation for Lithium-ion Batteries Based on Electrochemical Impedance Spectroscopy and Equivalent Circuit Model (NO.1479)
Yingjie Xi, Yang Liu, Yadong Xing, Ming Dong, Rongfa Chen (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China)
- 09:55-10:15 **Coffee Break**
- 10:15-10:30 Micro-cantilever Electric field Sensor Based on Piezoelectric-piezoresistive Coupling (No. 983)
Zhifei Han¹, Fen Xue¹, Jun Hu¹, Jinliang He¹ (¹Tsinghua University, Beijing, China)
- 10:30-10:45 Data Reliability of RFID Temperature Sensor Applied to Switchgear (No. 81)
Jiabao Mei, Ruolan Wang, Kaihong Xu, Zhifeng Dai and Jiangtao Li (Xi'an Jiaotong University, School of Electrical Engineering, Xi'an 710049, China)

Oral Session 20

November 25, 2021 (Thursday)

Session 20: Electromagnetic fields: computation, measurements, environmental effects

Chairs: Prof. Fan Yang, Chongqing University, China

Prof. Akiko Kumada, The University of Tokyo, Japan

Venue: Hall 4

- 08:30-08:55 Invited Speaker: Professor Jun Deng, China Southern Power Grid, China
Invited Study on Internal Electric Field Distribution of On-Load Tap Changer for Converter Transformer (NO. 1476)
Jun Deng, Zhicheng Xie, Haibin Zhou, Zhicheng Pan (Maintenance and test centre of EHV power transmission company of CSG, Guangzhou, China)
- 08:55-09:10 Simulation on Arcing Process Considering Continuous Motion of Non-return Valve for Auto-expansion Circuit Breakers (NO. 855)
Kai Zhu, Wenbing Zhang, Zhanfeng Ma, Xu Jiang, Jia Wu (Xi'an XD Switchgear Electric Co., Ltd., Xi'an, People's Republic of China)
- 09:10-09:25 Packaging Method and Temperature Characteristics of Miniature E-field Probe with Fiber-LiNbO₃ Evanescent Coupler (NO. 491)
Zhangying Cheng, Xuandong Liu, Lechen Ma, Ming Chen, Xianfei Liu, Zhao Tang (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China)
- 09:25-09:40 Multi-physic Field Simulation and Optimization of Integrated Voltage Selfsharing Interrupter (NO. 1425)
CHENG Xian^{1,2}, LI Xin^{1,2}, GE Guowei^{1,2}, DU Shuai^{1,2}, TIAN Xiaoqian^{1,2} (¹School of Electrical

- Engineering, Zhengzhou University, Zhengzhou, China, ² Henan Engineering Research Center of Power Transmission & Distribution Equipment and Electrical Insulation, Zhengzhou, China)
- 09:40-09:55 Dynamic Solidification Process of Silicone Oil Within Outdoor Cable Terminals under Cold Conditions (NO. 1093)
Longji Li¹, Pengxian Song¹, Fengzheng Zhou¹, Zhengzheng Meng¹, Zhijian Li¹, Qinghua Tang¹, Shengchen Fang¹, Xin Guo², Yang Yu¹, Songtao Liu³, Jin Li³, Boxue Du³ (¹State Grid Tianjin Electric Power Research Institute, Tianjin, 300384, China, ² State Grid Tianjin Electric Power Company, Hebei District, Tianjin 300010, China, ³ School of Electrical and Information Engineering, Tianjin University, Tianjin 300072, China)
- 09:55-10:15 **Coffee Break**
- 10:15-10:30 Numerical Simulation of Surface Discharge in Oil Paper Insulation Based on Finite Element Method and Cellular Automata (NO. 1480)
Jianning Chen, Yuanxiang Zhou, Yunxiao Zhang, Xin Huang, Ling Zhang (State Key Laboratory of Control and Simulation of Power System and Generation Equipment, Department of Electrical Engineering, Tsinghua University, Beijing, China)
- 10:30-10:45 Arc Interruption Performance of C4F7N-CO₂ and Dielectric Recovery in Disconnecting Switch (NO. 892)
Ran Zhou¹, Kai Wang¹, Boya Zhang¹, Xingwen Li¹ (¹ State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, People's Republic of China)

Poster/Semi-oral Sessions

Poster/Semi-oral Session 1

November 23, 2021 (Tuesday), 17:20-18:30

Session 1: High voltage and high current testing techniques: test procedures, measurements, evaluation, partial discharges, space charges, dielectric characteristics, emerging test techniques

Session Chairs: Dr. Lin Cheng, Shannxi Electric Power Research Institute, China
Assoc. Prof. Yuan Li, Xi'an Jiaotong University, China

Venue: Hall 1

- 17:20-17:25 Research on Ultraviolet Spectrum Characteristics of Corona Discharge on Porcelain Insulator under Different Pollution Degrees (NO. 131)
Dieji Zheng^{1,2}, Binqiang Xia³, Yuhong Chang³, Sheng Lu¹, Yuan Gao^{2}, Wenbin Zhao², Yaonan Zhang²* (¹East China Tianhuangping Pumped Storage Power Co Ltd, Hangzhou, China, ²Shanghai University of Electric Power, Shanghai, China, ³State Grid Xinyuan Company Ltd, Beijing, China)
- 17:25-17:30 A Wavelet De-Noiseing Method for Partial Discharge Based on Wavelet Entropy and Sparsity (NO. 166)
Lu Zhai¹, Haofei Sun², Xuefeng Zhao², YuXiao Hu¹, Yang Xu^{1}* (¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China, ²Electric Power Research Institute of State Grid Shaanxi Electric Power Company, Xi'an, China)
- 17:30-17:35 Improvement on Dynamic Drop Test for Dynamic Hydrophobicity Measurement (NO. 167)

- Qian Wang¹, Hao Shen², Xidong Liang^{1*}, Shuming Liu¹, Shuqi Liu¹, Zhou Zuo¹ (¹State Key Laboratory of Power System, Tsinghua University, Beijing, China, ²Ningbo Power Supply Center, State Grid Zhejiang Electric Power Company, Ningbo, China)*
- 17:35-17:40 Evaluation of Flashover Characteristics along Epoxy Spacer in DC-GIL (NO. 199)
Yanfeng Qi, Zehui Zhang, Weiqiang Jiang^{}, Yuan Cheng, Hua Ge, Hongshuai Zhang (Laiwu Power Supply Company of State Grid Shandong Electric Power Company, Laiwu 271100, China)*
- 17:40-17:45 Experiment and Simulation of High Current Temperature of Value Hall Fittings (NO. 229)
Zhikai Li^{1}, TingRen¹, Zemin Liao¹, Qilin Wang¹, Wei Zhang², Guohua Yang², Wenhao Wang², Peng Liu¹ (¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China, ²PingGao Group Co., Ltd Pingdingshan, China)*
- 17:45-17:50 Research on Impulse Response Characteristics of Capacitor Voltage Transformer and Analysis of Influencing Factors (NO. 238)
Xuan Li^{1,2}, Jiangbo Chen^{1,2}, Ping Wang³, Shipu Wu^{1,2}, Shuangyin Dai⁴ (¹China Electric Power Research Institute, Wuhan, China, ²State Key Laboratory of Power Grid Environmental Protection, Wuhan, China, ³North of China electric power university, Baoding, China, ⁴Electric Power Research Institute, State Grid Henan Electrical Power Company, Zhengzhou, China)*
- 17:50-17:55 Development of Standard Wave Source for Impulse Current Traceability (NO. 247)
Jiawei Fan, Zhaozhi Long, Wenting Li, Kangmin Hu, Shaobo Liu (China Electric Power Research Institute, No143 Luoyu Road, Wuhan, China)
- 17:55-18:00 Simulation Analysis of a 110 kV Cable Terminal Fault (NO. 283)
Hanchao Ma^{1}, Bo Zhang², Hao Fu², Xiaojun Zhang¹, Shuqiang Zhou³, Suzhou Wu¹ (¹State Grid Xinjiang Electric Power Research Institute, Urumqi, China, ²State Grid Xinjiang Electric Power Company, Urumqi, China, ³State Grid Urumqi Electric Power Supply Company, Urumqi, China)*
- 18:00-18:05 Study on Space Charge Characteristics in XLPE/EPDM composite under DC Superimposed Impulse Voltage (NO. 327)
Bonan Cui, Shuai Liu, Quanxu Jiang, Xia Wang^{} (State Key Laboratory of Electric Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China)*
- 18:05-18:10 Evaluation Method of Cable Dielectric Loss under Oscillating Wave Voltage (NO. 291)
Suzhou Wu^{1}, GongCheng², YingZhang², ChaoLi³, Hanchao Ma¹, Xiaojun Zhang¹ (¹State Grid Xinjiang Electric Power Research Institute, Urumqi, China; ²State Grid Xinjiang Electric Power Company, Urumqi, China; ³State Grid Urumqi Electric Power Supply Company, Urumqi, China)*
- 18:10-18:15 Research on Insulation Aging state of XLPE Cables under Accelerated Aging (NO. 373)
*Jiahe Wang¹, Man Ding^{*1,2}, Jinpeng Wang¹, Zhenfei Chen¹ (¹College of Energy and Electrical Engineering, Hohai University, Nanjing, P. R. China, ²State Grid Gansu Electric Power Co., Ltd. Research Institute, Lanzhou, 730071, P. R. China)*
- 18:15-18:20 Evaluation Model of Transformer State Based on Improved Fuzzy Comprehensive Diagnosis Theory (NO. 377)
Sen Liu¹, Yidan Hu², Zhaoyu Zhang², Junhao Li², Yanjun Zhao¹, Xu Li¹, Likun Xiong¹, Changchun Zhai¹ (¹China Nuclear Power Design Co. Ltd (Shenzhen), Shenzhen, People's Republic of China, ²State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, No. 28 West Xianning Road, Xi'an, People's Republic of China)
- 18:20-18:25 Research on Linearity Measurement Method of Impulse Current Measuring Devices (NO. 382)
Zhaozhi Long^{1}, WentingLi¹, Feng Zhou¹, Yi Liu², Jiawei Fan¹, Kangmin Hu¹, Wenxin Peng³ (¹Research Institute of Metrology China Electrical Power Research Institute, Wuhan, China,*

²SEEE, Huazhong University of Science & Technology, Wuhan, China, ³State Grid Chongqing Electric Power Research Institute, Chongqing, China)

18:25-18:30 Measurement and Analysis of Partial Discharge of Bubble Defects in GIS Basin Insulator (NO. 1026)

Tao Wang¹, Heng Ti^{2*}, Mingming Chen³, Rui Zhang¹, Guanglin Bai¹, Jianwen Zhang² (¹State Grid Economic and Technological Research Institute Co. Ltd, Beijing, China, ²School of Electrical and Power Engineering, China University of Mining and Technology, Xuzhou, China, ³Sieyuan Electric Co. Ltd, Shanghai, China)

Poster/Semi-oral Session 2

November 23, 2021 (Tuesday), 17:20-18:30

Session 2: Advanced materials and insulation systems: outdoor, indoor, solid, liquid and gas insulated, nanodielectrics, eco-friendly and other new materials, novel insulation system / Industrial applications of high voltage: non-energy applications in different fields / High voltage engineering problems in future power grids: distribution generations, smartening of power networks, and integration of renewable energies

Session Chairs: Assoc. Prof. Xuetong Zhao, Chongqing University, China

Dr. Lu Cheng, Xi'an Jiaotong University, China

Venue: Hall 2

17:20-17:25 Characterization of Polypropylene/ Titanium Dioxide Composites used for 3D Printing of Dielectric Functionally Graded Insulators (NO. 947)

Haoyang Yin, Guanjun Zhang, Wendong Li, Yucheng Zhang, Chao Wang, Zhihui Jiang (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China)

17:25-17:30 AC Breakdown Performance of Natural Esters combined with different biodegradable antioxidants under Accelerated Thermal Ageing (NO. 936)

Wei Peng, Mingxiang Xiong, Xianqin Deng, Zhiyan Peng, WuLu, Wenbin Zhao, Hao Zhang (Electric Power Research Institute, State Grid Shanghai Municipal Electric Power Company, China)

17:30-17:35 AIMD CALCULATION ON ELECTRON IONIZATION INDUCED FRAGMENTATIONS OF C5F100 AND ITS DISCHARGE DECOMPOSITION PRODUCTS (NO. 868)

Jiayu Xiong, Boya Zhang, Mai Hao, Tao Yang, Xingwen Li (Xi'an Jiaotong University, China)

17:35-17:40 Study of phased decomposition characteristics of insulator surface discharge under negative polarity DC voltage (NO. 856)

Ning Kang, Zhen Chen, Chenhao Lei, Honggang Zeng, Wenhai Yu, Dong Xiang, Yongchao Deng (Xinjiang Electric Power Company Limited Urumqi Power Supply Company, China)

17:40-17:45 Molecular Dynamics Simulation of the Destruction Mechanism of Polyester Films by Reactive Species in Plasma under Corona Discharge Based on ReaxFF (NO. 730)

Huichao wang, tong zhao, xiuqing yi, liang zou, li zhang (School of Electrical Engineering in Shandong University, China)

17:45-17:50 Role of Energy and Gas Pressure on Phase Evolution of Nano-Alumina in Wire Explosion Process (NO. 259)

Prem Ranjan¹, Ramanujam Sarathi², Hisayuki Suematsu³, Jun Jiang⁴, Lujia Chen¹ (¹Department

of Electrical & Electronic Engineering, The University of Manchester, Manchester, M13 9PL, UK, ²Department of Electrical Engineering, IIT Madras, Chennai, 600 036, India, ³EDI, Nagaoka University of Technology, Nagaoka 940-2188, Japan, ⁴Jiangsu Key Laboratory of New Energy Generation and Power Conversion, Nanjing University of Aeronautics and Astronautics (NUAA), Nanjing 211106, China)

- 17:50-17:55 Research on the Electrical Equipment Layout of Valve Hall for the Offshore VSC-HVDC Converter Station (NO. 266)
Peng Chen, Liang Ma, Guoliang Zhou, Jingen Yang, Yanqiao Liang (Central Southern China Electric Power Design Institute CO. LTD Whuhan, China)
- 17:55-18:00 Dynamic External Characteristics and Technical Weak Points of Insulated Pull Rods in GIS Circuit Breakers (NO. 342)
Ting Ren¹, Zhikai Li¹, Peng Liu¹, Zongren Pen¹ (¹State Key Laboratory of Electrical Insulated and Power Equipment, Xi'an Jiaotong University, Xi'an, China)
- 18:00-18:05 Analysis of the Influence of Winding Structure on Winding Vibration of Epoxy Cast Dry-type Transformer (NO. 642)
Fanyu Kong, Junping Zhao, Changlong Yan (State Key Laboratory of Electrical Insulated and Power Equipment, Xi'an Jiaotong University, Xi'an, China)
- 18:05-18:10 Research on the Selection of Anti-galloping Interphase Spacers (NO. 723)
Hui Liu¹, Chao Zhou¹, Zixin Zhao², Qinghe Shen¹, Jinxia Yao¹, Rong Liu¹, Yang Zhang¹, Ran Jia¹, Hao Shen¹ (¹State Grid Shan Dong Electric Power Research Institute, Ji nan, China, ²Engineering Laboratory of Power Equipment Reliability in Complicated Coastal Environments, Tsinghua Shenzhen International Graduate School, Shenzhen, China)
- 18:10-18:15 Combining Multi-Type Power Optimization to Improve the Consumption of Renewable Energy (NO. 832)
Wanli Ma¹, Zihang Zhang¹, Peng Zhang¹, Xuan Wang¹, Chengxiang Chen¹, Hongfei Zhao¹, Zheng Zong¹, Jinhua Dong² (¹Xi'an Jiaotong University School of Electrical Engineering, Xi'an, China, ²Jiangsu Electric Power Company Wuxi Power Supply Company, Jiangsu, China)
- 18:15-18:20 Breaking Performance of C4F7N/Air Gas Mixture and Acute Toxicity of Its By-Products (NO. 1366)
Fanchao Ye¹, Xiaoxing Zhang^{1,2}, Yi Li¹, Shuangshuang Tian², Song Xiao¹ (¹School of Electrical Engineering and Automation, Wuhan University, Wuhan, China, ²Hubei Engineering Research Center for Safety Monitoring of New Energy and Power Grid Equipment, Hubei University of Technology, Wuhan, China)
- 18:20-18:25 Electrical Stresses Simulation of DC Cable in ±10 kV Distribution System (NO. 235)
Haitian Wang¹, Mingyu Zhou¹, Yi Luo¹, Tobias Fechner¹, Fan Yu², Ersong Chen³ (¹Global Energy Interconnection Research Institute Europe GmbH, Berlin, Germany, ²New Electrical Materials Research Institute, Global Energy Interconnection Research Institute Ltd., Beijing, China, ³Ministry of science and technology, Hebei Electric Power Research Institute Co. Ltd, Shijiazhuang, China)

Poster/Semi-oral Session 3

November 23, 2021 (Tuesday), 17:20-18:30

Session 3: Monitoring and diagnostics: intelligent sensing, big data, artificial intelligence, asset management, live-line working, maintenance and repair, safety considerations

Session Chairs: Prof. Jiawei Zhang, Xi'an University of Technology, China

Assoc. Prof. Yushun Zhao, Hefei University of Technology, China

Venue: Hall 3

- 17:20-17:25 Research on Partial Discharge Simulation Device and Evaluation Method Based on GIS (NO.943)
Chunhui Gu, Jian Fang, Yong Wang, Wenxiong Mo (Guangzhou Power Supply Bureau of Guangdong Power Grid Co., Ltd, Guangzhou, China)
- 17:25-17:30 Theoretical and Experimental of Metal-doped Tin Oxide for Detection of Acetylene (NO.949)
Lingfeng Jin¹, Jinhua Zhu¹, Yiming Zheng¹, Chen Li¹, Xianjun Shao¹, Zihao Song² (¹Zhejiang Electric Power Research Institute, Hangzhou, China, ²Chongqing University, Chongqing, China)
- 17:30-17:35 Estimation of State of Charge of Lithium Battery Based on Electrochemical Impedance Spectroscopy (NO.979)
Wenjie Fan¹, Xinzhe Li¹, Ming Dong¹, Kun L², Yingan Zhi², Likun Meng² (¹State Key Laboratory of Electrical Insulation and Power Equipment, School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, China, ²Guangzhou Power Supply Bureau, Guangdong Power Grid Co., Ltd, Guangzhou, China)
- 17:35-17:40 CFD Research on Monitoring Heat Dissipation Efficiency of Radiator in Different Air-Cooling Modes (NO.1006)
Wanwan Zuo^{1,2}, Rui Zhang¹, Tao Wang¹, Guanglin Bai¹, Lujia Wang², Jianwen Zhang² (¹State Grid Economic and Technological Research Institute Co., Ltd. Changping District, Beijing, China, ²School of Electrical and Power Engineering, China University of Mining and Technology, Quanshan District Xuzhou, China)
- 17:40-17:45 Acoustic Method for Identification and Detection of Free Metal Particles Defects in GIS/GIL (NO.1095)
Jie Li¹, Xiaoang Li¹, Yufang Lv¹, Jing Ren¹, Qiaogen Zhang², Ke Zhao² (¹State Key Laboratory of Electrical Insulation and Power Equipment Xi'an Jiaotong University Xi'an China, ²State Grid Jiangsu Electric Power Research Institute Nanjing China)
- 17:45-17:50 Cumulative Damage Calculation and Life Prediction of Switching Device MOSFET for Charging Pile (NO.1100)
Xi Chen¹, Xiulan Liu¹, Yuan Jin¹, Lin Cheng¹, Jiangang Dai², Lingyu Zhu², Zhanlei Liu², Shengchang Ji² (¹ Beijing Electric Power Research Institute, State Grid Corporation of China, Fengtai District, Beijing, China, ² State Key Lab of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China)
- 17:50-17:55 Research on Vibration Law of Converter Transformer Oil Tank Surface (NO.1155)
Ningchuan Liang¹, Jiantao Sun² (¹China Electric Power Research Institute, Beijing, China, ²China Electric Power Research Institute, Beijing, China)
- 17:55-18:00 Failure diagnosis in rotating machines using FRA involving the rotation angle of the rotor (NO. 293)
Lukas Ranzinger¹, Prof. Dr.-Ing. Stephanie Uhrig¹, Reinhard Hinterholzer², Fabian Öttl³ (¹ Munich University of Applied Science, Munich, Germany, ²voestalpine Stahl GmbH, Linz, Austria, ³OMICRON Technologies Italia GmbH, Bruneck, Italy)
- 18:00-18:05 Lifetime Estimation of Operational Aged Transformers (NO. 159)
Sebastian Schreiter^{1,2}, Tobias Kinkeldey³, Holger Lohmeyer⁴, Peter Werle³ and Tobias Münster³

(¹HTWK Leipzig, Leipzig University of Applied Science, Faculty of Electrical Engineering and Information Technology, Department of Electric Power Systems. ²FTZ Leipzig e.V., Research and Transfer Centre at the HTWK Leipzig, Germany, ³Leibniz Universität Hannover, Institute of Electric Power Systems, Division of High Voltage Engineering and Asset Management, Schering-Institute, Hannover, Germany, ⁴Hitachi ABB Power Grids, Transformer Service Centre Halle, Oil lab Halle, Germany)

- 18:05-18:10 Development of a Novel Optical Sensor for Condition Assessment of Insulating Paper in Transformers (NO. 141)
Tobias Münster¹, Peter Werle¹, Kai Hämel², Jörg Preusel² (¹Leibniz Universität Hannover, Institute of Electric Power Systems, Division of High Voltage Engineering and Asset Management, Schering-Institute, Callinstr. 25A, 30167 Hannover, Germany, ²GRIDINSPECT GmbH, Mühlhof 3a, 36325 Feldatal, Germany)
- 18:10-18:15 Investigations on Detectability of Different Acids in Paper-Oil Insulation (No. 89)
Büsra Özdemir¹, Tobias Münster¹, Peter Werle¹, Kai Hämel², Jörg Preusel² (¹S Leibniz University Hannover, Institute of Electric Power Systems, High Voltage Technology and Asset Management Section, Schering-Institute, Callinstr. 25A, 30167 Hannover, Germany, ²RIDINSPECT GmbH, Mühlhof 3a, 36325 Feldatal, Germany)
- 18:15-18:20 Survey on Asset Management Strategies of Electric Grid Operators (No. 78)
Henning Schnittker¹, Peter Werle¹, Lin Zhao², Marcus Rohleder², Günter Bender³ (¹Schering-Institut, Leibniz University Hannover, Callinstr. 25a, 30167 Hannover, Germany, ²TenneT TSO GmbH, Bernecker Straße 70, 95448 Bayreuth, Germany, ³Sino-German international cooperation industrial park, Wiesenau 27, 60323 Frankfurt am Main)
- 18:20-18:25 Conceptual Design of a Data-Driven Condition Assessment for Secondary Substations (No. 28)
Jannis N Kahlen^{1,2}, Andre Würde², Martin Wicke², Philipp Lutat², Michael Andres¹, Albert Moser² (¹Fraunhofer Institute for Applied Information Technology FIT, Digital Energy, Schloss Birlinghoven 1, Sankt Augustin, Germany ²RWTH Aachen University, Schinkelstraße 6, 52062 Aachen, Germany)
- 18:25-18:30 Basic Behavior of Frequency Response Analysis Measurements on Rotating Machines (No. 20)
Lukas Ranzinger¹, Prof. Dr.-Ing. Stephanie Uhrig¹, Fabian Öttl² (¹Munich University of Applied Science, Munich, Germany ²OMICRON Technologies Italia GmbH, Bruneck, Italy)

Poster/Semi-oral Session 4

November 23, 2021 (Tuesday), 17:20-18:30

Session 4: Other related issues

Session Chairs: Assoc. Prof. Zhengshi Chang, Xi'an Jiaotong University, China

Assoc. Prof. Yongsan Han, Harbin University of Science and Technology, China

Venue: Hall 4

- 17:20-17:25 Electro-impulse De-icing (EIDI) Test of Aircraft Wing Leading Edge (NO. 46)
Xingliang Jiang¹, Yu Chen¹, Tingfan Huang¹, Maozheng Wang¹, Huan Huang² (¹State Key Laboratory of Power Transmission Equipment & System Security and New Technology, Chongqing University, Chongqing, 400044, China, ²Electric Power Science Research Institute of Guizhou Power Grid Co.,

Ltd, Guiyang, 550000, China)

- 17:25-17:30 Evaluation of the Grounding System of the High Voltage Laboratory: Case Study (NO. 415)
Paulla G S Freire¹, Estácio T Wanderley Neto², Credson de Salles³ (¹Federal University of Itajubá, Itajubá, Brazil)
- 17:30-17:35 Modeling and Parameter Study of Electromagnetic Launch System Driven by Inductive Pulsed Power Supply (NO. 444)
Liang Zhi, Dai ling, Feng Yongjie, Lin Fuchang (Key Laboratory of Pulsed Power Technology (Huazhong University of Science and Technology), Ministry of Education, Wuhan, China)
- 17:35-17:40 The Microstructure Study on the High-flexible Conductors for Charging Pile Cable Applications (NO. 477)
Jing Chen^{1,2}, Huaqiang Li¹, Jing Xu^{1,2}, Chongjun Tian^{1,2}, Lisheng Zhong¹, Jinghui Gao¹ (¹Xi'an Jiaotong University, 28# Xianning west road, Xi'an, PRC, ²Far East Cable Co., Ltd, No.8 Yuandong road, Yixing, PRC)
- 17:40-17:45 Detectable Absorption Range Measurement of SOF₂ and SO₂F₂ Using a System Based on Tunable Diode Laser Absorption Spectroscopy (NO. 604)
Feng Dai, Chao Bian, Jun Cheng, Qiang Gan, Xuan Chen, Zhengdong Zhang, Sheng Zhu, Chao Sun, Yang Jiang, Dongfeng Li, Jiangang Xie, Yan Kong (State Grid Jiangsu Electric Power Co., Ltd., Nanjing, China)
- 17:45-17:50 The AC and DC Resistance of Metal Shields in Medium Voltage XLPE Cables (NO. 665)
Ying Liu, Heyan Zhang, Jiamei Chen (School of Electrical Engineering, Xi'an Jiaotong University Xi'an 710049, Shaanxi Province, China)
- 17:50-17:55 Influence of Lightning Rod Flange Connection Parameters on Bolt Fatigue Performance and Improvement Measures (NO. 835)
Mingguan Zhao¹, Xinsheng Dong¹, Jian Wang¹, Yang Yang¹, Meng Li¹, Wenbing Zhaung¹, Xiaojun Zhang¹ (¹State Grid Xin jiang Company Limited Electric Power Research Institute, Urumqi, 830011, China)
- 17:55-18:00 Effect of Stereoregularity and Grafting Monomers on Dielectric Constant of Polypropylene (NO. 1225)
Yonghao Fang¹, Yu Deng¹, Sijia Lao¹, Fei Yan¹ (¹China Electric Power Research Institute, Beijing, China)
- 18:00-18:05 Optimal Scheduling with Dynamic Characteristics of Network for Electric Thermal Integrated Energy System (NO. 1253)
Jiandong Duan¹, Bo Qin², Siyu Tu³, Fan Liu⁴ (¹School of Electrical Engineering, Xi'an University of Technology, Xi'an, China, ²School of Electrical Engineering, Xi'an University of Technology, Xi'an, China, ³School of Electrical Engineering, Xi'an University of Technology, Xi'an, China, ⁴School of Electrical Engineering, Xi'an University of Technology, Xi'an, China)
- 18:05-18:10 Disc-Type Motor Control Based on Current Prediction (NO. 1257)
Jing Zhu¹, Jian Luo², Zhihui Jin³, Chun Chen⁴ (¹Shanghai University, Shanghai, China, ²Shanghai University, Shanghai, China, ³ Shanghai University, Shanghai, China, ⁴ Shanghai University, Shanghai, China)
- 18:10-18:15 Detection of SF₆ Decomposition Components SO₂F₂ and SOF₂ Based on Mid-Infrared Laser Photoacoustic Spectroscopy (NO. 1306)
Chao Bian¹, Feng Dai¹, Jun Cheng^{1}, Xuan Chen¹, Qiang Gan¹, Zhengdong Zhang¹, Tingyue Tan¹, Bin Yang¹, Cong Wang¹, Guanglu Cui¹, Pengfei Zhang¹, Bin Sun¹ (¹State Grid Jiangsu Electric Power CO., LTD. Maintenance Branch Company, Nanjing, China)*

- 18:15-18:20 The Influence of the Background Gas on Photoacoustic Signal (NO. 1507)
Jiaming Xiong^{1,2}, Jianping Liao³, Dibo Wang^{1,2}, Fan Gao³, Ran Zhuo^{1,2}, Yufei Chen³ (¹CSG Electric Power Research Institute CO., LTD, Guangzhou, China, ²United Laboratory of Advanced Electrical Materials and Equipment Support Technology, CSG., Guangzhou, China, ³Maintenance & Test Center of EHV Power Transmission Company, Guangzhou, China)
- 18:20-18:25 The Influence of Temperature and Pressure on Photoacoustic Signals in Co Detection (NO. 1512)
Jianping Liao¹, Dibo Wang^{2,3}, Fan Gao¹, Ran Zhuo^{2,3}, Yufei Chen¹, Zhiming Huang^{2,3} (¹Maintenance & Test Center of EHV Power Transmission Company, Guangzhou, China, ²CSG Electric Power Research Institute CO., LTD, Guangzhou, China, ³United Laboratory of Advanced Electrical Materials and Equipment Support Technology, CSG., Guangzhou, China)
- 18:25-18:30 Variation of Chemical Bonds of Oil-Paper Insulation in the Process of Thermal Aging: A Molecular Simulation (NO. 440)
Jianlin Li¹, Taiyun Zhu², Shenglong Zhu², Jia Xie¹, Shaorui Qin², Han Li³, Yuan Li³ (¹State Grid Anhui Electric Power Co. Ltd., Hefei 230001, China, ²State Grid Anhui Electric Power Research Institute, Hefei 230601, China, ³State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an 710049, China)
- 18:30-18:35 The Influence of the Background Gas on Photoacoustic Signal (NO. 1264)
Jiaming Xiong^{1,2}, Jianping Liao³, Dibo Wang^{1,2}, Fan Gao³, Ran Zhuo^{1,2}, Yufei Chen³ (¹CSG Electric Power Research Institute CO., LTD, Guangzhou, China; ²United Laboratory of Advanced Electrical Materials and Equipment Support Technology, CSG., Guangzhou, China; ³Maintenance & Test Center of EHV Power Transmission Company, Guangzhou, China)*
- 18:35-18:40 The Influence of Temperature and Pressure on Photoacoustic (NO. 1304)
Jianping Liao¹, Dibo Wang^{2,3}, Fan Gao¹, Ran Zhuo^{2,3}, Yufei Chen¹, Zhiming Huang^{2,3} (¹Maintenance & Test Center of EHV Power Transmission Company, Guangzhou, China; ²CSG Electric Power Research Institute CO., LTD, Guangzhou, China; ³United Laboratory of Advanced Electrical Materials and Equipment Support Technology, CSG., Guangzhou, China)*

Poster/Semi-oral Session 5

November 23, 2021 (Tuesday), 19:30-21:00

Session 5: High voltage and high current testing techniques: test procedures, measurements, evaluation, partial discharges, space charges, dielectric characteristics, emerging test techniques

Session Chairs: Assoc. Prof. Meng Huang, North China Electric Power University, China
Assoc. Prof. Weiwang Wang, Xi'an Jiaotong University

Venue: Hall 1

- 19:30-19:35 Study on the Partial Discharge Recognition for Special-Shaped Voltage Method (NO. 149)
Yasen Wu¹, Wen Cao^{1}, Wei Shen², Qianwen Song¹, Changjiang Chen¹, Yan Du¹, Yang Wang¹ (¹School of Electronic Information, Xi'an Polytechnic University, Xi'an, China, ²Electric Power Research Institute, State Grid, No. 669, Hangtian Middle Road, Chang'an District, Xi'an, China)*
- 19:35-19:40 Study on the parameter evaluation of dielectric relaxation and electric conduction for the thermal aged XLPE cables by DCICQ(t) Method (NO. 55)
Qihang Jiang¹, Bingrong Huang¹, Weiwang Wang^{1}, Xinyuan Li¹, Shengtao Li¹, Yongjie Nie² (¹State*

Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China, ²Yunnan Electric Power Research Institute, Yunnan, China)

- 19:40-19:45 Fiber-Optic Sensing for Partial Discharge Acoustic Detection on Power Cable Joints (NO. 306)
Hongke Li¹, Jianjun Yang¹, Yuqian Sheng^{2}, Wenbo Zhu², Shuai Hou², Bin Feng², Ke Wang¹ (¹Power China Huadong Engineering Corporation Limited, Hangzhou, China, ²Electric Power Research Institute, China Southern Power Grid, Guangzhou, China)*
- 19:45-19:50 Partial Discharge Pattern Recognition in GIS Based on S Transform Denoising (NO. 525)
Zhiyu Wang, Yushun Zhao, Jianxin Guo, Yang Su, Gang Liu, Lijian Ding (School of Electrical Engineering and Automation, Hefei University of Technology, Hefei, China)
- 19:50-19:55 Finite Element Analysis of Temperature Field and Electric Field of Oil-Paper Insulation Nonuniform Aging of Transformer in Operation (NO. 292)
Lu Li¹, Ji Liu¹, Mingze Zhang^{1}, Yufei Sun², Hao Yun² (¹Key Laboratory of Engineering Dielectrics and Its Application, Ministry of Education, Harbin University of Science and Technology, 150080 Harbin, China, ²China Nuclear Power Operation Technology Corporation, 430073 Wuhan, China)*
- 19:55-20:00 Study on the Self-Sensing Partial Discharge Detection Method for Power Transformers Adopting its Component as Ultra-High Frequency Sensor (NO. 265)
Xuanrui Zhang, Jun Cai, Ruochen Guo, Zhaoyu Zhang, Junhao Li (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China)*
- 20:00-20:05 The Influence of Different Particle Content on the Statistical Characteristic Parameters of Partial Discharge of Metal Particles in Flowing Oil (NO. 294)
Dajian Li¹, Xiajin Rao¹, Lei Zhang¹, Zhangting Yu¹, Liangyuan Chen¹, Shouxiao Ma^{1,2,3} (¹Electric Power Research Institute of Guangxi Power Grid Co., Ltd, Nanning, China, ²School of Electrical Engineering and Automation, Wuhan University, Wuhan City, Hubei Province, China, ³Institute of Water Resources and Electric Power, Qinghai University, Xining City, Qinghai Province, China)*
- 20:05-20:10 Numerical Simulation on Charge Transport and Analysis of Its Relationship with DC Electric Breakdown (NO. 177)
Dongri Xie^{1}, Wei Wei¹, Li Ding¹, Shuibin Xia¹, Dengping Tang¹, Tao Peng¹, Daomin Min², Shengtao Li² (¹State Grid Hubei Marketing Service Center (Measurement Center), Wuhan, China, ²State Key Laboratory of Electrical Insulation and Power Equipment (Xi'an Jiaotong University), Xi'an, China)*
- 20:10-20:15 Study on Dispersion Characteristics of Epoxy Resin Nanocomposites at Terahertz Range (NO. 879)
Ze Lian^{1,2}, Shengtao Li¹, Danyang Chen², Huan Niu¹ (¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an 710049, China, ²State Grid Shanxi Electric Power Research Institute, Postdoctoral Programme, Taiyuan 030001, China)*
- 20:15-20:20 Thermal Aging of Cross-Linked Polyethylene Cables: Mechanism and Influence on the Time-Varying Property of Frequency Domain Dielectric Spectroscopy (NO. 1318)
Zhen Qin, Lijun Yang, Wei Li, Xuetong Zhao, Yuan Xia (State Key Laboratory of Power Transmission Equipment & System Security and New Technology, Chongqing University, Chongqing, China)*
- 20:20-20:25 Effect of Hydrolyzable Chlorine Content on Dielectric Properties of Epoxy/Al₂O₃ Composite Hygrothermal Aging (NO. 1462)
Yufan Xu¹, Yushun Zhao¹, Minghao Wei¹, Cheng Yan¹, Song Zhang¹, Kun Wang² (¹School of Electrical Engineering and Automation, Hefei University of Technology, Hefei, China; ²State Key Laboratory of Advanced Power Transmission Technology, Global Energy Interconnection Research

Institute Co., Ltd., Beijing, China)

- 20:25-20:30 An Algorithm for Anomaly Detection of On-Line Monitoring Data of Dissolved Gas in Transformer Oil Based on Rule Extraction (NO. 1467)
Wenjun Liu^{1}, Chenxi Guo², Yuanfu Xu², Qiang Han², Ming Dong² (¹State Key Laboratory of for Power Equipment, Xi'an Jiaotong University, Xi'an, China, ²Electric Power Research Institute, State Grid Tianjin Electric Power Company, Tianjin, China, ³State Grid Tianjin Electric Power Company, Tianjin, China)*
- 20:30-20:35 Influence of Low Temperature on Velocity Positive Streamer under Uniform Field of Air Gap (NO. 1481)
Jinggang Guo¹, Xiujiang Zuo¹, Bo Li¹, Wenxi Tang², Yansong Wu², Hongwei Mei^{2}, Liming Wang² (¹State Grid East Inner Mongolia Electric Power Company Research Institute, Hohhot City, China, ²Tsinghua Shenzhen International Graduate School, Tsinghua University, Shenzhen City, China)*
- 20:35-20:40 Influence of Low Temperature on Luminous Characteristics of Positive Streamer in Air (NO. 1482)
Shizeng Liu¹, Yigang Ma¹, Wenxi Tang², Yansong Wu², Hongwei Mei^{2}, Liming Wang² (¹Dali Bureau, EHV Power Transmission Company of CSG, Dali 671000, China, ²Tsinghua Shenzhen International Graduate School, Tsinghua University, Shenzhen City, China)*
- 20:40-20:45 Phase-Resolved Cavity PD Pattern Time Evolution Characteristics in Polyethylene Insulation (NO. 435)
Isaac K Kyere^{1}, Cuthbert Nyamupangedengu², J J Walker³ (¹Department of Power Engineering, Vaal University of Technology, Vanderbijlpark, South Africa, ²School of Electrical engineering University of the Witwatersrand Johannesburg, South Africa, ³Walmet Consultancy (Pty) Ltd, Vereeniging, South Africa)*
- 20:45-20:50 Influence of the Blocking Element on the Front of a HVDC-Lightning Impulse Composite Voltage (NO. 931)
Andreas Dowbysch, Thomas Götz, Hans-Peter Pampel, Karsten Backhaus, Stephan Schlegel (Institute of Electrical Power Systems and High Voltage Engineering, Technische Universität Dresden, Dresden, Germany)*
- 20:50-20:55 Enabling a Lipp System for Space Charge Measurements under the Influence of Temperature Gradients (NO. 929)
Felix M Klichowski, Felix Rösch, Ronald Plath (Technical University Berlin, Einsteinufer 11, 10587 Berlin, Germany)*
- 20:55-21:00 Intensive Monitoring and Disassembling Analysis of a 1000kV Shunt Reactor with Abnormal Grounding Current and Dissolved Gas in Oil (NO. 1436)
Shaohe Wang, Jinhua Zhu, Lin Zhao, Yong Yang, Yongtao Jin (State Grid Zhejiang Electric Power Research Institute, Hangzhou, China)*

Poster/Semi-oral Session 6

November 23, 2021 (Tuesday), 19:30-21:00

Session 6: Advanced materials and insulation systems: outdoor, indoor, solid, liquid and gas insulated, nanodielectrics, eco-friendly and other new materials, novel insulation system

Session Chairs: Dr. Zhaoliang Xing, Global Energy Interconnection Research Institute co. Ltd., China

Dr. Shihang Wang, Xi'an Jiaotong University, China

Venue: Hall 2

- 19:30-19:35 Obtaining Attachment Cross Sections of C4F7N by Analysis of Electron Swarm Parameters (NO. 897)
MaiHao, JiayuXiong, BoyaZhang, XingwenLi (Xi'an Jiaotong University, China)
- 19:35-19:40 Stability study of wind and de-icing resistant anti-icing coatings (NO. 1472)
Siguo zhu, yanjun tan, QDu, b wang, min wang, xueqin zhang (Disaster Prevention and Reduction Center, State Grid Hunan Electric Company, China)
- 19:40-19:45 Study on the Effect of Negatively Charged PMMA@SiO₂ Filler on the Thermal Conductivity and Electrical Resistance of Epoxy Resin (NO. 1461)
Kun Wang, Yun Chen, Wei Yang, Liqun Han, Guodong Feng, Li Yin, Bingyue Yan (Global Energy Interconnection Research Institute Co. Ltd)
- 19:45-19:50 The molecular weight and curing dynamics of bisphenol A expansion chain modified epoxy resin affect the physical and electrical properties of their curing materials (NO. 1459)
Hongli Dou, Yushun Zhao, MinghaoWei, Cheng Yan, Song Zhang, Yun Chen, (Hefei University of Technology, China)
- 19:50-19:55 STUDY ON THE CONTROLLED REGULATION METHOD OF Na⁺ DOPING ON THE CROSSLINKING NETWORK OF EPOXY RESIN (NO. 1456)
Qian Liu, Bin Du, Yushun Zhao, Yuxiang Mai, Nanqing Chen (Hefei University of Technology, China)
- 19:55-20:00 Improving the Insulation Performance of Epoxy Resin After Damp by POSS Modification (NO. 1452)
Chao Gong, Y ushun Zhao, Ziyang Zhang, Song Zhang, Lijian Ding, Hongda Zhang (Hefei University of Technology, China)
- 20:00-20:05 Investigation on Enhancement of Flashover Voltage of High Temperature Vulcanized Silicone Rubber By Micron Composite Coating (NO. 1423)
Jingrui Zhang, Didi Liu, Manqing Zhao, DaiWan, Bo Zhang, Yan Du, Yang Wang (Xi'an Polytechnic University, China)
- 20:05-20:10 Research on Space Charge Characteristics and Electric Threshold of High Doping Rate Epoxy/Micro-Al₂O₃ Composites used for GIL Basin Insulators (NO. 1416)
QilinWang, Weiyu Wang, Shifeng Shi, Chongchong Chen, He Li, Jinbin Li, Yaqin Wen, Peng Liu, Zongren Peng (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China)
- 20:10-20:15 Study on the Difference of DC Breakdown Strength Between XLPE and LDPE (NO. 1404)
Yunfei Bai, Shihang Wang, LiuqingYang, Jiakai Li, Shengtao Li, Shenghe Wang, Dong Pan (State Key Laboratory of Electrical Insulation and Power Equipment, China)
- 20:15-20:20 EFFECT OF PREMATURE CROSSLINKING AND THERMAL OXIDATION ON THE BREAKDOWN PERFORMANCE OF CROSSLINKABLE POLYETHYLENE INSULATING MATERIALS (NO. 1397)
Hao Liu, Mengqi Wang, Shihang Wang, Shengtao Li, Shenghe Wang, Yun Gao (State Key Laboratory of Electrical Insulation and Power Equipment, China)
- 20:20-20:25 Repetitive microsecond pulse flashover characteristics of switch stage insulators in SF₆ (NO. 1386)
Tianyu Lin, Lanjun Yang, Xi Chen, Meiyan Wang, Feng Wang, FengXue, Zhilong Fan (Xi'an Jiaotong University, China)

- 20:25-20:30 STUDY ON AC BREAKDOWN CHARACTERISTICS OF EPOXY IMPREGNATED FABRIC BASED INSULATION MATERIALS (NO. 1375)
Xudong Li, Yuefang Li, Xin Liu (Institute of Engineering Electronics, China Academy of Engineering Physics, China)
- 20:30-20:35 Research on absorption spectrum characteristics of transformer oil (NO. 1358)
Xiaohui He, Qiaogen Zhang, Chong Guo, Rui Zhang, Xingwang Wu (Xi'an Jiaotong University, China)
- 20:35-20:40 Micromagnetic Investigation on Vortex Motion of Nanocrystalline Alloy under kHz Level Magnetization (NO. 1324)
KaiHang Guo, Liang Zou, YongJian Li, Ling JunDai, Li Zhang (Department of electrical engineering in Shandong university, China)
- 20:40-20:45 RESEARCH ON THE POWER FREQUENCY BREAKDOWN CHARACTERISTICS OF A NEW ECO-FRIENDLY GAS INSULATING MEDIUM HFO-1336mzz(E) (NO. 1275)
Long Li¹, Pu Han², Qiang Yao¹, Baojia Deng¹, Ying Zhang¹, Song Xiao^{2}, Yi Li², Chao Lin³, Yijiang Chen² (¹State Grid Chongqing Electric Power Company Electric Power Research Institute, Jiangbei District, Chongqing 401123, China; ²School of Electrical Engineering and Automation, Wuhan University, Wuhan 430072, China; ³State Key Laboratory of Power Transmission Equipment and System Security and New Technology, Chongqing University, Chongqing 400044, China)*
- 20:45-20:50 EFFECT OF MOLECULAR WEIGHT ON PROCESSABILITY OF LDPE BASED ON MULTI-SCALE SIMULATION (NO. 1203)
Jiacai Li, Han Xu, Kai Shang, Shengtao Li, Shenghe Wang, Dong Pan (Xi'an Jiaotong University, China)

Poster/Semi-oral Session 7

November 23, 2021 (Tuesday), 19:30-21:00

Session 7: Monitoring and diagnostics: intelligent sensing, big data, artificial intelligence, asset management, live-line working, maintenance and repair, safety considerations

Session Chairs: Assoc. Prof. Haibao Mu, Xi'an Jiaotong University, China

Assoc. Prof. Cheng Pan, Wuhan University, China

Venue: Hall 3

- 19:30-19:35 A Voltage Measurement Method Based on Pockels Effect for UHV AC Transmission Line Overvoltage Monitoring (NO.367)
Zixin Guo, Ziming He, Ting Lei, Weidong Shi (China Electric Power Research Institute, Beijing, China)
- 19:35-19:40 A Convolutional Neural Network and Sequence-to-sequence Model Based Energy Disaggregation Algorithm for Non-Intrusive Load Monitoring (NO.381)
Wenli Lian¹, Tuo Wu², Ying He¹, Zihan Shan³, Gangquan Si³ (¹Smart Grid Xian Electric Power Supply Company, Xi'an, China, ²Smart Grid Shanxi Electric Power Company, Xi'an, China, ³School of Electrical Engineering of Xi'an Jiaotong University, Xi'an, China)
- 19:40-19:45 Risk Assessment of Ferroresonance in Distribution in Network (NO.388)

Jinggang Yang¹, Xinyao Si², Guangqing Zhang³, Yuxiao Chen³ (¹Electric Power Research Institute of State Grid Jiangsu Electric Power Co., Ltd, Nanjing, China; Southeast University, Nanjing, China,²Electric Power Research Institute of State Grid Jiangsu Electric Power Co., Ltd, Nanjing, China,³College of Electrical Engineering, Shanghai University of Electric Power, No. 258 Changyang Road, Yangpu District, Shanghai, Shanghai, China)

19:45-19:50 The Online Monitoring Method of Degraded Vacuum in High Voltage Vacuum Quick Switch with SF6 Tank Insulation Structure Based On Electromagnetic Wave Method (NO.403)

Qiang-Ping Ma¹, Li Chen¹, Si-Lei Chen², Yun-Qing Wei¹ (¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China,²School of Electrical Engineering, Xi'an University of Technology, 58 Yanxiang Road, Xi'an, China)

19:50-19:55 Diagnostic Method for Partial Discharge in Transformer Based on Multiple Information and Application Analysis (NO.421)

Jie Yang¹, Jiang Nan², Shanglin Lv², Yanhui Shi³, Yang Yang³ (¹Engineering Training Center of CAVTC, Chengdu Aeronautic Polytechnic, Chengdu, China,²Xi'an Thermal Power Research Institute Co., Ltd., Xi'an, China,³Guangzhou Bureau of EHV Transmission Company, China Southern Power Grid Co. Ltd., Guangzhou, China)

19:55-20:00 Research on Vibration Characteristics of Dry-type Air-core Reactor Under Turn-to-turn Short Circuit Fault (NO.442)

Yiming Du, Lu Gao, Shengchang Ji, and Lingyu Zhu (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xian 710049, China)

20:00-20:05 Fault Diagnosis Model of DGA in Transformer and Reactor Oil Based on Time Series Feature Analysis (NO.457)

Zhong Qiang Zhan¹, Wentao Chen, Duo Hu Gong, Tong Li, Chong Wang (¹State Grid Xinjiang Electric Power Research Institute, 830011, Urumqi, China)

20:05-20:10 A Novel Cable Defect Localization Technique Via Time-Frequency Domain Reflectometry (NO.504)

Cheng Xie^{1,2}, Haibao Mu², Xingyu Zou², Haotian Zhang², Xiang Sun¹, Guanjung Zhang² (¹State Grid Zhejiang Electric Power Research Institute, Hangzhou 310014, China,²State Key Lab of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China)

20:10-20:15 Test Method for Opening and Closing Time of 500kv High Voltage Circuit Breaker Under Double Terminal Grounding Condition (NO.526)

Song Yan¹, Kai Ma¹, Xiaoming Zhang¹, Yang Su², Yushun Zhao², Gang Liu² (¹Maintenance Company State Grid Anhui Electric Power Co., Ltd. Hefei China,²School of Electrical Engineering and Automation Hefei University of Technology Hefei China)

20:15-20:20 Accurately Measuring the Structure Parameters of Insulators in Real Time by Using Structured Light Illumination (NO.544)

Jian Wang¹, Ziliang Zheng¹, Meng Li¹, Ming Jin¹, Kai Liu² (¹State Grid Xin jiang Company Limited Electric Power Research Institute, Urumqi, China,²College of Electrical Engineering, Sichuan University, Chengdu, China)

20:20-20:25 Research on Diagnosis Technology of Foreign Matter in GIS Equipment Based on Vibration Signal (NO.559)

Xuan Meng¹, Ting Shu¹, Zhaoyu Zhang¹, Jiushan Wu¹, Junhao Li¹ (¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China)

20:25-20:30 Research on Key Technology of Turn to Turn Insulation Test of Core Reactor by High Frequency

Method (NO.577)

Shouming Wang¹, Ji Liu¹, Mingze Zhang¹, Kunhan Wang² (¹Key Laboratory of Engineering Dielectrics and Its Application, Ministry of Education, Harbin University of Science and Technology, 150080 Harbin, China.²State Grid East Inner Mongolia Electric Power Research Institute, 010020 Hohhot, China)

20:30-20:35 A Cable Hybrid Type Defect Localization Method Based on Frequency Domain Reflectometry (NO.580)

Xu Lu¹, Haotian Zhang², Haibao Mu², Jie tian¹, Daning Zhang² (¹Electric Power Research Institute Shenzhen Power Supply Bureau Co., Ltd, Shenzhen, China,²State Key Lab of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China)

20:35-20:40 A Case Analysis on Suspension Discharge Defect of 220kV GIS Disconnecting Switch (NO.637)
Bo Zhou¹, Jun Gao¹, Hongquan Yang¹, Yufei Hu², Chuan Cai¹, Jun Liu¹, Chao Guo¹ (¹State Grid Chengdu Electric Power Company, Chengdu, Sichuan Province, China,²State Grid Sichuan Electric Power Company, Chengdu, Sichuan Province, China)

20:40-20:45 Simulation Analysis for Partial Deformation of Transformer Winding and Distortion of Magnetic Leakage Distribution Considering Asymmetric Mechanical Constraint (NO.639)

Hujun Shang^{1,2}, Quan Zhou^{1,2}, Xi Ouyang^{1,2}, Junfeng Dai^{1,2}, Jiajia Zheng^{1,2} (¹State Key Laboratory of Power Transmission Equipment & System Security and New Technology, Chongqing University, Chongqing, China,²School of Electrical Engineering, Chongqing University, Chongqing, China)

20:45-20:50 Prediction of Pollution Flashover Voltage Based on Multiple Characteristics of Leakage Current (NO.646)

Rongfa Chen, Ming Ren, Jiahe Yu, Ming Dong, Changjie Xia (State Key Laboratory of Electrical Insulation and Power Equipment, School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, China)

Poster/Semi-oral Session 8

November 23, 2021 (Tuesday) 19:30-21:00

Session 8: Transient voltages: lightning, switching, repetitive impulses, surge arresters, insulation coordination, over-voltage protection, EMC

Session Chairs: Assoc. Prof. Hengxin He, Huazhong University of Science and Technology, China
Assoc. Prof. Ming Yang, Chongqing University, China

Venue: Hall 4

19:30-19:35 Study on Pollution Accumulation of Different String Insulators in the UHVDC Transmission Line (No. 1277)

Tian Liang, Huang Ruiping, Zhou Jun (China Electric Power Research Institute, China)

19:35-19:40 The Influence of Impulse Polarity on the Degradation of Varistors (No. 1207)

Yuji Zhang, Xueling Yao, Mingjie Ma (Xi'an Jiaotong University, China)

19:40-19:45 Analysis and Study on Withstand Voltage Characteristic of the Arrester of DC Transfer Switch (No. 1063)

Xiang Xiao, Wenhao Lu, Xiaoxing Wei, Jinwei Chu (CSG EHV Power Transmission Company, China)

- 19:45-19:50 Research on Electromagnetic Transient Response of Photovoltaic System When Lightning Strikes the Earth (No. 1041)
Chenglong Jia, Wenbin Zhao, Yuan Gao, Feng Li, Min Tang, Zhong Tang (Shanghai university of electric power, China)
- 19:50-19:55 Study of Controlled Switching with Pre-insertion Resistor During Energization of AC Filters (No. 1011)
Xiaohui Chen, Chunying He, Junbo Deng (Xi'an Jiaotong University, China)
- 19:55-20:00 Simulation of Space Charge Characteristics of Epoxy Resin Under Pulse Voltage (No. 913)
Yuming Shao, Youping Tu, Geng Chen, Shaocong Wu (North China Electric Power University, China)
- 20:00-20:05 Design of a Miniaturized Bounded Wave Simulator for Broadband and Intensive Electric Fields (No. 873)
Zhifei Han¹, Jun Hu¹, Fen Xue¹, Shanxiang Wang¹, Jinliang He¹, Zhong Liu², Peng Li², Bing Tian², Zhiming Wang², Qiancheng Lv², Bofeng Luo² (¹Tsinghua University, China; ²China Southern Power Grid, China)
- 20:05-20:10 Modelling of DC Over-voltage Phenomena in Metro Electrification System Under Starting and Breaking Combined Conditions (No. 750)
Qing Ye, Chenglong Jia, Wenbin Zhao, Wu Lu, Yuan Gao, Feng Li (Shanghai University of Electrical Power, China)
- 20:10-20:15 Analysis of Internal Electrothermal Performance of Varistor Under Impulse Current (No. 652)
Yuji Zhang, Xueling Yao, Mingjie Ma (Xi'an Jiaotong University, China)
- 20:15-20:20 Transient Analysis of Lightning Strike to Wind-PV Hybrid System (No. 635)
Yilong Zhang¹, Dongyang Yang¹, Hongzhi Bian², Jianxun Zhang², Yakun Liu¹ (¹Shanghai Jiaotong University, China; ²State Grid Fujian Construction Company, China)
- 20:20-20:25 Analysis of the Suppression Effect of Voltage Transformer's Neutral Point Capacitance on Ferromagnetic Resonance (No. 614)
Pengfei Li, Zixin Ma, Lin Shen, Zhe Chen, Chonghao Fang, Jie Guo (Xi'an Jiaotong University, China)
- 20:25-20:30 Simulation Study of EMU Arrester under Typical Overvoltage (No. 490)
Qizhe Zhang, Fangcheng Lyu, Shenghui Wang, Xinghao Dong, Wenwen Zhang (North China Electric Power University, China)

Poster/Semi-oral Session 9

November 24, 2021 (Wednesday), 17:20-18:30

Session 9: High voltage and high current testing techniques: test procedures, measurements, evaluation, partial discharges, space charges, dielectric characteristics, emerging test techniques

Session Chairs: Assoc. Prof. Junping Zhao, Xi'an Jiaotong University, China

Dr. Yu Deng, China Electric Power Research Institute, China

Venue: Hall 1

- 17:20-17:25 Diagnosis and Analysis of High-Frequency PD Detection in Cable Equipment (NO. 483)
Yuqing Chang, Quanwei Hu, Yunfei Chen, Zhanpeng Wei, Wenting Wei, Wen Li (State Grid Tianjin)

- Cable Company, Tianjin, China)*
- 17:25-17:30 Research on Self-Healing Characteristics of Metallized Film Capacitor via Acoustic and Electric Combined Detection (NO. 512)
Xianfei Liu, Xuandong Liu, Yue Zhao (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China)
- 17:30-17:35 Study on the Characteristics of Bird Streamer Flashover Discharge Under DC Voltage (NO. 522)
Shenghui Wang¹, Xinghao Dong^{2}, Fengtian Guo², Ximing Wang² (¹North China Electric Power University, Beijing, China, ²North China Electric Power University, Baoding, China)*
- 17:35-17:40 Development of a Complete Set of Equipment for the Insulation Performance Test of the UHV Converter Transformer Valve Side (NO. 531)
Longfei Li (State Grid Xinjiang Electric Power Research Institute, Urumqi, China)
- 17:40-17:45 PD Characteristics of Epoxy Surface Triggered by Metal particle under AC Superimposed Lightning Impulse in SF₆ Gas (NO. 541)
Cong He, Haotian Wang, Ting Shu, Yidan Hu, Zhaoyu Zhang, Xuan Meng, Junhao Li (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China)*
- 17:45-17:50 Research on Corona Discharge Characteristics of DC Overhead Lines with Burr Defect Based on Experimental and Numerical Simulation (NO. 553)
Shenghui Wang^{1}, Tingyue Jiang¹, Xinghao Dong¹, Leilei Niu¹, Likun Ding², Kai She² (¹North China Electric Power University, Beijing, China, ²State Grid Hebei Electric Power Co., Ltd., Shijiazhuang 050021, China)*
- 17:50-17:55 Research on the Motion Behavior and Characteristics of Metal Particles in 320 kV DC GIS (NO. 565)
Zemin Liao^{1}, Zhikai Li¹, Qilin Wang¹, Quansheng Zhu², Peng Liu¹, Zongren Peng¹ (¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China, ²State Grid Henan Electric Power Company, China)*
- 17:55-18:00 Investigation on Surface Charge Accumulation Characteristics of C₄F₇N/CO₂ Mixture under Different Electric Fields (NO. 576)
Junhong Chen, Junhao Dong, Jinshu Li, Junbo Deng, Guan-jun Zhang (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, Shaanxi, China)*
- 18:00-18:05 Study on the Influence of Pollution Level on Temperature Rise of Composite Insulators (NO. 625)
Ruzhang Dai¹, Bing Zhang¹, Jipeng Li¹, Jian Zhao², Houxu Li², Yujiao Zhang^{2} (¹Jiangsu Power Transmission & Transformation Co., Ltd, Nanjing, China, ²School of Electrical Engineering and Automation, Hefei University of Technology, Hefei, China)*
- 18:05-18:10 Space Charge Distribution Characteristics of Polyimide (PI) Films Modified by Nano-Al₂O₃/SiO₂ (NO. 645)
Daosheng Liu, Chunhua Zhou, Wei Zhong, Liang Zhang (School of Electrical Engineering and Automation, Jiangxi University of Science and Technology, Ganzhou 341000, China)*
- 18:10-18:15 A Novel Localization Methodology for Partial Discharge in Power Transformer Considering Internal Structure (NO. 648)
Xiaochang Hua¹, Haibao Mu^{1}, Yiming Zheng², Jiangyang Zhan^{1,2}, Xianjun Shao², Lingfeng Jin², Ping Qian², Guanjun Zhang¹ (¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, No.28, Xianning West Road, Xi'an, China, ²State Grid Zhejiang Electric Power Research Institute, No.1, Huadian lane, District 8, Zhaohui, Hangzhou,*

China)

18:15-18:20 Partial Discharge Pattern Classification of Composite Insulators by Electromagnetic Spectrum and Stacked Autoencoder Network (NO. 659)

Cheng Chen¹, Shengwen Shu^{1}, Yifei Dong¹, Jian Wang², Ming Jin² (¹College of Electrical Engineering and Automation, Fuzhou University, Fuzhou, China, ²State Grid Xinjiang Electric Power Co., Ltd., Electric Power Research Institute, Urumchi, China)*

18:20-18:25 Adsorption Characteristics of Moisture in Insulating Paper and its Influence on Charge Transport (NO. 698)

Haoxiang Zhao, Ning Ding, Huanmin Yao, Daning Zhang, Haibao Mu^{}, Guanjun Zhang (School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, China)*

18:25-18:30 Research on “8”-shaped Magnetic Core Current Transformer Based on Magnetic Field Cancellation (NO. 656)

Xiaojun Tang^{}, Jiaqi Chen, Zhongda Xu, Ling Yan (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China)*

Poster/Semi-oral Session 10

November 24, 2021 (Wednesday) 17:20-18:30

Session 10: Transient voltages: lightning, switching, repetitive impulses, surge arresters, insulation coordination, over-voltage protection, EMC / Monitoring and diagnostics: intelligent sensing, big data, artificial intelligence, asset management, live-line working, maintenance and repair, safety considerations

Session Chairs: Prof. Junbo Deng, Xi'an Jiaotong University, China

Assoc. Prof. Pengfei Meng, Sichuan University, China

Venue: Hall 2

17:20-17:25 Transient Response Characteristics of Metal Oxide Arrester Under High Altitude Electromagnetic Pulse (No. 406)

Feng Qin^{1,2}, Xutong Wang^{1,2}, Haiyang Wang^{1,2}, Tao Huang^{1,2}, Xin Nie^{1,2}, Wei Chen^{1,2} (¹Northwest Institute of Nuclear Technology, China; ²State Key Laboratory of Intense Pulsed Radiation Simulation and Effect, China)

17:25-17:30 Switching Test of 35 kV Bridging Regulation Vacuum On-load Tap Changer (No. 369)

Yan Li¹, Peter A.A.F. Wouters², Suoyi Li³, Mao Li⁴ (¹North China Electric Power University (Baoding), China; ²Eindhoven University of Technology, The Netherlands; ³Baoding Xintong Electric Ltd., China; ⁴State Grid Chengdu Power Supply Company, China)

17:30-17:35 Lightning Transient Analysis of Distributed Power Flow Controller in 220 kV AC Transmission Lines (No. 362)

Xiangrui Meng¹, Ning Xu², Xianjun Shao², Luyao Zhou², Tiebing Lu¹ (¹North China Electric Power University, China; ²Electric Power Research Institute of State Grid Zhejiang Electric Power Corporation, China)

17:35-17:40 Influence of Electrode Configuration in Simulated Lightning Strike Test (No. 258)

Cien Xiao¹, Weifang Wang¹, Xiaolei Bi², Yakun Liu¹ (¹Shanghai Jiaotong University, China; ²SINOPEC Qingdao Research Institute of Safety Engineering, State Key Laboratory of Safety and Control Chemicals, China)

- 17:40-17:45 Research on the Influence Factors of Dominant Frequency of Switching Overvoltage Along Power Cables (No. 117)
Jiaming Li¹, Zhu Ou¹, Changhua Nie¹, Changzhe Xu¹, Li Zhan¹, Minggang Li¹, Tongxi Li¹, Zhilong Liu¹, Junbo Deng² (¹Nuclear Power Institute of China, China; ²Xi'an Jiaotong University, China)
- 17:45-17:50 Particle-in-cell Simulation of Re-breakdown in Post-arc Stage for Low Voltage Circuit Breaker (No. 61)
Zhiwei Wang, Lijun Wang, Dan Wang (Xi'an Jiaotong University, China)
- 17:50-17:55 Lightning Stroke Identification for Transmission Line Based on the Joint Criterion: the Polarity of Transients and Wavelet Transform Energy (No. 54)
Ruolan Wang, Jiangtao Li, Zheng Zhao, Xingchen Tian, JiaBao Mei, Kaihong Xu (Xi'an Jiaotong University, China)
- 17:55-18:00 Impulse Overvoltage on Stator Winding of Direct-drive Wind Turbine Generators (No. 488)
Pengfei Yuan¹, Xuezhong Liu¹, Qirui Fan¹, Mingpeng He², Yue Zhang², Bo Hu² (¹Xi'an Jiaotong University, China; ²Dongfang Electrical Machinery Co., Ltd, China)
- 18:00-18:05 Failure Analysis for Water-blocking Cushion Layer Erosion of HV XLPE Cable (NO.686)
Qing Liu¹, Wenjie Li², Zhenpeng Zhang², Yuli Wang², Yang Zhao¹, Ying Liu³, Benhong Ouyang², Wenbin Rao², Yunjie Zhou⁴, Tianyu Yang⁴, Hongliang Liu¹, Libin Hu⁵, Ruoxi Liu¹, Zhigang Ren¹ (¹Beijing Municipal Electric Power Company, Beijing, China, ²China Electric Power Research Institute, Wuhan, China, ³Xi'an Jiaotong University, Xi'an, China, ⁴Shanghai Municipal Electric Power Company, Shanghai, China, ⁵Jiangsu Electric Power Research Institute, Nanjing, China)
- 18:05-18:10 On-line Condition Monitoring of OLTC Based on Mechanical Vibration and Driving Current (NO.694)
Guoming Wang¹, Jiahua Shen¹, Tonglei Wang², Jin Wang³, Gyung-Suk Kil⁴ (¹R&D Center, Hangzhou Guozhou Power Technology Co., Ltd., Hangzhou, China, ²Research Institute, State Grid Jiangsu Electric Power Co., LTD., Nanjing, China, ³DC Technology Center, State Grid Corporation of China, Beijing, China, ⁴Department of Electrical and Electronics Engineering, Korea Maritime and Ocean University, Busan, Republic of Korea)
- 18:10-18:15 Research and Application of the Phase-checking Method Based on the Leakage Current Signal of Metal Zinc Oxide Arrester (NO.720)
Bo Zhou¹, Peng Cheng¹, Yanqing Liu¹, Xinchun Yang¹, Heng Zhao², Xin Liu¹, Qihang Wang¹ (¹State Grid Chengdu Electric Power Company, Chengdu, Sichuan Province, China, ²State Grid Sichuan Electric Power Company, Chengdu, Sichuan Province, China)
- 18:15-18:20 Signal Characteristics of Transient Earth Voltage Sensor Installed Inside and Outside Switch Cabinet (NO.735)
Jie Wang, Hongxia Wang, Yingbin Shi, Jinliang Li (Equipment Technology Center State Grid Xinjiang Electric Power Research Institute, Urumqi, China)

Poster/Semi-oral Session 11

November 24, 2021 (Wednesday) 17:20-18:30

Session 11: HVDC technologies and systems: design problems, testing and measuring techniques, advanced HVDC systems / Monitoring and diagnostics: intelligent sensing, big data, artificial intelligence, asset

management, live-line working, maintenance and repair, safety considerations

Session Chairs: Prof. Jinhui Gao, Xi'an Jiaotong University, China

Dr. Kangning Wu, Xi'an Jiaotong University, China

Venue: Hall 3

- 17:20-17:25 Time Transition of Gas Conductivity and Charge Behavior in SF₆-Epoxy Composite Insulation System Under DC Partial Discharge (No.18)
Ryuichi Nakane^{1,2}, Hiroki Kojima¹, Naoki Hayakawa¹ (¹Nagoya University, Japan; ²Central Research Institute of Electric Power Industry, Japan)
- 17:25-17:30 Simulation and Design of New DCCB Test Circuit (No. 390)
Guixia Li, Zhao Yuan, Lixue Chen, Chun Deng, Wei Cai, Yifan Qin (Huazhong University of Science and Technology, China)
- 17:30-17:35 Active Power Control Strategy Depending on Frequency for MMC-HVDC System Connected to Offshore Windfarms (No. 336)
Fangyuan Li^{1,2,3}, Lin Zhu^{1,2,3}, Jiapei Zhou^{1,2,3}, Longze Kou^{1,2,3}, Bixing Ren^{4,5} (¹State Key Laboratory of Advanced Power Transmission Technology, China; ²Beijing Key Laboratory of DC Grid Technology & Simulation, China; ³Global Energy Interconnection Research Institute Co., Ltd, China; ⁴Electric Power Research Institute of State Grid Jiangsu Electric Power Co., Ltd, China; ⁵State Grid Jiangsu Electric Power Co., Ltd, China)
- 17:35-17:40 Research on the Thermal Field Distribution of the Current-carrying Fittings with Different Heat Dissipation Structure (No. 823)
Shoufeng Jin¹, Shifeng Shi¹, Guohua Yang² (¹Xi'an Jiaotong University, China; ²Pinggao Group Co., Ltd., China)
- 17:40-17:45 Optimal Analysis of Electric Field Characteristics for Live Working on Straight-line Tower of ±1100 kV DC Transmission Line (No. 759)
Yushun Zhao¹, Yixian Dai¹, Weiguo Wu², Ling Meng², Shizhong Lin², Pengfei Ma² (¹Hefei University of Technology, China; ²Anhui Transmission and Transformation Engineering Co., Ltd., China)
- 17:45-17:50 Application and Research of Resistive Superconducting Fault Current Limiter in 60 kV HVDC System (No. 1419)
Hou Bodun, Zhang Baoge, Sun Rui (Lanzhou Jiaotong University, China)
- 17:50-17:55 The Evaluation of the Buffer Layer Chemical Corrosion for HV XLPE Insulated Cable with Corrugated Aluminum Sheath Structure (NO.740)
Lei Jiang¹, Xiyuan Zhao¹, Zhigang Ren², Yekun Men², Jinghui Gao¹, Lisheng Zhong¹ (¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an 710049, China, ²State Grid Beijing Electric Power Research Institute, Beijing 100075, China)
- 17:55-18:00 Research on Fault Diagnosis Method of Power Module for Charging Pile Based on Neural Network (NO.754)
Jiangang Dai¹, Lingyu Zhu¹, Zhanlei Liu¹, Ziyi Zhao¹, Shengchang Ji¹, Xianglong Li², Ping Chen², Yu Guan², Huimin Chen² (¹State Key Lab of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China, ²Beijing Electric Power Research Institute, State Grid Corporation of China, Fengtai District, Beijing, China)
- 18:00-18:05 Defect Analysis of Abnormal Growth of Hydrogen in 220kV Transformer Bushing Oil (NO.755)
Shuo Jiang¹, Dan Zhou¹, Zhiqin Ma¹, Xian Yang¹, Linglong Cai¹, Yuhui Jin¹, Xiang Shu¹ (¹Guangdong Key Laboratory of Electric Power Equipment Reliability, Electric Power Research

Institute of Guangdong Power Grid Co., Ltd, Guangzhou, China)

- 18:05-18:10 Application of Digital Twin Technology in Optimizing the Operation and Maintenance of Substation Equipment (NO.813)
Zhang Shuai¹, Wang Song¹, Peng Zaixing¹, Zhao Linjie¹, Li Ruihai¹ (¹China Southern Power Grid Research Institute, Guangzhou, China)
- 18:10-18:15 Micro Electric-Field Sensor Based on Inverse Piezoelectric Effect (NO.844)
Mingyong Xin¹, Changbao Xu¹, Jianyang Zhu¹, Peng Li², Bing Tian², Zhong Liu², Zhifei Han² (¹Guizhou Electric Power Research Institute, Guiyang, China, ²Digital Grid Research Institute, China Southern Power Grid, Guangzhou, China)
- 18:15-18:20 Beam Structure Capacitive Electric Field Sensor (NO.869)
Changbao Xu¹, Mingyong Xin¹, Jipu Gao¹, Yu Wang¹, Bing Tian², Zhong Liu², Peng Li², Qiancheng Lv², Zhifei Han² (¹Guizhou Electric Power Research Institute, Guiyang, China, ²Digital Grid Research Institute, China Southern Power Grid, Guangzhou, China)
- 18:20-18:25 Anomaly Analysis of 500 kV High Voltage Reactor Based on Multi-detection Information Fusion (No. 83)
Hongmei Wang¹, Jiacheng Yang¹, Xin Wang¹, Shuai Shao¹, Zhao Li¹, Dengwei Ding², Rong Li², Liang He² (¹State Grid Sichuan Maintenance Company, Chengdu, China, ²Tsinghua Sichuan Energy Internet Research Institute, Chengdu, China)
- 18:25-18:30 RESEARCH STATUS AND PROSPECT OF ON-LINE MONITORING AND FAULT DIAGNOSIS TECHNOLOGY FOR TRANSFORMER ON-LOAD TAP-CHANGER (NO.886)
Xiang Li¹, Feng Wang¹, Lipeng Zhong¹, Kaibin Liang¹ (¹College of Electrical and Information Engineering, Hunan University, Changsha, China)

Poster/Semi-oral Session 12

November 24, 2021 (Wednesday), 17:20-18:30

Session 12: Advanced materials and insulation systems: outdoor, indoor, solid, liquid and gas insulated, nanodielectrics, eco-friendly and other new materials, novel insulation system

Session Chairs: Prof. Zepeng Lv, Xi'an Jiaotong University, China

Prof. Pengfei Cheng, Xi'an Polytechnic University, China

Venue: Hall 4

- 17:20-17:25 INVERSE ANALYSIS OF OPTIMUM PERMITTIVITY DISTRIBUTION FOR FGM SPACER IN CONSIDERATION WITH MULTIPLE OBJECTIVE FUNCTIONS IN GASEOUS INSULATION SYSTEM (NO. 401)
Katsumi Kato, Hiroki Kojima, Naoki Hayakawa, Hidetaka Masui, Hironori Yanase, Kenji Okamoto, Hitoshi Okubo (National Institute of Technology, Niihama College, Japan)
- 17:25-17:30 HIGH DIELECTRIC PERMITTIVITY POLYIMIDE FILMS BY CONSTRUCTING POLAR UNITS (NO. 368)
Yaya Tian¹, Liangyu Gui¹, Ming-Sheng Zheng¹, Jun-Wei Zha^{1,2} (¹School of Chemistry and Biological Engineering, University of Science and Technology Beijing, Beijing, China; ²Beijing Advanced Innovation Center for Materials Genome Engineering, University of Science and Technology Beijing, Beijing 100083, China)*

- 17:30-17:35 Study on altitude correction coefficient of pollution flashover voltage of UHVDC insulators with different shed shapes (NO. 366)
Ruiping Huang, Liang Tian, Jun Zhou, Yueneng Xu (China Electric Power Research Institute Co., Ltd, China)
- 17:35-17:40 INHIBITION OF THE SPACE CHARGE OF LLDPE BY CROSSLINKING EFFECT (NO. 334)
Yinge Li, Lisheng Zhong, Liang Cao, Wei Zhao, Jinghui Gao, HongZhang (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China)
- 17:40-17:45 Research on Development and Performance of the Strain Composite Cross-Arm in 10kV Distribution Line (NO. 326)
Songsong Zhou, Jun Zhou, Zheyuan Li, Le Li, Hechen Liu, Yuan Gui, Xiaohan Dai (China Electric Power Research Institute, China)
- 17:45-17:50 Effect of Modified Silicone Rubber on Discharge of SR/XLPE Composite Interface (NO. 278)
Jiarui Han, Yifan Hao, Guangzhi Guo, Junbo Deng, GuanjunZhang (Xi'an Jiaotong University, China)
- 17:50-17:55 STUDY ON EXTERNAL INSULATION DURABILITY TEST OF COMPOSITE CROSS ARM INSULATOR (NO. 267)
Jing Nan, Xuechun Han, Feng Huo, Hengdong Song, Xingyu Liao (China Electric Power Research Institute, China)
- 17:55-18:00 PHYSICAL PARAMETERS CALCULATION OF C4F7N/CO2 MIXTURE (NO. 255)
Yang Meng, Zhichuang Li, Zhongbo Zheng, Weidong Ding (Xi'an Jiaotong University, China)
- 18:00-18:05 Mechanisms behind the transition of streamer propagation mode in natural ester around the acceleration voltage under lightning impulse voltages (NO. 234)
Wu Lu, Feng Li, Wenbin Zhao, Zhiyan Peng, Hao Zhang, Zhiyan Peng (Shanghai University Of Electric Power, China)
- 18:05-18:10 ANALYSIS OF WIND DEVIATION RESISTANCE OF COMPOSITE INSULATOR REPLACING PORCELAIN INSULATOR IN TANGENT TOWER AT DIFFERENT WIND SPEEDS (NO. 232)
Yaqing Ji, Zhijin Zhang, Jun Xu, Xiaojie Wang, Xingliang Jiang (Chongqing University, China)
- 18:10-18:15 Effect of Nanofiller Content on DC Conductivity and Breakdown Strength of PP/MgO Nanocomposites (NO. 209)
QinrongLi, Daomin Min, Wei Shen, Mengyao Han, Shengtao Li (Xi'an Jiaotong University, China)

Poster/Semi-oral Session 13

November 24, 2021 (Wednesday), 19:30-21:00

Session 13: High voltage and high current testing techniques: test procedures, measurements, evaluation, partial discharges, space charges, dielectric characteristics, emerging test techniques

Session Chairs: Assoc. Prof. Ming Ren, Xi'an Jiaotong University, China
Assoc. Prof. Xi Yang, Hefei University of Technology, China

Venue: Hall 1

- 19:30-19:35 Discharge Characteristics of Actual Winding Turn-to-turn Structure inside Transformers under Oscillating Switching Impulse Voltage (NO. 384)
*Ruochen Guo, Yuan Sun, Xuanrui Zhang, Jiushan Wu, Junhao Li** (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China)
- 19:35-19:40 Electric Field Simulation and Partial Discharge Test of 10 kV Cable Terminations with Hole Deffects (NO. 393)
Chao Wang¹, Chunfang Wu¹, Weiyang Zhen¹, Tao Huang², Jiapeng Xiao², Yun Chen², Yanwen Chen², Yanpeng Hao^{2}, Licheng Li²* (¹Jiangmen Power Supply Bureau of Guangdong Power Grid Co., Ltd, 529000, Jiangmen, China, ²School of Electric Power Engineering, South China University of Technology, 510630, Guangzhou, China)
- 19:40-19:45 Partial Discharge Detection Technology of Live Ring Network Cabinet Based the 5G Cloud Computing (NO. 412)
Xiaoqiu Lu¹, Yan Zhou², Xiaoxian Zhu³, Yujie Cao⁴, Zhibin Xu⁵, Chun Ai⁶ (¹State Grid Shanghai Jinshan Power Supply Company, Shanghai, China, ²State Grid Shanghai Jinshan Power Supply Company, Shanghai, China, ³State Grid Shanghai Jinshan Power Supply Company, Shanghai, China, ⁴State Grid Shanghai Jinshan Power Supply Company, Shanghai, China, ⁵Bingo Electric Technology (Shanghai) Co.,Ltd, Shanghai, China, ⁶Bingo Electric Technology (Shanghai) Co.,Ltd, Shanghai, China)
- 19:45-19:50 Dielectric Frequency Response of Oil-paper Insulation Under Uneven Damp (NO. 423)
Ronglun Zhang¹, Huanmin Yao², Haibao Mu^{2}, Jiasui Wu¹, Daning Zhang², Haoxiang Zhao², Guanjun Zhang²* (¹Hainan Electric Power Research Institute, Hainan Power Grid Co., Ltd, Haikou, People's Republic of China, ²State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, Shaanxi, People's Republic of China)
- 19:50-19:55 Effect of Thermal Aging on the Decay-like Fracture of Silicone Rubber Composite Insulator (NO. 445)
Hao Shen^{1}, Hui Liu¹, Yu Deng², Ran Jia¹, Chao Zhou¹, Yang Zhang¹, Rong Liu¹, Chuanbin Liu¹* (¹Shandong Electric Power Research Institute, Jinan, China, ²China Electric Power Research Institute, Beijing, China)
- 19:55-20:00 Evaluation of High Voltage Switchgear based on RBF Neural Network Information Fusion Technology (NO. 474)
*Jing Xie, Qi Song, Linglin Luo, Tianyi Wang** (Department of Electrical Engineering, Kunming University of Science and Technology, Kunming, China)
- 20:00-20:05 Study on the characteristics of the Pre-breakdown Process of Nanosecond High-Voltage Pulse Discharge in Water (NO. 1024)
Kangkai Liu^{1,2}, Rui Zhang¹, Guanglin Bai¹, Tao Wang¹, Lujia Wang², Jianwen Zhang²* (¹State Grid Economic and Technological Research Institute Co., Ltd. Changping District, Beijing, China, ²School of Electrical and Power Engineering, China University of Mining and Technology, Xuzhou, China)
- 20:05-20:10 Numerical Simulation of Space Charge in XLPE DC Cable under Temperature Gradient (NO. 1331)
Chi Chen, Jiaxing Li, Ni Zhao, Chuang Wang, Deyi Wang, Guoqing Yang* (School of electrical engineering, Xi'an University of technology, Xi'an, China)
- 20:10-20:15 Dynamic and Quantitative Risk Assessment of Ultra-High Voltage Converter Transformers (NO. 1473)
Yadong Xing, Yang Liu, Yizhuo Hu, Ming Dong* (State Key Laboratory of Electrical Insulation and

Power Equipment, School of Electrical Engineering, Xi'an Jiaotong University, Xi' an, China)

- 20:15-20:20 Research on the Developing Law of the Air-Gap Discharge in Oil-Paper Insulation by Multiple Methods (NO. 981)
Qingdan Huang, Haoyong Song, Wei Wang, Yuqing Chen (Guangzhou Power Supply Bureau, Guangdong Power Grid Co., Ltd., Guangzhou, China)*
- 20:20-20:25 Research on the Temperature Rise Characteristics of Converter Transformer Valve-side Bushing and the Prediction Model of Full State Index (NO. 1323)
Mu Lin¹, Kai Liu^{1}, Zhen Ding¹, Hao Tang², Yan Yang¹, Guangning Wu¹ (¹School of Electrical Engineering Southwest Jiaotong University, Chengdu, China, ²China Electirc Power Research Institute, Beijing, China)*
- 20:25-20:30 An Electro-Thermal Model for Dielectric Heating in Silicone Elastomers under Harmonic Distorted Voltages (NO. 357)
Jun Ting Loh^{1}, Stefan Kornhuber¹, Thomas Linde², Stephan Schlegel² (¹Department of High Voltage Engineering/Materials/Electromagnetic Theory, University of Applied Sciences Zittau/Görlitz, Zittau, Germany, ²Institute of Electrical Power Systems and High Voltage Engineering, Technische Universität Dresden, Dresden, Germany)*
- 20:30-20:35 Application of Finite Element Method to Complete the Installation Requirements in a Buried Cable According to IEC60287 Standard (NO. 536)
Sandy JM Balla, Jeremiah J Walker, Isaac K Kyere (Department of Power Engineering, Vaal University of Technology, Vanderbiljpark, South Africa)*
- 20:35-20:40 A Correction Model of Furfural Loss in Transformer oil under Partial oil Change (NO. 710)
Heng Zhang, Jiefeng Liu, Chuhan Geng, Xianhao Fan, Enze Zhang, Yiyi Zhang (School of Electrical Engineering, Guangxi University, Nanning 530004, China)*
- 20:40-20:45 Sheath Overvoltage on 220 kV XLPE Cable under Fault Conditions (NO. 191)
R Arunjothi, Thirumurthy, K P Meena (Central Power Research Institute, Bengaluru, India)*
- 20:45-20:50 Determination of Voltage Dependence of Capacitance of 100 kV and 300 kV Compressed Gas Capacitors Using the Kinetic Method (NO. 309)
Mohamed Agazar^{1}, Hanane Saadeddine¹, Johann Meisner², Frank Gerdinand², Stephan Passon², Jean Marc Pillet³ (¹LNE, Laboratoire National de métrologie et d'Essais, 1 Rue Gaston Boissier, 75015 Paris, France, ²PTB, Physikalisch-Technische Bundesanstalt, Bundesallee 100, 38116 Braunschweig, Germany, ³Appareils Vettiner, 8 Boulevard de l'Artillerie 69007 Lyon, France)*
- 20:50-20:55 Analysis of Partial Discharges of Power Cables with 50 Hz and VLF (NO. 192)
R Arunjothi, Kumar Puhan Dillip, Sharma Rajat, K P Meena (Central Power Research Institute, Bengaluru, India)*
- 20:55-21:00 The Space Charge Behaviour in LDPE under AC Field with Frequency from 1 mHz to 1 kHz (NO. 1047)
Fanfan Yang¹, Jiandong Wu^{1,2}, Huaipei Su¹, Yi Yin^{1,2} (¹Department of Electrical Engineering, School of Electronic Information and Electrical Engineering Shanghai Jiao Tong University, Shanghai, China, ²Key Laboratory of Control of Power Transmission and Conversion Shanghai Jiao Tong University, Shanghai 200240, China)*

Poster/Semi-oral Session 14

November 24, 2021 (Wednesday), 19:30-21:00

Session 14: Electromagnetic fields: computation, measurements, environmental effects

Session Chairs: Assoc. Prof. Jun Guo, Xi'an Jiaotong University, China

Assoc. Prof. Hailiang Lu, Wuhan University, China

Venue: Hall 2

- 19:30-19:35 Electromagnetic-Thermal Coupled Analysis of a 10 KV Silicone Rubber Cast Dry-Type Transformer (NO. 700)
Yue Tong, Chao Fu, Tian Yuan, Qi Wang (China Electric Power Research Institute, Wuhan, China)
- 19:35-19:40 Simulation of Grid Particle Trap for Switch Fault Current Limiter (NO.240)
Hui Ni¹, Feiyue Ma¹, Zhonghua Xiang², Shangpeng Sun¹, Lei Chen¹ (¹Power Research Institute of the State Grid Ningxia Power Company Limited, Yinchuan, China, ²State Grid Ningxia Power Company Limited, Yinchuan, China)
- 19:40-19:45 A Hybrid Analytical Model for Estimating the Shielding Effectiveness of an Irregular Cavity Structure Withaperture Arrays (NO. 562)
Kejian Chen¹, Hai Jin¹, Hongliang Zhang¹, Xiaoying Zhang¹, Zhengqiang Liu¹ (¹College of Electrical and Information Engineering, Lanzhou University of Technology, Lanzhou, China)
- 19:45-19:50 Development of a Spherical Transient Electric Field Measuring Instrument Based on Wireless Transmission (NO. 375)
Wenting Li, Zhaozhi Long, Jiawei Fan, Kangmin Hu, Liu Shaobo, Feng Zhou (Measurement Research Institute, China Electric Power Research Institute, Wuhan, China)
- 19:50-19:55 Finite Element Analysis of Electrical Stresses in the Insulation System of Rotating Machines Fed by Static Converters (NO. 42)
Reza Sargazi¹, Peter Werle¹, Asghar Akbari² (¹ Leibniz Universität Hannover, Schering-Institute for High Voltage Engineering and Asset Management, Callinstr. 25A, D-30167, Hannover, Germany, ²Electrical Department of K.N. Toosi University of Technology, Tehran, Iran)
- 19:55-20:00 The Influence of Dielectric Constant Characteristics of AC High Gradient Resistor on Potential Distribution (NO. 579)
Zixin Ma¹, Chonghao Fang¹, Lin She¹, Pengfei Li¹, Zhe Chen¹, Jie Guo¹ (¹School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, China)
- 20:00-20:05 Study on Transient Electric Shock of Human Body under High-Voltage Hybrid Transmission Lines (NO. 632)
Bin Yang¹, Wen Han¹, Yujia Wang¹, Lyu Wang¹, Shuhong Wang², Mingxin Geng¹, Xiaochun Bai¹, Jian Wu^{1,2} (¹State Grid Shaanxi Electric Power Research Institute, Xi'an, China ²Xi'an Jiaotong University, Xi'an, China)
- 20:05-20:10 Current Field Distribution Calculation for Water-Blocking Buffer Layer of HV XLPE Cable (NO. 781)
Wenjie Li¹, Qing Liu², Ying Liu³, Benhong Ouyang¹, Yunjie Zhou⁴, Tianyu Yang⁴, Hongliang Liu², Libin Hu⁵, Ruoxi Liu², Zhigang, Ren² (¹China Electric Power Research Institute, Wuhan, China, ²Beijing Municipal Electric Power Company, Beijing, China, ³Xi'an Jiaotong University, Xi'an, China ⁴Shanghai Municipal Electric Power Company, Shanghai, China, ⁵Jiangsu Electric Power Research Institute, Nanjing, China)

Poster/Semi-oral Session 15

November 24, 2021 (Wednesday), 19:30-21:00

Session 15: Advanced materials and insulation systems: outdoor, indoor, solid, liquid and gas insulated, nanodielectrics, eco-friendly and other new materials, novel insulation system

Session Chairs: Assoc. Prof. Yu Gao, Tianjin University, China

Assoc. Prof. Guodong Meng, Xi'an Jiaotong University, China

Venue: Hall 3

- 19:30-19:35 MOLECULAR DYNAMICS SIMULATION ON THE EFFECT OF ELECTRIC FIELD ON PROPERTIES OF EPOXY RESIN REGARDING GIS INSULATOR (NO. 1017)
Guanglin Bai, Dongwei Wang, Tao Wang, Rui Zhang, Shuai Du, Jianwen Zhang (State Grid Economic and Technological Research Institute Co., Ltd., China)
- 19:35-19:40 DISCUSSION ON POLLUTION ACCUMULATION CHARACTERISTICS OF INSULATOR ON TOP OF EMU BASED ON MULTI FIELD COUPLING (NO.1010)
RuiZhang, Ting Chen, Guanglin Bai, Tao Wang, Jianwen Zhang, Lujia Wang (State Grid Economic and Technological Research Institute Co., Ltd., China)
- 19:40-19:45 Thermal-oxidative Aging Effected on The Properties of EPDM Used for Nuclear Cables Insulation (NO. 980)
Xiaohong CHI, Minzun JI, Jianxi LI, Tao LIU, WenfengLIU (Xi'an Jiaotong University, China)
- 19:45-19:50 Effect of Polycyclic Aromatic Hydrocarbons on Excitation and Growth Characteristics of Electrical Tree in Polyethylene-based Insulation for High Voltage Cables (NO. 976)
Zhuoran Yang, Xiao Liu, Yilei Wang, Wei Chen (State Grid Nanjing Power Supply Company, China)
- 19:50-19:55 Influence of Type, Content and Degassing Time of Crosslinking Agent on Electrical Tree Characteristics of XLPE in High Voltage Cables (NO. 975)
Wei Chen, Zhuoran Yang, XiaoLiu, Yilei Wang (State Grid Nanjing Power Supply Company, China)
- 19:55-20:00 An Improved Method of Thermal Resistance Calculation for the Buffer Layer in HV XLPE Cables (NO. 183)
Ying Liu, Meng Ma, Jiawei Chen (Xi'an Jiaotong University, China)
- 20:00-20:05 Research on the relevance of flow electrification characteristics under AC and DC voltage (NO. 168)
Jie Dai, Yunbo Tian, Chendong Duan, Kai Wu (Chang'an University, China)
- 20:05-20:10 Study on the Acute Inhalation Toxicity of Eco-friendly Gas Insulating Medium C5-PFK (NO. 103)
Yalong Li, Xiaoxing Zhang, Zhuo Wei, Yi Wang, Yi Li, Song Xiao (Wuhan University, China)
- 20:10-20:15 MOISTURE DEPENDENT SURFACE CHARGE BEHAVIOR OF FLUORINATED OIL-IMPREGNATED PAPER UNDER THE HARMONIC SUPERIMPOSED DC VOLTAGES (NO. 82)
Wenbo Zhu, Mingli Fu, Baojun Hui, Shuai Hou, Yifan Zhang, Bin Feng, jun Chen, Le Gu, Huihong Huang (China Southern Power Grid Electric Power Research Institute, China)
- 20:15-20:20 Modeling of Initial Streamer Discharge Voltage of C4F7N/CO2 Mixed Gas Considering Electrode Surface Roughness (NO. 65)
Yu Zheng, Wenjun Zhou, Tianpeng You, Tengda Shen (Wuhan University, China)
- 20:20-20:25 Breakdown characteristics and synergistic effects of eco-friendly hydrofluorocarbon gases for replacement of SF6 (NO. 529)

Xiaopeng Fan, Yongyan Zhou, Li Li, Nian Tang, Zhuanglei Zou, Dongwei Sun (Electric Power Research Institute of Guangdong Power Grid Limited Liability Corporation, Guangzhou, China)

20:25-20:30 IMPROVED ENERGY DENSITY AND SUPPRESSED DIELECTRIC LOSS OF POLYPROPYLENE/MALEIC ANHYDRIDE-GRAFTED POLYPROPYLENE/ZrO₂@Al₂O₃ TERNARY NANOCOMPOSITES (NO. 505)

Ziqi Zhang¹, Yuxin Zhang¹, Wenfeng Liu^{1}, Lu Cheng¹, Zhe Xu¹, Shengtao Li¹, Lei Jia² (¹State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China; ²State Key Laboratory of HVDC Electric Power Research Institute, China Southern Power Grid)*

20:30-20:35 Simulation and analysis of polypropylene dielectric constant based on molecular simulation method (NO. 1190)

Sijia Lao, Huiwen He, Lei Wang, Ting Yin (China Electric Power Research Institute, China)

Poster/Semi-oral Session 16

November 24, 2021 (Wednesday), 19:30-21:00

Session 16: Advanced materials and insulation systems: outdoor, indoor, solid, liquid and gas insulated, nanodielectrics, eco-friendly and other new materials, novel insulation system

Session Chairs: Assoc. Prof. Zhonglei Li, Tianjin University, China

Assoc. Prof. Yu Feng, Harbin University of Science and Technology, China

Venue: Hall 4

19:30-19:35 The Voltage Endurance Characteristics of HVDC Cable Insulation Slices (NO. 713)

Fei Li, Lisheng Zhong, Jinghui Gao, Rui Sui, Wenpeng Li, Hong Zhang (Xi'an Jiaotong University, China)

19:35-19:40 The electrical properties along the radial distribution of 500kV DC cable insulation (NO. 697)

Wenpeng Li, Jinghui Gao, Lisheng Zhong, Fei Li, Ying Li, Zhuoyuan Shen, Hongda Yan (Global Energy Interconnection Research Institute, China)

19:40-19:45 Experimental study on thrust and thrust to power ratio of graphene-coated wire-airfoil electrodes for ionic wind propulsion (NO. 696)

Fangxiang OuYang, She Chen, Rengui Tian, Dongdong Xu, Fayou Yang, Qianming Xu, Zhenxing Zhao (HUNAN UNIVERSITY, China)

19:45-19:50 Molecular Design of Eco-Friendly Insulating Gases Based on Structure-Activity Relationship (NO. 693)

Bin Hai, She Chen, Feng Wang, Jie Liu, Lipeng Zhong, Dongwei Sun (College of Electrical and Information Engineering, Hunan University, Changsha, China)

19:50-19:55 Study on the structure and mechanics, electrical properties of β -crystal blended polypropylene (NO. 689)

Kaiwen HUANG, Man Xu, zhigang Xue, weiZhang, yunshun Peng, liyuan Zhang (Xi'an Jiaotong University, China)

19:55-20:00 INFLUENCE OF CROSSLINKED BEHAVIOR ON THE DIELECTRIC PROPERTIES OF XLPE/OMMT NANOCOMPOSITE DIELECTRIC (NO. 663)

Qingzhong Xu, Guanghua Sun, Xiufeng Li, Fansheng Deng, Yunzi Dong, Xiaoqiang Wang (College

of Electrical and Electronic Engineering, Shandong University of Technology, China)

- 20:00-20:05 Excellent varistor CaCu₃Ti₄O₁₂ composites tailored by interface engineering (NO. 615)
ZhuangT ang, Zhiyao Fu, Kai Ning, Pengkang Xie (State Key Laboratory of Disaster Prevention and Reduction for Power Grid Transmission and Distribution Equipment, China)
- 20:05-20:10 Effect of Epoxy Material Itself on Characteristics and Properties of Its Fluorinated Surface Layer (NO. 608)
Bo Niu, Feiyue Ma, Zhonghua Xiang, Xuguang Liu, Zhenlian An (State Grid Ningxia Electric Power Corporation Research Institute, China)
- 20:10-20:15 THE THERMAL DECOMPOSITION CHARACTERISTICS OF HFO_{1234ze}(E) GAS FOR MV EQUIPMENT (NO. 602)
Long Li¹, Zhen Li², Ke Li¹, Qiang Yao¹, Song Xiao^{2}, Yi Li², Chao Lin³, Haoying Wu² (¹State Grid Chongqing Electric Power Company Electric Power Research Institute, Jiangbei District, Chongqing 401123, China; ²School of Electrical Engineering and Automation, Wuhan University, Wuhan 430072, China; ³State Key Laboratory of Power Transmission Equipment and System Security and New Technology, Chongqing University, Chongqing 400044, China)*
- 20:15-20:20 Research on the Detection Method of 500kV Composite Insulator's Decay-Like Fracture (NO. 581)
Guohui Pang, Zhijin Zhang, Ming Lu, Chao Gao, Xingliang Jiang (Chong Qing University, China)
- 20:20-20:25 STUDY ON THE CONDUCTION CHARACTERISTICS OF SF₆ GAS GAP UNDER CAPILLARY PULSE PLASMA INJECTION (NO. 573)
Hao Sun, Xuandong Liu, Ming Chen (Xi'an Jiaotong University, China)
- 20:25-20:30 FIRST PRINCIPLE STUDY OF CHARGE TRANSPORT PROPERTIES IN SILICONE RUBBER BASED ON CLASSICAL MARCUS THEORY (NO. 563)
Guang zhi Guo, Jun bo Deng, Jia ruiHan, Yi fan Hao, Guan junZ hang (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China)
- 20:30-20:35 Study on dielectric and discharge characteristics of nano-Al₂O₃ modified insulating paperboard under AC-DC combined voltage (NO. 558)
Zhihua Liu, Zewei Bu, Simeng Li, Shengchang Ji (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China)
- 20:35-20:40 RESEARCH ON OIL-PAPER INSULATION CHARACTERISTICS UNDER NONUNIFORM ELECTRIC FIELD (NO. 557)
Wei Shen, Feng Zhao, Liuqing Yang, Huize Cui, Jiachen Yu, Shengtao Li, Ziqi Zhang (Shaanxi Electric Power Research Institute Shaanxi Electric Power Corporation, China)

Poster/Semi-oral Session 17

November 25, 2021 (Thursday), 11:05-12:00

Session 17: High voltage and high current testing techniques: test procedures, measurements, evaluation, partial discharges, space charges, dielectric characteristics, emerging test techniques

Session Chairs: Assoc. Prof. Hongwei Mei, Tsinghua Shenzhen International Graduate School, China
Assoc. Prof. Jian Hao, Chongqing University, China

Venue: Hall 1

- 11:05-11:10 Research and Protection of Stray Current in Grounding System of HV XLPE Cable along Subway (NO. 741)
Bo Wang¹, Lingwen Meng¹, Quanwei Hu¹, Chao Zuo², Yunfei Chen¹, Yue Li¹, Yuqing Chang¹ (¹State Grid Tianjin Cable Company, Tianjin, China, ²China Railway Liuyuan Group Co.LTD, Tianjin, China)
- 11:10-11:15 Pulsed Townsend Measurement of Electron Swarm Parameters in Dry Air (NO. 771)
Dibo Wang^{1,2}, Wenxiong Mo³, Yan Luo^{1,2}, Wei Wang³, Ran Zhuo^{1,2}, Haoyong Song³ (¹CSG Electric Power Research Institute CO., Ltd., Guangzhou, China, ²United Laboratory of Advanced Electrical Materials and Equipment Support Technology, CSG., Guangzhou, China, ³ Guangzhou Power Supply Bureau, Guangdong Power Grid Co., Ltd., Guangzhou, China)
- 11:15-11:20 PD Characteristic and Motion Behaviors of Free Metallic Particles in Transformer Oil with Paper-Covered Electrodes (NO. 796)
Yuhang Yao¹, Suyi Xia¹, Cheng Pan^{1}, Ju Tang¹, Xinyu Luo²* (¹Wuhan University School of Electrical Engineering and Automation Wuhan, China, ²State Grid Sichuan Electric Power Research Institute Chengdu, China)
- 11:20-11:25 Experimental Research on Erosion Detection Method of High Voltage Cable Cushion Layer (NO. 800)
Xin Zhang¹, Guowen Hao¹, Binqiang Xia¹, Hui Yu², Lijun Xu², Zhao Han², Wenjie Li³, Benhong Ouyang³, Rong Xia³ (¹State Grid XinYuan Corp.Ltd, Beijing, China, ²Jiangxi Hongping pumped storage Co., Ltd, Yichun, China, ³China Electric Power Research Institute, Wuhan, China)
- 11:25-11:30 Surface Charge Accumulation under Nanosecond Pulse Discharge and Its Effect on the Breakdown Voltage of the Gas Switch (NO. 820)
Lipeng Zhong^{1}, Yongchao Deng¹, Zhiqiang Chen², Wei Jia², Fan Guo²* (¹College of Electrical and Information Engineering, Hunan University, Changsha, China, ²State Key Laboratory of Intense Pulsed Radiation Simulation and Effect, Northwest Institute of Nuclear Technology, Xi'an, China)
- 11:30-11:35 Effect of Light Stabilizer Injection Technology on Insulation Properties of the Thermal-Oxidative Aged XLPE Cable (NO. 822)
Yaping Wu^{}, Kai Zhou, Shiyu Li, Jianbo Xiang, Qingwen Xu* (College of Electrical Engineering, Sichuan University, Chengdu, Sichuan, China)
- 11:35-11:40 Influence of Thermal Aging on the Physical Characteristics of Liquid Silicone Rubber (NO. 867)
Qian Wang¹, Sen Xu², Xidong Liang^{1}, Shuming Liu¹, Shuqi Liu¹, Zhou Zuo¹* (¹State Key Laboratory of Power Systems, Tsinghua University, Beijing, China, ²Beijing ByteDance Technology Co. Ltd., Beijing, China)
- 11:40-11:45 Partial Discharge Diagnosis Based on TMR Magnetic Field Sensor (NO. 875)
Shi Pan¹, Jun Hu^{1}, Ran Bi¹, Haoyu Ma¹, Jinliang He¹, Zhong Liu², Peng Li², Bing Tian², Zhiming Wang², Qiancheng Lv², Bofeng Luo²* (¹Department of electrical engineering, Tsinghua University, Beijing, China, ² Digital Grid Research Institute, China Southern Power Grid, Guangzhou, China)
- 11:45-11:50 Research on Short-Time Withstand Current Test Technology of Main-Branch of 500 kV Mechanical DC Circuit Breaker (NO. 893)
Guangwei Fan^{}, Ping Liu, Pu Liu, Shi Huang, Peiren Wang, Juncen Du* (Xi'an High Voltage Apparatus Research Institute Co., Ltd., Xi'an, China)
- 11:50-11:55 Detection of Dissolved Acetylene in Transformer Oil Based on Photothermal Interferometry Spectroscopy (NO. 898)
Yuan Wang^{1}, Zhanglin Chen¹, Weiqi Qin¹, Hongyang Zhou², Guoming Ma^{1*}* (¹State Key

Laboratory of Alternate Electrical Power System with Renewable Energy Sources, North China Electric Power University, Beijing, 102206, China, ²Guangdong Engineering Technology Research Centre of Power Equipment Reliability in Complicated Coastal Environments, Tsinghua Shenzhen International Graduate School, Tsinghua University, Shenzhen, Guangdong 518055, China)

11:55-12:00 Partial Discharge Dead Zone Location for Power Cables Based on Matching Pursuit and the Granado Propagation Model (NO. 946)

Tong Wang^{1}, Jian Li² (¹Ordnance Non-Commissioned Officers Academy, Army Engineering University of PLA, Wuhan, China, ²Unit 96943 of PLA, Beijing, Country)*

Poster/Semi-oral Session 18

November 25, 2021 (Thursday), 11:05-12:00

Session 18: High voltage and high current testing techniques: test procedures, measurements, evaluation, partial discharges, space charges, dielectric characteristics, emerging test techniques

Session Chairs: Assoc. Prof. Potao Sun, Chongqing University, China
Assoc. Prof. Song Xiao, Wuhan University, China

Venue: Hall 2

11:05-11:10 Comparative Study of Partial Discharge Detection with Multi-band Helical Antenna and Silicon Photomultiplier (NO. 1049)

Yifan Rui^{1,3}, Mingyu Zhou², Haitian Wang², Yalin Wang^{1,3}, Lu Fan^{1,3}, Yi Yin^{1,3} (¹Department of Electrical Engineering, School of Electronic Information and Electrical Engineering Shanghai Jiao Tong University, Shanghai, China, ²Global Energy Interconnection Research Institute Europe GmbH, Berlin, Germany, ³Key Laboratory of Control of Power Transmission and Conversion Shanghai Jiao Tong University, Shanghai 200240, China)*

11:10-11:15 An Integrated Voltage Generator for Medium Voltage Power Cable Insulation Diagnosis (NO. 1067)

Lin Zhang¹, Li Wang², Qishen Lv¹, Zhiren Tian¹, Saike Yang², Xianyu Yue², Hongjie Li^{2} (¹Shenzhen Power Supply Corporation, Shenzhen, China; ²Xi'an Jiaotong University, Xi'an, China)*

11:15-11:20 Design of a Current Sensor with Hybrid Integrator Based on a New Circuit Topology (NO. 1088)

Fangfei Su, Weidong Ding, Yue Yu, Xiwen Zhang (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, Shaanxi, China)*

11:20-11:25 Analysis of Moisture Diffusion of Oil-Impregnated Bushing under Axial Non-Uniform Distribution based on FEM and Fick's Second Law (NO. 1136)

Xianhao Fan, Kuo Jiang, Jiefeng Liu Qingyin Wang, Yiyi Zhang (School of Electrical Engineering, Guangxi University, Nanning, 530004 China)*

11:25-11:30 Discharge Characteristics and Harmfulness of Millimetre Metal Particles on the 1100 kV Insulator Surface (NO. 1164)

Xing Li^{1}, Yuan Xu², Weidong Liu¹, Ke Zhao³ (¹Department of Electrical Engineering, Tsinghua University, Beijing, China, ²China Electric Power Research Institute, Beijing, China, ³State Grid Jiangsu Electric Power Research Institute, Nanjing, China)*

11:30-11:35 Modeling of Hybrid DC Fuse Based on Piecewise Fitting (NO. 1174)

Shaopeng Liu^{1}, Feng Ji¹, Siguang Li², Wen Sun¹ (¹National Key Laboratory of Science and*

Technology on Vessel Integrated Power System, Naval University of Engineering, Wuhan 430033, China, ²College of Electrical Engineering, Naval University of Engineering, Wuhan 430033, China)

- 11:35-11:40 Application Research of Ultraviolet Imaging, Leakage Current and Acoustic emission signal in composite insulator defect detection (NO. 1199)
Ming Li¹, Yugang Jing¹, Lei Zhang¹, Xinmei Li¹, Guilin Huang², Zihao Wang³ (¹State Grid Shandong Electric Power Research Institute, Jinan, China, ²Imperial College London, London, UK, ³North China Electric Power University, Baoding, China)
- 11:40-11:45 Research on the Propagation Characteristics of Ultrasonic Signals Generated by Partial Discharge in GIS under Different Structures (NO. 1210)
Zhimin Wu, Chenglong Jia, Wenbin Zhao, Wu Lu, Yuan Gao, Feng Li (Electrical Engineering, Shanghai, China)*
- 11:45-11:50 Research on Target Selection of Gateway Power Transformer Error Test Based on Fuzzy Decision and Combination Weighting Method (NO. 1278)
Kangmin Hu^{1}, Shaobo Liu¹, Kunxiong Liu², Xiaodong Yin¹, Zhaozhi Long¹, Wenting Li¹, Jiawei Fan¹ (¹China Electric Power Research Institute, Wuhan, China, ²State Grid Shaanxi Electric Power Research Institute, Xi'an, China)*
- 11:50-11:55 A Portable Partial Discharge Locating Tool for 10-kV Covered Conductor Lines (NO. 1307)
Yuan Yan, Hongjie Li, Yanchao Wang, Jiaqi Tao, Zhenyu Lu, Yinsong Zhao (School of the Electrical Engineering, Xi'an Jiaotong University, Xi'an, China)
- 11:55-12:00 Recognition of Partial Discharge of XLPE Cable Based on ResNets (NO. 1316)
Zhe Zhao¹, Changhai Sun¹, Ruixi Kong¹, Jiayun He², Jiliang Han³, Shuchun Zhao³, Junxiang Ma³ (¹Department of Electrical Engineering, Dalian University of Technology, Dalian, China, ²Power Technology Engineering Division, Chongqing Taishan Cable Co., Ltd., Chongqing, China, ³Henan Branch, China Huaneng Group Co., Ltd., Zhengzhou, China)

Poster/Semi-oral Session 19

November 25, 2021 (Thursday), 11:05-12:00

Session 19: Monitoring and diagnostics: intelligent sensing, big data, artificial intelligence, asset management, live-line working, maintenance and repair, safety considerations

Session Chair: Prof. Guoming Ma, North China Electric Power University, China

Assoc. Prof. Aijun Yang, Xi'an Jiaotong University, China

Venue: Hall 3

- 11:05-11:10 Partial Discharge Diagnosis for GIS Equipment with Deep Decision Network (NO. 355)
Huang Zhihong, Zhang Keren, Xiao Jian, Chen Junxingxu, Huang Wei, Zhu Guangmin (State Grid Hunan Electric Power Corporation Limited Research Institute, Changsha, China)
- 11:10-11:15 Development of Management System for Bushing UV Imaging Detection (NO.1160)
Yufeng Chen¹, Zhaoli Gao², Mingkai Xu², Xianfei Lu², Leilei Niu³ (¹ State Grid Shandong Electric Power Research Institute, ² State Grid Jinan Supply Company ³ School of Electrical and Electronic Engineering North China Electric Power University Beijing, China)
- 11:15-11:20 On-line Monitoring and Characteristic Analysis of Converter Transformer Vibration (NO. 268)

Shuyu Wu¹, Fan Zhang², Shengchang Ji³, Zhenyu Zhan⁴, Wei Wang⁵ (¹State Key Lab of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China, ²State Key Lab of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China, ³State Key Lab of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China, ⁴State Grid Henan Electric Power Research Institute, Zhengzhou, China, ⁵State Grid Henan Electric Power Research Institute, Zhengzhou, China)

11:20-11:25 Research on Error Test Objective of Gateway Transformer Based on Fuzzy Decision and Combination Weighting Method (NO. 245)

Kangmin Hu¹, Shaobo Liu¹, Feng Zhou¹, Jiawei Fan¹, Zhaozhi Long¹, Wenting Li¹ (¹China Electric Power Research Institute, Wuhan, China)

11:25-11:30 Study on Method of Measuring the Interface Pressure of Cable Accessory with Fiber Grating Curvature Sensor (NO. 244)

Xia Wang, Zhuoyang Fan, Chao Wu, Kai Wu, (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, 710049, China)

11:30-11:35 Analysis on the locomotion of Cable Tunnel Inspection Quadruped Robot Based on Deep Reinforcement Learning (NO.1337)

Chenbin Wu¹, Yunjie Zhou¹, Yi Zhang¹, Hai Li¹, Xiaodi Wang¹, Zhiqiang Li² (¹State Grid Shanghai Cable Company, Shanghai, China, ²Shuoneng (Shanghai) Automation Technology Co., Ltd, Shanghai, China)

11:35-11:40 Experimental Study on Temperature Rise of 40.5 kV Switchgear with Heater Installed (NO.1355)

Yong Huang¹, Shengwen Shu¹, Shaomei Shi¹, Zhiwen Bian², Dengfeng Wei², Yihong Lin² (¹College of Electrical Engineering and Automation, Fuzhou University, Fuzhou, China, ²State Grid Fujian Electric Power Co., Ltd., Electric Power Research Institute, Fuzhou, China)

11:40-11:45 Study on Partial Discharge Pulse Propagation Characteristics and Clustering Analysis of Cable (NO.1439)

Binqiang Xia¹, Zhao Han², Ming Chen², Wenjie Li³, Benhong Ouyang³, Senxuan Zhou², Zihao Chen², Xiaoyun Guo² (¹State Grid XinYuan Corp.Ltd, Beijing, China, ²Jiangxi Hongping pumped storage Co., Ltd, Yichun, China, ³China Electric Power Research Institute, Wuhan, China)

11:45-11:50 Research on the Development of Photoelectric Signal During Typical Discharges in Transformer Main Insulations (No. 88)

Jianan Weng, Wu Lu, Muzi Li, Hao Zhang, Wenbin Zhao (Shanghai University of Electric Power, Shanghai, China College of Electrical Engineering, Shanghai University of Electric Power, No. 2588 Changyang Road, Yangpu District, Shanghai, China)

Poster/Semi-oral Session 20

November 25, 2021 (Thursday), 11:05-12:00

Session 20: Electromagnetic fields: computation, measurements, environmental effects

Session Chairs: Assoc. Prof. Chuang Wang, Xi'an University of Technology, China

Assoc. Prof. Tianyu Dong, Xi'an Jiaotong University, China

Venue: Hall 4

11:05-11:10 Design of Robust, Safe and Reliable Switchgear with Electrothermal Numerical Simulations (NO.

- 804)
Adrian Scott¹, Weiran Xu¹, Mattewos Tefferi², Andres Laso², Nenad Uzelac² (¹Dassault Systèmes, Germany, ²G&W Electric Co. 305 W. Crossroads Pkwy. Bolingbrook, IL. 60440 USA)
- 11:10-11:15 Research on Bus Electrodynamics Force of 750kV Micro-Loss Economical Fault Current Limiter under Power Frequency Short-Circuit (NO. 925)
Shaogui Ai¹, Dongyang Hou², Yiping Fan¹, Feiyue Ma¹, Kui Ma³, Jun Zou² (¹State Grid Ningxia Electric Power Co., Ltd. Electric Power Research Institute, Ningxia, China, ²Department of Electrical Engineering, Tsinghua University, Beijing, China, ³State Grid Ningxia Electric Power Limited company, Ningxia, China)
- 11:15-11:20 Research on Transformer Electrodynamics Force of 750kV MicroLoss Economical Fault Current Limiter Under Power Frequency Short-Circuit (NO. 933)
Shaogui Ai¹, Dongyang Hou², Yongning Huang¹, Hui Ni¹, Xiuguang Li¹, Jun Zou² (¹State Grid Ningxia Electric Power Co., Ltd. Electric Power Research Institute, Ningxia, China, ²Department of Electrical Engineering, Tsinghua University, Beijing, China)
- 11:20-11:25 A Digital Input Electricity Meter Calibration System Based on IEC 61850 Standard (NO. 994)
Wei Wei¹, Yi Fang¹, Li Ye¹, He Yu¹, Yingchun Wang¹, Dongri Xie¹ (¹State Grid Hubei Marketing Service Center (Measurement Center), Wuhan, China)
- 11:25-11:30 Field Measurement and Analysis on Wind-induced Vibration response of single column Lightning Rod (NO. 1087)
Xinsheng Dong¹, Hui Wang², Kezhu Guo³, Jiangong Ma¹, Wei Liu¹, Minguan Zhao¹ (¹State Grid Xinjiang Electric Power Research Institute, Urumqi, China, ²State Grid Changji Electric Power Supply Company, Xinjiang, Changji, China, ³State Grid Tacheng Electric Power Supply Company, Xinjiang, Tacheng, China)
- 11:30-11:35 Simulation of the Electric Field of Human Body Surface When the ±1100kV Line is Installed in Parallel with the 1000 kV AC Line (NO. 1109)
Cao Songyuan¹, Wang Jian², Dong Guolun¹, Yan Bo¹, Fang Dengzhou¹, Keer Sun³ (¹State Grid Anhui Electric Power Co., LTD., Hefei, 230022, China; ²State Grid, Beijing, 100017, China; ³Chongqing University, China)
- 11:35-11:40 The Influence of Adjacent Lines on the Surface Electric Field of Outage Maintenance Personnel (NO. 1115)
Xia Lingzhi¹, Cheng Dengfeng¹, Cheng Yang¹, Ding Zhiyuan², Sun Keer² (¹State Grid Anhui Electric Power Co., Ltd. Electric Power Research Institute, Hefei, China, ² State Key Laboratory of Power Transmission Equipment & System Security and New Technology (Chongqing University), Chongqing, China)
- 11:40-11:45 Research on Spectral Recognition Method of Tree Species in Transmission Corridor (NO. 1216)
LI Jieshan¹, WANG Ning¹, WANG Chaoshuo¹, Yao Libin², Yang Chengguang², Yan Xianglong² (¹EHV Transmission Company China Southern Power Grid Guangzhou, China, ²School of Electrical Engineering Southwest Jiaotong University Chengdu, China)
- 11:45-11:50 Research on Overvoltage and Electromagnetic Disturbance Characteristic of AIS Isolating Switch (NO. 1263)
Huang Xingming¹, Min Yongzhi², Yuan Jiaxin³, Yin Shan⁴ (¹School of Automation and Electrical, Lanzhou Jiaotong University, Lanzhou, China, ²School of Automation and Electrical, Lanzhou Jiaotong University, Lanzhou, China, ³School of Automation and Electrical, Wuhan University, Wuhan, China, ⁴ School of Automation and Electrical, Wuhan University, Wuhan, China)

- 11:50-11:55 Electric Field Prediction and Optimization of 12 kV Switchgear Contact Box (NO. 1348)
Zhiwen Bian¹, Shaomei Shi², Yanxue Guo¹, Yihong Lin¹, Yong Huang², Shengwen Shu² (¹State Grid Fujian Electric Power Co., Ltd., Electric Power Research Institute, Fuzhou, China, ² College of Electrical Engineering and Automation, Fuzhou University, Fuzhou, China)
- 11:55-12:00 Effect of Material Choice on the Operation of a Wind Turbine Lightning Protection System (NO. 253)
K. N. Koutras, K. S. Apostolopoulou, I. A. Naxakis, E. I. Tsolou, E. C. Pyrgioti (High Voltage Laboratory, Department of Electrical & Computer Engineering, University of Patras, GR 26500, Patras, Greece)



28 August – 1 September 2023
University of Strathclyde Technology
& Innovation Centre, Glasgow, UK

International Symposium on High Voltage Engineering | Glasgow, UK
www.ISH2023.org

Host Organisation: The Institute for Energy and Environment, The Department of Electronic and Electrical Engineering, The University of Strathclyde



Glasgow is a thriving city with a rich cultural history and is regarded as one of the friendliest cities in the world. It is located in the west of Scotland with excellent communication links through three international airports.

It is a gateway to the scenic beauties of the historic Scottish Highlands. There are excellent transport links to other famous historic cities and sites in Scotland like Edinburgh and Stirling.



The conference venue is the University of Strathclyde's Technology and Innovation Centre. As well as being a hub for industry facing research at the University the TIC provides modern conference facilities in a venue at the heart of Glasgow close to affordable accommodation. The TIC has been hosting International conferences in Glasgow for over 5 years.

The scope of the 23rd International Symposium on High Voltage Engineering will include the following areas:

- Electromagnetic fields
- Transient voltages
- High voltage and high current testing techniques
- Advanced materials and insulation systems
- Monitoring and diagnostics
- HVDC technologies and systems
- High voltage engineering in future power grids
- Industrial applications of high voltage
- Environmental impacts of high voltage systems

In addition there will be special events to help our young professionals with career development.

Preliminary Deadlines	
Receipt of 500 Word Abstract	1st November 2022
Preliminary Notice of Acceptance	20th December 2022
Receipt of Full Papers	1st March 2023
Final Acceptance	1st May 2023

As the planning and preparation for the delivery of ISH-2023 develops more information will be made available through the conference website.

Register your interest at :

<https://confpartners.eventsair.com/ish-2023/registeryourinterest/Site/Register>



Sponsorship



After 15 years of wind and rain, we pursue it all the way. Golden crown Electric Co., Ltd. (listed on the science and Innovation Board of Shanghai Stock Exchange, stock code: 688517) is committed to becoming a craftsman enterprise in the industrial 4.0 era in the power equipment industry. The company implements the focus strategy and is committed to "digging 100 meters deep in one meter" to build its core competitiveness.

The company has two core products of "1 + 1", which serve the construction of strong smart grid and smart distribution network

respectively.

The first "1" refers to lightning arrester products. The company's lightning arrester products have three characteristics: complete product specifications and models, leading technology and high market share. They rank first in the bid winning share of State Grid Corporation of China and China Southern Power Grid Corporation for many consecutive years, and the market retention rate of UHV products ranks first, The number of 110kV and above arresters in operation in the State Grid Corporation of China exceeds 22%. The second "1" refers to intelligent distribution network equipment, including distribution network products such as ring network cabinet, column circuit breaker, switch cabinet and box substation. The product technology has reached the domestic advanced level. In the bidding of State Grid Corporation of China and China Southern Power Grid Corporation, the winning share has always been among the top.

The company is an innovation driven enterprise, with R & D centers in Beijing and Xi'an, national enterprise technology center, national postdoctoral workstation, Henan UHV transmission and transformation overvoltage protection equipment engineering technology research center and million-volt UHV laboratory. The company has carried out technical cooperation and talent training with famous domestic universities and scientific research institutions such as Tsinghua University, North China Electric Power University, Xi'an Jiaotong University, Chongqing University, Chinese Academy of electrical Sciences and Wuhan University of technology, and jointly established a "collaborative innovation base" with North China Electric Power University.

The company is a national high-tech enterprise, one of the 100 excellent non-public enterprises in Henan Province assessed by the Henan provincial Party committee and the Henan provincial government, a leading innovation enterprise in Henan Province, a service-oriented manufacturing demonstration enterprise in Henan Province, 50 equipment manufacturing enterprises cultivated by Henan Province, and a charity enterprise in Henan Province; It is a member of the national insulator arrester Standardization Committee, vice chairman of insulator arrester branch of China Electrical Industry Association, vice chairman of Henan smart grid industry alliance, and an excellent supplier of State Grid Corporation of China and China Southern Power Grid Corporation. The golden crown trademark is recognized as a well-known trademark in China by the State Administration for Industry and commerce.

