TECHNICAL PROGRAM

October 22-25, 2017

ORAL SESSIONS

ICEPE-ST2017 Preliminary Program V2

Monday, October 23rd, 2017

Opening Ceremony & Plenary Lecture
Monday, October 23rd, 08:30-10:00
Chair:
Venue: Room A

08:30-08:50 Opening Ceremony

08:50-10:10 Plenary Lectures

PL-1 **Introduction on the Switchgear of DC Transmission System**
Jianying Zhong *(State Grid Pinggao Group Co. LTD., Pingdingshan, China)*

PL-2 **Title of the Talk: Fundamental Studies on Switching Arcs -Experimental and Numerical Approaches-**
Yasunori Tanaka *(Kanazawa University, Japan)*

10:10-10:40 Coffee Break & Group Photo

10:40-12:00 Plenary Lectures

PL-3 **HVDC Circuit Breaker - Design Considerations and Application Issues**
Bang-Wook LEE *(Hanyang University, South Korea)*

PL-4 **Developments and Trends in European T&D Switching Technology**
René Peter Paul Smeets *(KEMA Laboratories DNV GL Arnhem, the Netherlands)*

Monday, October 23rd, 13:30-15:30
Oral 1: A1- Switching Phenomena in SF6 Gas
Chair:
Venue: Room A

A1-I-1 **Arc Plasma Characteristics and Analysis in Gas Discharge**
(Invited) ***Fei Yang*** *(Xi'an Jiaotong University, Xi'an, China)*

A1-O-1 **Test Analysis of Dielectric Recovery Characteristic in High Voltage SF6 Circuit Breaker (No. 752958) (Award Candidate)**
Wang Feiming , Zhang Bin, Tian Yong, Lang Fucheng (Electric Power Research Institute of State Grid Liaoning Electric Power Supply Co., Ltd., Shenyang, China), Lin Xin, Xia Yalong (Shenyang University of Technology, Shenyang, China)

A1-O-2 Influence of the different power frequency on interruption simulation for a Self-blast Type 252kV SF6 circuit breaker (No. 753019) (Award Candidate)

Jin Guo, Xu Jiang, Bing Chen, Wen Gao, Rui Cao (XI'AN high voltage apparatus research institute co..ltd, Xi'an ,China)

A1-O-3 Universal Approach to Gas Flow and Pressure Rise Calculation in HV Circuit Breaker Chambers (No. 753276)

Amer Smajkic (University of Sarajevo, Sarajevo, Bosnia and Herzegovina; EnergoBos ILJIN d.o.o, Sarajevo, Bosnia and Herzegovina), Armin Hajdarovic, Belma Bosovic (EnergoBos ILJIN d.o.o, Sarajevo, Bosnia and Herzegovina), Mirsad Kapetanovic (Unversity of Sarajevo, Sarajevo, Bosnia and Herzegovina; EnergoBos ILJIN d.o.o, Sarajevo, Bosnia and Herzegovina), Kyong-Hoe Kim, Myoung-Hoo Kim (ILJIN Electric Co., Ltd., Gyeonggi-do, Republic of Korea)

A1-O-4 Numerical Calculation and Experimental Study on Breaking Characteristics for High Voltage SF6 Circuit Breaker (No. 753383) (Award Candidate)

Yu SONG, Xin LIN (Shenyang University of Technology, Shenyang, China), Jianying ZHONG, Yujing GUO (Pinggao Electric Co.,Ltd., Pingdingshan, China), Wei LI, Jianyuan XU, Yalong XIA, Feiming WANG (Shenyang University of Technology, Shenyang, China)

A1-O-5 Research on the Key Technology of 1100 kV SF6 Gas-Insulated Metal-Enclosed Transmission Line (No. 753220)

Zhong Jianying, Guo Yujing, Jin Guangyao, Du Liping (Pinggao Group Co., Ltd., Pingdingshan, Henan, China)

A1-O-6 Influence of Straight Line Length of Nozzle Throat on the Breaking Performance of Ultra - high Voltage SF6 Circuit Breaker (No. 753217)

GUO Yujing, ZHANG Hao, YAO Yongqi, WANG Zhijun, ZHANG Bo, HAO Xiangyu, WANG Guan (Pinggao Group Co., Ltd., Pingdingshan, China)

Monday, October 23rd, 13:30-15:30
Oral 2: A2-Switching Phenomena in Vacuum 1
Chair:
Venue: Room B

A2-I-1 The Future of Vacuum Switchgear

(Invited) ***Leslie T Falkingham*** *(VIL, UK)*

A2-I-2 Formation of Anode Spots in Transmission Voltage Vacuum Circuit Breakers

(Invited) *Zhiyuan Liu (Xi'an Jiaotong University, Xi'an, China)*

A2-O-1 Chromium Vapor Density Measurement by Optical Absorption Spectroscopy of Diffuse Vacuum Arcs in Vacuum Interrupters (No. 752980) (Award Candidate)

Haoran Wang, Zhenxing Wang, Jiankun Liu, Yingsan Geng, Zhiyuan Liu and Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

A2-O-2 Research on speed control method of motor operated mechanism of 126kV vacuum circuit breaker (No. 753329) (Award Candidate)

Kai QU, Jian-yuan XU, Guan-nan WU (Shenyang University of Technology, Shenyang, China), Xin JIN (State Grid Liaoning Electric Power Supply Co., Ltd, Shenyang, China)

A2-O-3 Interruption property of vacuum interrupter with four different contact materials (No. 752981)

Min Li, Dacheng Shi, Xiaoqin, Wang, Congjun Xue (Pinggao Group Co., Ltd.,Pingdingshan, China)

A2-O-4 Design of a 126 kV Double-break Fast Vacuum Circuit Breaker for Controlled Switching

Bojian Zhang (Xi'an Jiaotong University, Xi'an, China), Shaogui Ai (Ningxia Electric Power Research Institute, Ningxia, China), Wei Du (State Grid Electric Power Research Institute Wuhan NARI Limited Liability Company, Wuhan, China), Xiaofei Yao, Ran Zhang, Jianhua Wang, Zhiyuan Liu, Yingsan Geng, Satoru Yanabu (Xi'an Jiaotong University, Xi'an, China)

Monday, October 23rd, 13:30-15:30
Oral 3: F - Testing Technologies in Switchgears
Chair:
Venue: Room C

F-I-1 (Invited) **Discussion on the Problem about Capacitive Current Switching of EHV and UHV AC Circuit Breaker**
Gang Li (Xi'an High Voltage Apparatus Research Institute Co., LTD (XIHARI), Xi'an, China)

F-O-1 **Insulating Void Defect Analysis of Onsite 252kV GIS by Employing Partial Discharge UHF Diagnosis and Industry CT (No. 752434) (Award Candidate)**
Yifan He, Xianjun Shao, Shao'an Wang, Feiran Li (Research Institute of State Grid Zhejiang Electric Power Company, Hangzhou, CHINA)

F-O-2 **Highly Sensitive Partial Discharge Detection by TEV Method under Severe Noise Conditions (No. 753301) (Award Candidate)**
Yuuki Fujii, Hiroaki Cho, Yusuke Nakamura (Toshiba Corporation, Fuchu-shi, Tokyo, Japan)

F-O-3 **Study on Transient Enclosure Voltage Generated by GIS Operation and Its Suppression Method (No. 753261) (Award Candidate)**
Wenpeng ZHAI, Xin LIN, Sha HAO, Jianyuan XU, Boyao LIU (Shenyang University of Technology, Shenyang, China)

F-O-4 **Discharge Location Technology in Handover Test of UHV GIS (No. 752644)**
Tianhui Li, Boyan Jia, Chaomin Gu, Xiaofeng Li, Da Zhang, Gengsen Wang, Chi Dong, Xianhai Pang, Jin Pan (State Grid Hebei Electric Power Research Institute, Shijiazhuang, China)

F-O-5 **Preliminary Experiment on Development of Non-Contact Measuring Method of Arc Potential -Simultaneous Measurement of Potential and Radius- (No. 753255)**
S. Minami, Y. Yokomizu, T. Matsumura (Nagoya University, Nagoya, Japan) , A. Majima, T. Uchii (Toshiba Corporation, Kawasaki, Japan), K. Suzuki (Tokyo Denki University, Adachi, Japan)

F-O-6 **The Design of Post Arc Current Measurement System with High Precision on Multi-break Vacuum Circuit Breakers (No. 753360)**
Minfu Liao, Hao Zhang, Xiongying Duan (Dalian University of Technology, Dalian, China), Guowei Ge (Zhengzhou University, Zhengzhou, China), Jiyan Zou, Enyuan Dong (Dalian University of Technology, Dalian, China)

Monday, October 23rd, 16:30-18:30
Oral 4: A4 - Eco-Friendly SF6 Alternative Gas
Chair:
Venue: Room A

A4-I-1 (Invited) **TBD**
Xin Lin (Shenyang University of Technology, Shenyang, China)

A4-O-1 **Research on the Microscopic State Parameters of SF6/N2 and SF6/CO2 Circuit Breaker in Arc Formation Process (No. 753211) (Award Candidate)**
Li Jing, Zheng Hao, Cao Yundong, Liu Shuxin (Shenyang University of Technology, Shenyang, China), Yu Longbin (Northeast China Electric Power Research Institute, Shenyang, China)

A4-O-2 **Research on Insulation Characteristics and Decomposition Products of c-C4F8/N2 mixtures in Slightly Non-uniform Electric Field (No. 752949)**
DENG Xian-qin (State Grid Shanghai Electric Power Research Institute, Shanghai, China), XUE Peng, ZHAO Su, ZHANG Hui (Shanghai Jiao Tong University, Shanghai, China)

A4-O-3 **Thermophysical Properties Calculation of C4F7N/CO2 mixture Based on Computational Chemistry—A Theoretical Study of SF6 Alternative (No. 753314) (Award Candidate)**
Wang Chunlin, Wu Yi, Sun Hao, Duan Jiawei, Niu Chunping, Yang Fei (Xi'an Jiaotong University, Xi'an, China)

A4-O-4 **Key Properties of Eco-friendly Mixed Gases and Its Ratio Distribution with Height (No. 753008)**
Yan Xianglian; Gao Keli; Li Zhibing; He Jie (China Electric Power Research Institute, Beijin, China), Zheng Yu; Hu Shizhuo; Zhou Wenjun (Wuhan University, Wuhan, China)

A4-O-5 **Fundamental Study on Re-ignition Process for CO2-blast Arcs in a Model Circuit Breaker Using Synthetic Tests Highly Controlled by Power Semiconductors (No. 752965)**
Tomoyuki Nakano, Yu Tabata, Yasunori Tanaka, Yoshihiko Uesugi, Tatsuo Ishijima (Kanazawa University, Kakuma, Kanazawa, Japan), Kentaro Tomita (Kyushu University, Kasuga, Japan), Yuki Inada (Saitama University, Saitama, Japan), Katsumi Suzuki (Tokyo Denki University, Senjuasahi, Adachi, Japan), Takeshi Shinkai (Tokyo University of Technology, Katakura, Hachioji, Japan)

A4-O-6 **Arc Motion Characteristics of H2-N2 Mixed Gas Switch with Magnetic Field (No. 753234)**
Jia Bowen, Wu Jianwen (Beihang University, Beijing, China), Kong Guowei, Wei Jie (Beijing SOJO Electric Co., Ltd, Beijing, China), Liu Guangyong (Yishui Campus, Linyi University, Linyi, China)

Monday, October 23rd, 16:30-18:30
Oral 5: A2 - Switching Phenomena in Vacuum 2
Chair:
Venue: Room B

A2-I-3 **Research on Vacuum Breakdown and Discharge Related to Electrode Gap of Vacuum Interrupter**
(Invited) ***Yosushi Yamano*** *(Saitama University, Japan)*

A2-O-5 **Vacuum Circuit Breakers – Promising Switching Technology for Pumped Storage Power Plants up to 450 MVA (No. 754756) (Award Candidate)**
Hong Urbanek, Karthik Reddy Venna, Nils Anger (SIEMENS AG, Berlin, Germany)

A2-O-6 **Mechanism of Dynamic Voltage Distribution in Series-connected vacuum interrupters (No. 753257) (Award Candidate)**
Guowei Ge (Zhengzhou University, Zhengzhou, China; Dalian University of Technology, Dalian, China), Xian Cheng (Zhengzhou University, Zhengzhou, China), Minfu Liao (Dalian University of Technology, Dalian, China), Qinkuan Xue (Zhengzhou University, Zhengzhou, China), Jiyan Zou (Dalian University of Technology, Dalian, China)

A2-O-7 **Evaluation of Back to Back Capacitive Current Switching performance of 36kV VCB (No. 753258)**
Byoung-Chul Kim, Woo-Jin Park, Kil-young Ahn, Young-Geun Kim (LS industrial systems, Cheongju, Republic of Korea)

A2-O-8 **Interruption Characteristics on the Sintering for Cu-Cr Contact Material (No. 753455)**

J.H. Yoon, C.Y. Bae, J.S. Ryu, J.U. Choi, Y.G. Kim (LSIS Co., Ltd., Cheongju-si, Chungcheongbuk-do, Korea)

A2-O-9 **Experimental Investigation of Triggered Vacuum Arc Behavior under Different TMF-AMF Composite Contacts (No. 753088)**
Weixin Shi, Lijun Wang, Renjie Lin, Jie Deng, Shenli Jia (Xi'an Jiaotong University, Xi'an, China)

A2-O-10 **Fractal Features of Contact Surface Ruptured from Arc Welding by High Frequency Inrush Current in Vacuum Interrupters (No. 753203)**
Guoqin Li, Yongxiang Yu, Yingsan Geng, Zhiyuan Liu, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

Monday, October 23rd, 16:30-18:15
Oral 6: F - Testing Technologies in Switchgears + H - Others
Chair:
Venue: Room C

F-I-2 **TBD**
(Invited) ***Joseph Williams Spencer*** *(University of Liverpool, UK)*

F-O-7 **Novel and Necessary Assessment Procedure Ensuring UHF Partial Discharge On-line Supervision System Effective for GIS/GIL (No. 754202) (Award Candidate)**
Yang LIU, Weidong QI, Jingfeng WU, Lu PU, Bin DING, Chuankai YANG (State Grid shaanxi electric power research institute, Xi'an, China), Ziqi ZHANG, Siyu CHEN (State Grid xi'an electric power supply company, Xi'an, China)

F-O-8 **Study on Lightning Overvoltage Protection Methods for UHV GIS Substation with Different Lightning (No. 753228) (Award Candidate)**
Lu WANG, Jianyuan XU, Sha HAO, Haoran CHEN, Shuo MA, Wenpeng ZHAI (Shenyang University of Technology, Shenyang, China)

F-O-9 **Development of synthetic test methods for high-voltage circuit breakers 145 – 1200 kV (No. 753130)**
René Peter Paul Smeets*, Adriaan Hofstee, Marten Dekker (KEMA Laboratories DNV GL Arnhem, the Netherlands)*

H-O-1 **Arc Flash Mitigation Initiatives in Data Centers Electrical Substations: A Case Study (No. 752543) (Award Candidate)**
Abdullah AL-Harbi, Abdulaziz Al-Mutairi (Saudi Aramco, Dhahran, Saudi Arabia)

H-O-2 **Simulation of Controlled Switching of Reactive Power Compensation Line in 35kV System (No. 753011)**
Duan Xiongying, Lv Guanxiong, Liao Minfu, Guo Yan, Zou Jiyan (Dalian University of Technology, Dalian, China)

Tuesday, October 24th, 2017

Tuesday, October 24th, 08:30-10:30
Oral 7: D - Fundamental Physics and Electrical Insulation in Switchgears 1
Chair:
Venue: Room A

D-I-1 (Invited) **Multicomponent Diffusion in Arc Plasmas – Examples from Arc Welding, and Implications for Circuit Breaker**
Anthony B. Murphy *(CSIRO Materials Science and Engineering, Australia)*

D-O-1 **Interruption Process and Droplets Emission in Vacuum Arc for Aviation Intermediate-frequency Power Supply System (No. 752922) (Award Candidate)**
Jiang Yuan, Wu Jianwen, Huo Wenlei, Jia Bowen (Beihang University, Beijing, China)

D-O-2 **Study on the Development Process of Ejected Plasma Used as a Trigger Method in Gas Spark Switch (No. 753051) (Award Candidate)**
Xi Shen, Xuandong Liu, Shanhong Liu, Lei Feng, Qiaogen Zhang (Xi'an Jiaotong University, Xi'an, China)

D-O-3 **Ion Current Measurements in SF6 and Vacuum under High Voltage DC Application (No. 752812)**
Valeria Teppati, Philipp Simka (ABB Switzerland Ltd, Baden-Dättwil, Switzerland)

D-O-4 **Electric Field Enhancement of Vacuum Gap Electrodes Based on Fractal Modeling and Random Surface (No. 753241) (Award Candidate)**
Yingyao Zhang, Xinye Xu, Shaojie Chen (Tongji University, Shanghai, China), Xiaojun Wang (Shaanxi Sirui Advanced Material Co., Ltd, Xi'an, China)

D-O-5 **Dielectric Recovery Property Measurements of CO2 and Air Arcs under Free Recovery Condition using Power Semiconductors (No. 754560)**
Yu Tabata, Tomoyuki Nakano, Yuuki Demura, Yasunori Tanaka, Yoshihiko Uesugi, Tatsuo Ishijima (Kanazawa University, Kakuma, Kanazawa, Ishikawa, Japan), Katsumi Suzuki (Tokyo Denki University, Tokyo, Japan), Takeshi Shinkai (Tokyo University of Tehnology, Tokyo, Japan)

D-O-6 **Electrical Aging Experiment of Epoxy Resin Insulation Equipment and Research on the Influence of Electrical Field Uniformity (No. 753248)**
Wang Haiyan (Pinggao Group Co. Ltd, Pingdingshan, China) Gu Yunjie, Cheng Xian (Zhengzhou University, Zhengzhou, China)

Tuesday, October 24th, 08:30-10:30
Oral 8: E - Simulation Technologies in Switchgears 1
Chair:
Venue: Room B

E-I-1 (Invited) **TBD**
Jiudun Yan *(The University of Liverpool, UK)*

E-O-1 **Research on Main Circuit Design of a New Three-phase Disc Rotation Vacuum Interrupter (No. 753202) (Award Candidate)**
Shuxin Liu, Peng Wang, Yundong Cao, Peng Sun (Shenyang University of Technology, Shenyang, China)

E-O-2 **Fatigue Life Simulation of Vacuum Interrupter Bellows Subjected to High Gas Pressure and High Operating Velocity (No. 753053)**

Lixin Hong (Xi'an Jiaotong University, Xi'an, China), Shaogui Ai (Electric Power Research Institute of Ningxia Electric Power Company, Yinchuan, China), Wei Du (NARI Group Corporation, Nanjing, China), Xiaofei Yao, Bojian Zhang, Pei Liu, Zhiyuan Liu, Jianhua Wang, Yingsan Geng (Xi'an Jiaotong University, Xi'an, China)

E-O-3 **A Numerical Model on Dynamic Behavior of Vapor from the Electrode in Low-Pressure Arcs using Moving Partical Method (No. 752963)**
Yasunori Tanaka, Takuya Nakagawa, Yoshihiko Uesugi, Tatsuo Ishijima (Kanazawa University, Kakuma, Japan),Gaku Asanuma, Toshiyuki Onchi (Fuji Electric Co. Ltd, Minami, Kounosu, Japan)

E-O-4 **Numerical Simulation of Low-Current Vacuum Arc in Strong Axial magnetic Field Taking into Account the Generation of Secondary Plasma (No. 753231)**
Dmitry Shmelev, Igor Uimanov (Institute of Electrophysics, Ural Division of Russian Academy of Science, Ekaterinburg, Russia), Lijun Wang (Xi'an Jiaotong University, Xi'an, China)

E-O-5 **An Investigation of Arc Root Motion by Dynamic Tracing Method (No. 753263)**
Yufei Wu, Chunping Niu, Yi Wu, Mingliang Zhu, Fei Yang, Hao Sun (Xi'an Jiaotong University, Xi'an, China)

E-O-6 **Simulation of Pressure Relief Valve Movement in the Compression Volume of a Self-blast Interrupter (No. 753325)**
Kyong-Hoe Kim, Myoung-Hoo Kim, Min Cheol Kang (ILJIN Electric Co., Ltd., Hwaseong, Gyeonggi, Republic of Korea), Mahir Muratovic, Mirsad Kapetanović (University of Sarajevo, Sarajevo, Bosnia and Herzegovina; EnergoBos ILJIN d.o.o., Sarajevo, Bosnia and Herzegovina)

Tuesday, October 24th, 08:30-10:30
Oral 9: B - DC Switching Technologies 1
Chair:
Venue: Room C

B-I-1 (Invited) **DC Interruption Technologies for HVDC Transmission: State-of-art and Outlook**
Riccardo Bini *(ABB Corporate Research, Switzerland)*

B-I-2 (Invited) **DC Current Interruption of CO2 and SF6 Based on Selfexcited Oscillation Under Transverse Magnetic Field (No. 752987)**
Bin Xiang (Xi'an Jiaotong University, Xi'an, China), Chuanchuan Wang, Zhenle Nan (Xi'an XD High Voltage Apparatus CO.,LTD, Xi'an, China), Kun Yang,Zhiyuan Liu, Yingsan Geng,Jianhua Wang, ***Satoru Yanabu*** *(Xi'an Jiaotong University, Xi'an, China)*

B-O-1 **Investigation of Thermal Characteristics of Graphene Coated Contacts for Hybrid HVDC Circuit Breaker (No. 752953) (Award Candidate)**
Manareldeen A.H Ahmed, Yongjian Li (Hebei University of Technology, Tianjin, China), Erping Li (Zhejiang University, Hangzhou, China)

B-O-2 **Research on the Influence Factors of Arc Characteristics in the Arc Extinguish Chamber in DC Contactor Breaking Process (No. 753187) (Award Candidate)**
Cao Yundong, Liu Kai, Li Jing, Liu Shuxin, Liu Yang (Shenyang University of Technology, Shenyang, China)

B-O-3 **Analysis of Action Process of ZnO Arrester in HVDC Vacuum Circuit Breakers (No. 753023)**
Lixia Geng, Jiyan Zou, Xianpeng Li, Zeyu Bi (Dalian University of Technology, Dalian, China)

B-O-4 **Passive DC neutral breaker for bipolar HVDC schemes (No. 753401)**
Magnus Backman, Lars Liljestrand (ABB AB, Västerås, Sweden), Farshad Rafatnia (ABB AB, Ludvika, Sweden), Rui Du (ABB Sifang Power Systems, Beijing, China)

Tuesday, October 24th, 13:00-15:00
Oral 10: D - Fundamental Physics and Electrical Insulation in Switchgears 2
Chair:
Venue: Room A

D-I-2 (Invited) **Surface Flashover Mechanism and Its Application to Diagnosis in Vacuum Interrupter**
Hiroki Kojima *(Nagoya University, Japan)*

D-O-7 **The Effect of Anode on the Initial Stage of a Vacuum Discharge (No. 753081) (Award Candidate)**
Zhipeng Zhou, Yanjun Jiang, Zhiyuan Cao, Zhenxing Wang, Yingsan Geng, Zhiyuan Liu, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

D-O-8 **Study on the Influence of Breaking Parameters and Load Characteristics on Arc Energy (No. 753198) (Award Candidate)**
Li Jing, Chen Yang, Cao Yundong, Hou Chunguang, Liu Shuxin (Shenyang University of Technology, Shenyang, China)

D-O-9 **Measurement of Charge Distibutions inside of Cylindrical Alumina Insulator with Shield Rings after Repeating AC Voltage Application (No. 753312) (Award Candidate)**
Issei Fujita, Yasushi Yamano (Saitama University, Saitama, Japan), Hideaki Fukuda, Keita Ishikawa, Akira Sano (MEIDENSHA CORPORATION, Shizuoka, Japan)

D-O-10 **Fundamental Investigation on DC Arc Formation and Extinction in Separation Process of Brush and Commutator Segment (No. 753300)**
K. Oshima, Y. Yokomizu, T. Fukutsuka (Nagoya University, Nagoya, Japan)

D-O-11 **Modeling of Cathode Spot Crater in Vacuum Arc (No. 753126)**
Xiao Zhang, Lijun Wang, Shenli Jia (Xi'an Jiaotong University, Xi'an, China), D.L. Shmelev (Institute of Electrophysics, RAS, Ekaterinburg, Russia)

D-O-12 **Study on the Heat Flux Density Delivered to the Anode at the Transition to Anode Spot Formation in High Current Vaccum Arcs (No. 753337)**
Zaiqin Zhang, Hui Ma, Xiuli Yi, Zhiyuan Liu, Yingsan Geng and Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

Tuesday, October 24th, 13:00-15:00
Oral 11: E - Simulation Technologies in Switchgears 2
Chair:
Venue: Room B

E-I-3 (Invited) **The Thermodynamic Processes before and after CZ in a high-current Vacuum Arc Interruption**
Zhenxing Wang *(Xi'an Jiaotong University, Xi'an, China)*

E-O-5 **Calculation on the Composition Varying Characteristics of Decaying SF6 Arc in the Presence of Trace Oxygen and Moisture (No. 752831) (Award Candidate)**
Yuwei Fu, Xiaohua Wang, Qingqing Gao, Mingzhe Rong, Xi Li, Aijun Yang, Dingxin Liu (Xi'an Jiaotong University, Xi'an, China), Yuling Li, Chanqiong Wang (State Grid Shanxi Electric Power Company Changzhi Power Supply Company, Changzhi, China)

E-O-6 **Research on A 252kV SF6 Self-blast Circuit Breaker Re-ignition based on CFD Simulation (No. 753393) (Award Candidate)**
Hao Xiangyu,Guo Yujing, Zhang Hao, Wang Zhijun (Pinggao Electric Co.,Ltd., Pingdingshan, China)

E-O-7 **A New Electro Magnetic Force Actuator for 126kV Vacuum Circuit Breaker (No. 753001)**
Jiayuan Xu (State Grid Pinggao Group Co., ltd., Pingdingshan, China), Peng Zhang (Dalian University of Technology, Dalian, China), Yuan Deng (State Grid Pinggao Group Co., ltd., Pingdingshan, China), Enyuan Dong, Yu Tian (Dalian University of Technology, Dalian, China), Yu Cong (State Grid Dalian Power Supply Company, Dalian, China)

E-O-8 **Self-loosening Process Simulation of Bolted Joints in 12kV Vacuum Circuit Breakers under Vibration (No. 753092)**
Guangwei Liu, Lijun Wang, Shenli Jia (Xi'an Jiaotong University, Xi'an, China), Ren Yang (Shaanxi Electric Power Research Institute, State Grid Shaanxi Electric Power Company, Xi'an, China)

E-O-9 **Simulation Study on Estimating PD Current by Analyzing Emitted EM Waves (No. 753012)**
Li Wang (Xi'an Jiaotong University, Xi'an, China; Tokushima University, Tokushima, Japan), Masatake KAWADA (Tokushima University, Tokushima, Japan), Ming DONG (Xi'an Jiaotong University, Xi'an, China)

E-O-10 **Numerical Analysis of DC arc Evolution Process of Two Parallel Contacts Model (No. 753094)**
Haoyong Song (Test & Research Institute of Guangzhou Power Supply, Guangzhou, China), Jianning Yin (Xi'an Jiaotong University, Xi'an, China), Qian Wang (Xi'an University of Technology, Xi'an, China), Wei Wang, Qingdan Huang, Wenxiong Mo (Test & Research Institute of Guangzhou Power Supply, Guangzhou, China), Xingwen Li (Xi'an Jiaotong University, Xi'an, China)

Tuesday, October 24th, 13:00-15:00
Oral 12: B - DC Switching Technologies 2
Chair:
Venue: Room C

B-I-3 **Research on DC Switching Technology**
(Invited) ***Yi Wu*** *(Xi'an Jiaotong University, Xi'an, China)*

B-I-4 **TBD**
(Invited) ***Lorenz Bort*** *(Swiss Federal Institute of Technology (ETH), Switzerland)*

B-O-5 **Investigation on the Interrupting Test of Mechanical HVDC Vacuum Circuit Breaker (No. 753149)**
Yongxing Wang, Zeyu Bi, Jiyan Zou, Zhihui Huang, Wenliang Dong (Dalian University of Technology, Dalian, China)

B-O-6 **Impact of Topology and Fault Current on Dimensioning and Performance of HVDC Circuit Breakers (No. 754447)**
Viktor Lenz, Tim Schultz, Christian M. Franck (ETH Zurich, Zurich, Switzerland)

B-O-7 **Vibration Monitoring of Converter Transformer On-load Tap-Changer Using Phase Space Reconstruction and Poincare Section (No. 753242) (Award Candidate)**
Yiming Zheng, Wenlin He (Zhejiang Electric Power Research Institute, Hangzhou, China), Fenghua Wang, Shushi Li (Shanghai Jiaotong University, Shanghai, China)

B-O-8 **Research on a Novel Bidirectional Direct Current Circuit Breaker (No. 753320) (Award Candidate)**
Yang Su, Yi Wu, Yifei Wu, Qiang Yi, Guanshu Sun (Xi'an Jiaotong University, Xi'an, China), Guiquan Han, Guangke Lin, Die Wang (State Grid Pinggao Group Co., LTD., Pingdingshan, China)

Tuesday, October 24th, 16:00-18:00
Oral 13: A3 - Low-voltage Circuit Breakers Technologies
Chair:

Venue: Room A

A3-I-1 (Invited) **Low Voltage Power Distribution Level DC Circuit Breaking (No. 754762)**
John J. Shea *(Schneider-Electric, Knightdale, USA)*

A3-I-2 (Invited) **The Experimental Study on the Influence of Debugging Parameters of DC Contactor on Contact Breaking Velocity and Rebound**
Huimin Liang *(Harbin Institute of Technology, Harbin, China)*

A3-O-1 **Time-resolved Radiation Measurement and Energy Balance of Air Arcs (No. 753326)**
Shaodi Fan, Hantian Zhang, Chunping Niu (Xi'an Jiaotong University, Xi'an, China), Ting Chen (Jiangsu Suyi Electronic Appliances CO.,LTD, Huai'an, China), Yi Wu, Jiawei Duan, Hao Sun (Xi'an Jiaotong University, Xi'an, China)

A3-O-2 **Research on the Dynamic Behavior of the Arc between Contacts of DC Contactor (No. 753168) (Award Candidate)**
Cao Yundong, Liu Kai, Li Jing, Hou Chunguang, Lai Changxue (Shenyang University of Technology, Shenyang, China)

A3-O-3 **Design and Optimization of Energy-saving Wind Power Grid-connected Contactor Based on Nano Two-phase Composite Magnetic Materials (No. 753252) (Award Candidate)**
Shen CHENG, Zhiyuan Cai (Shenyang University of Technology, Shenyang, China)

A3-O-4 **Experimental Study on the Influence of Vent Aperture Size and Distribution on Arc Motion and Interruption in Low-Voltage Switching Devices (No. 754417)**
Dongkyu Shin, Igor O. Golosnoy (University of Southampton, Southampton, U.K.), Thomas G. Bull (TaiCaan Technologies Ltd., Southampton, U.K.), John W. McBride (University of Southampton, Southampton, U.K.; University of Southampton Malaysia Campus, Nusajaya, Johor, Malaysia)

Tuesday, October 24th, 16:00-18:00
Oral 14: C - Fault Current Limiting Technologies
Chair:
Venue: Room B

C-I-1 (Invited) **Progress in High Temperature Superconducting Power Technology**
Guomin Zhang *(Institute of Electrical Engineering Chinese Academy of Science, China)*

C-I-2 (Invited) **Application of Fault Current Limiter in Korea**
Min-Jee Kim *(LSIS, South Korea)*

C-O-1 **Insulation Design of Direct Current Resistive Type Superconducting Fault Current Limiter (No. 753003)**
Kun Yang, Yi Li, Bin Xiang, Zhenxing Wang, Zhiyuan Liu, Yingsan Geng, Jianhua Wang, Satoru Yanabu (Xi'an Jiaotong University, Xi'an, China)

C-O-2 **Application of controlled switching device for high voltage circuit breaker in KEPCO real power system (No. 753463)**
Chul-Hee Cho, Jeong-Bok Lee, Byoung-Woon Min (HYUNDAI ELECTRIC & ENERGY SYSTEMS CO., LTD., Gyeonggi-do, Republic of Korea)

C-O-3 **A New Intelligent Controlled Reactor with Controlled Moveable Magnetic-wedge for Fault Current Limiter (No. 752982)**

Zhihui Huang, Qitao Zou, Jiyan Zou (Dalian University of Technology, Dalian, China), Lin Zou, Ruihai Li, Song Wang (Grid Technology Research Center, China Southern Power Grid Company Limited, Guangzhou, China)

C-O-4 **Dynamic Behavior of Current-through Galinstan in Liquid Metal Current Limiter (No. 753336)**
Hailong He, Siyu Lv (Xi'an Jiaotong University, Xi'an, China), Wei Liu, Zhenquan Sun (Shaanxi Regional Electric Power Group Company, Ltd., Xi'an, China), Xufeng Kang, Chunping Niu (Xi'an Jiaotong University, Xi'an, China)

Tuesday, October 24th, 16:00-17:30
Oral 15: B - DC Switching Technologies 3
Chair:
Venue: Room C

B-I-5 (Invited) **High-Speed Current Interruption Performance of Hybrid DCCB for HVDC Transmission System (No. 753294)**
***Akira Daibo**, Yoshimitsu Niwa, Naoki Asari, Wataru Sakaguchi, Kazuyasu Takimoto, Kazuhisa Kanaya and Takahiro Ishiguro (Toshiba Corporation, Fuchu-shi, Tokyo, Japan)*

B-O-10 **Experiment research on Post-arc Current in DC Vacuum Circuit Breakers (No. 752999)**
Xianpeng Li, Jiyan Zou, Wenliang Dong, Deshi Liang (Dalian University of Technology, Dalian, China), Taotao Qin (Nanjing University of Science and Technology, Nanjing, China)

B-O-11 **ARCING TIME ANALYSIS OF LIQUID NITROGEN WITH RESPECT TO ELECTRODES GEOMETRY (No. 753144) (Award Candidate)**
Muhammad Junaid, Kun Yang, Hanming Ge, Zhiyuan Liu, Yingsan Geng, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

B-O-12 **Design and Experimental Investigation on Small Currents Magnetic Blow-out Equipment of Air DC Circuit Breaker (No. 752977)**
Xiang Fei, Zhihao Zhu, Duanlei Yuan, Yunpeng Sha, Rui Yang, Hongtie Zhang (Pinggao Group Co., Ltd, State of Grid, Pingdingshan, China)

B-O-13 **Voltage Sharing Between Mechanical Switch and IGBT in a Hybrid DC Circuit Breaker (No. 753260)**
Wenlong Yan, Kun Yang, Zhenxing Wang, Zhiyuan Liu, Yingsan Geng, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

Wednesday, October 25th, 08:00-18:00 **Technical Tour & Banquet (Closing Ceremony & Award Ceremony)**
18:00-20:30 **Dumpling Banquet & Dance Performance of Tang Dynasty**

Poster Sessions

Monday, October 23rd, 15:30-16:30
Poster Session I & Coffee Break:
Switching Phenomena inSF6 Gas + Eco-friendly SF6 Alternative Gas + Eco-friendly SF6 Alternative Gas + Switching Phenomena in Vacuum + Switching Phenomena in Air (Low-voltage Circuit Breakers and Relays) + Others
Chair:
Venue: Room A

A1: Switching Phenomena in SF6 Gas

A1-P-1 **Research on Impact of Opening Velocity in DRM Tests of SF6 High Voltage Circuit Breakers (No. 753215)**
Yakui Liu , Guogang Zhang , Yingsan Geng , Jianhua Wang (Xi'an Jiaotong University, Xi'an, China), Jinggang Yang , Ke Zhao (Jiangsu Electric Power Company Research Institute, State Grid Corporation of China, Nanjing, China)

A1-P-2 **Study on the VFTO in 800kV GIS based on Mayr-Schwarz Arc Model (No. 753262)**
Gao Youhua , Du Hanwen, Song Jia (Shenyang University of Technology, Shenyang, China), Gao Youfeng Li Yanbin, Li Jing (Benxi Power Supply Company, Benxi, China; Shenyang University of Technology, Shenyang, China)

A1-P-3 **The influence of energy separated nozzle on the gas flow parameters for SF6 circuit breaker (No. 753428)**
Li-Ying Li, Jia-Xiu Sun, Jun Wang (Shenyang University of Technology, Shenyang, China)

A1-P-4 **Research on the EMI Mechanism and Suppressing Measures of TEV Disturbing the Electronic Transformer (No. 754540)**
Wang hao, Zhang Hunqing, Sima Zhaojin, Pan Dazhang (Hu Bei electric power Maintenance Company of State Grid Corporation of China, Wuhan, China), Wu Xixiu (Wuhan University of Technology, Wuhan, China)

A1-P-5 **Bezier Curve-based Shape Optimization of SF6 Gas Circuit Breaker to Improve the Dielectric Withstanding Performance for both Medium and Maximum Arcing Time (No. 753441)**
Chang-Seob Kwak, Hong-Kyu Kim (Korea Electrotechnology Research Institute, Changwon, Republic of Korea), Se-Hee Lee (Kyungpook National University, Deagu, Republic of Korea)

A1-P-6 **Study on the Transient Characteristics of 1100kV VFTO (No. 754538)**
Wu Xixiu (Wuhan University of Technology, Wuhan, China), Wu Shipu (China Electric Power Research Institute, Wuhan, China), Zhou Fan, Cheng Shimin, Reem A. Almenweer (Wuhan University of Technology, Wuhan, China)

A1-P-7 **Simulation and Validation of Pressure Rise in a HV Circuit Breaker with SF6 and Alternative Interrupting Media**
Belma Bosovic (EnergoBos ILJIN d.o.o, Sarajevo, Bosnia and Herzegovina), Amer Smajkic, Mahir Muratovic, Mirsad Kapetanovic (EnergoBos ILJIN d.o.o, Sarajevo, Bosnia and Herzegovina; University of Sarajevo, Sarajevo, Bosnia and Herzegovina), Myoung-Hoo Kim, Kyong-Hoe Kim (ILJIN Electric Co., Ltd., Gyeonggi-do, Republic of Korea)

A2: Switching Phenomena in Vacuum

A2-P-1 **Prestrike Characteristics when Switching on Inrush Current in 40.5kV VIs with Axial Magnetic Field (No. 752824)**

Haoqing Wang (Xi'an Jiaotong University, Xi'an, China; China Electric Power Research Institute, Beijing, China), Jinyang Lin, Xiangyang Li, Ning Liu (China Electric Power Research Institute, Beijing, China), Yingsan Geng, Zhiyuan Liu (Xi'an Jiaotong University, Xi'an, China)

A2-P-2 **Development of an Indoor 40.5 kV Vacuum Circuit Breaker for Back-to-back Capacitor Bank Switching Duty (No. 752898)**

Feng Zhao, Biao Hu (Xi'an Jiaotong University, Xi'an, China), He Yang (Electrical Sector APAC Eaton, Shanghai, China), Youyin Wang (State Grid Liaoning Electric Power Company Limited Economic Research Institute, Shenyang, China)

A2-P-3 **Research on current breaking and carrying property of cup shaped and horseshoe axial magnetic electrode in vacuum interrupter (No. 752984)**

Dongli Bi (Shaanxi Baoguang Vacuum Electric Device Co., Ltd., Baoji, China), Weigang Feng (Shaanxi Baoguang Vacuum Electric Device Co., Ltd., Baoji, China; Xi'an Jiaotong University, Xi'an, China), Quan Wang, Sen Li, Yali Zhang (Shaanxi Baoguang Vacuum Electric Device Co., Ltd., Baoji, China)

A2-P-4 **Comparison of Mounted Angles Between a Pair of 2/3 Coil-type AMF Electrodes in a 126 kV Single-break Vacuum Interrupter (No. 752978)**

Weigang Feng (Shaanxi Baoguang Vacuum Electric Device Co., Ltd., Baoji, China; Xi'an Jiaotong University, Xi'an, China), Xiaofei Yao, Xiaoshe Zhai, Zhiyuan Liu (Xi'an Jiaotong University, Xi'an, China)

A2-P-5 **Post-arc Current of Vacuum DC Interruption (No. 752976)**

Taotao Qin (Nanjing University of Science and Technology, Nanjing, China), Deshi Liang, Enyuan Dong, Jiyan Zou (Dalian University of Technology, Dalian, China)

A2-P-6 **Experimental Investigation of the Anode Current Radial Distribution in Vacuum Arcs (No. 753338)**

Hui Ma, Zaiqin Zhang, Zhiyuan Liu, Yingsan Geng and Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

A2-P-7 **Influence of the Pulsed AMF Arc Control on the Vacuum Arc and Post Arc Characteristic in Vacuum Interrupters (No. 753256)**

Guowei Ge (Zhengzhou University, Zhengzhou, China; Dalian University of Technology, Dalian, China), Xian Cheng (Zhengzhou University, Zhengzhou, China), Minfu Liao (Dalian University of Technology, Dalian, China), Qinkuan Xue (Zhengzhou University, Zhengzhou, China), Jiyan Zou (Dalian University of Technology, Dalian, China)

A2-P-8 **Influence of Contact Plate Slots on Inrush Current Prestrike Arc Behaviors of Vacuum Interrupters (No. 752995)**

Yongxiang Yu, Guoqin Li, Yingsan Geng, Zhiyuan Liu, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

A2-P-9 **Influence of Grading Capacitors on Breakdown Characteristics of a Double-Break Vacuum Interrupter (No. 753145)**

Pei Liu (Xi'an Jiaotong University, Xi'an, China), Shaogui Ai (Electric Power Research Institute of Ningxia Electric Power Company, Yinchuan, China), Wei Du (NARI Group Corporation, Nanjing, China), Xiaofei Yao, Bojian Zhang, Li Ren, Zhiyuan Liu, Yingsan Geng, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

A2-P-10 **Design Optimization of a 3/4 Coil-Type Axial Magnetic Field Contact for 126 kV Vacuum Interrupter (No. 753206)**

Zihan Wang, Haomin Li (Xi'an Jiaotong University, Xi'an, China), Dacheng Shi, Junhui Wu, Congjun Xue (Pinggao Group Co., Ltd., Pingdingshan, China), Jianhua Wang, Zhiyuan Liu (Xi'an Jiaotong University, Xi'an, China)

A2-P-11 Minimum Arcing Interruption Performance of a 126 kV Single-break Vacuum Circuit Breaker with 3/4 Coil- type Axial Magnetic Field Contacts (No. 753208)

Haomin Li, Zihan Wang (Xi'an Jiaotong University, Xi'an, China), Guiquan Han, Yonglin Li, Yinghua Bi (Pinggao Group Co., Ltd., Pingdingshan, China), Yingsan Geng, Zhiyuan Liu (Xi'an Jiaotong University, Xi'an, China)

A2-P-12 Design and Multibody Dynamic Analysis of a Generator VCB with a High Breaking Capability (No. 752972)

Jun-Yeon Jo, Sung-tae Kim, Hong-Ik Yang, Woo-Jin Park, Kil-Young Ahn, Young-Geun Kim (LSIS Co., Ltd., Cheongju-si, Chungcheongbuk-do, Korea)

A2-P-13 Investigation on The Axial Magnetic Field of Cup Type Vacuum Interrupter Considering the Geometry of Contact Support (No. 753033)

Jin-Yong Na, Kyu-Hoon Park, Jae-Hong Koo, Bang-Wook Lee (Hanyang University, Ansan, Korea), Tae-Yong Shin, Chi-Wuk Gu, Heung-Jin Ju, Young- Kwang Cha (VITZROTECH CO., Ltd., Ansan, Korea)

A3: Switching Phenomena in Air (Low-voltage Circuit Breakers and Relays)

A3-P-1 The study of temperature rise in Low Voltage switchgear about cooling system (No. 752796)

MINSOO SON, HANYOUNG KANG, SEOKWON LEE, GILYOUNG AHN, YOUNGGEUN KIM (LSIS, Cheongju, Republic of Korea)

A3-P-2 Study of the Arc Motion Characteristics of Low-Voltage Circuit Breaker based on Magnetic Sensor Array (No. 752968)

Shuang Qie, Guogang Zhang, Youdang Xu, Zhiqiang Zhang, Yingsan Geng, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

A3-P-3 Design of Polycyclic Gas Switch and its Performance Test (No. 753162)

Chuncheng Cao, Haitao Lin, Yongli Luo (Hulunbuir Power Supply Bureau, East Inner Mongolia Electric Power Limited Company, Hulunbuir, China), Junqi Wang, Xian Cheng (Zhengzhou University, Zhengzhou, China)

A3-P-4 Experiments on the Pre-ionization of Coaxial Gas Spark Switch (No. 753163)

Junqi Wang, Xian Cheng, Guowei Ge (Zhengzhou University, Zhengzhou, China), Xin Tu (University of Liverpool, Liverpool, England)

A3-P-5 Current Density Reconstruction in Low-voltage Circuit Breakers for the Stationary Configuration Based on Magnetic Inverse Problem Solution (No. 753169)

Jinlong Dong, Guogang Zhang, Zhiqiang Zhang, Yingsan Geng, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

A3-P-6 Condition Evaluation of AC Contactor Based on The Grey Fuzzy Theory (No. 753188)

Shuxin Liu, Yuanyuan Wang, Zichun Liu, Yundong Cao, Shunhua Zhu (Shenyang University of Technology, Shenyang, China)

A3-P-7 Research on Intelligent Contactor of Distributed Wind Power System (No. 752947)

Shen Cheng, Zhiyuan Cai (Shenyang University of Technology, Shenyang, China)

A4: Eco-friendly SF6 Alternative Gas

A4-P-1 Application Experience of SF6 –Free 72.5kV Hybrid-Gas-Insulated-Switchgears in China (No. 752660)

Yitao Liu, He Hong, Xucheng Lu, Shuang Li (State Grid of Liaoning Electric Power Co. Ltd, Shenyang, China), Yaping Hou, Jun Zhang, Guangfu Liu, Jiaosuo Zhang (Shenyang Huade High Techn. Elec. Ltd.CO.， Shenyang, China)

A4-P-2 **Research on the Discharge Behaviors of SCF N2 (No. 752938)**

Liu Zhiyiong (New Northeast Electric Group, Shenyang, China), Wei Hongqing (State Grid Zhejiang Electric Power Corporation, Jiaxing Power Supply Company，Jiaxing，China), Zhao Dawei, Chen Chuntian, Zheng Dianchun (Harbin University of Science and Technology, Harbin, China)

A4-P-3 **Insulation Characteristics of CF3I/N2 Gas Mixtures and Potential Application in C-GIS (No. 753227)**

Fanyi Cai, Baijie Zhou, Jian Xue, Zhou Bin (State grid Electric Power Research Institute, Nari Group Corporation, Nanjing, China), Dongxian Tan (Shanghai Jiao Tong University, Shanghai, China)

A4-P-4 **Research on Breaking Performance of CO2 Rotating Arc Chamber (No. 753232)**

Xiangwen Xiao, Kun Zhang, Jing Yan, Yingsan Geng, Shishi Fan (Xi'an Jiaotong University, Xi'an, China)

A4-P-5 **Researches on Dielectric Recovery Characteristics of CO2 Gas-Blast Arc Chamber Under No-Load Breaking (No. 753235)**

Shishi Fan, Kun Zhang, Jing Yan, Yingsan Geng, Xiangwen Xiao (Xi'an Jiaotong University, Xi'an, China)

A4-P-6 **Insulation Performance and Liquefaction Characteristic of C5F10O/CO2 Gas Mixture (No. 753322)**

Jianying Zhong (Pinggao Group Co., Ltd., Pingdingshan, China), Xiongxiong Fu, Aijun Yang (Xi'an Jiaotong University, Xi'an, China), Guiquan Han (Pinggao Group Co., Ltd., Pingdingshan, China), Jialin Liu (Xi'an Jiaotong University, Xi'an, China), Yanhui Lu (Pinggao Group Co., Ltd., Pingdingshan, China), Xiaohua Wang, Mingzhe Rong (Xi'an Jiaotong University, Xi'an, China)

A4-P-7 **Experiment of Dielectric Strength of C5F10O Gas Mixture and Calculation of Stratification (No. 753357)**

J Junhui Wu (State Grid Pinggao Group Co.,Ltd., Pingdingshan, China), Jialin Liu, Aijun Yang, Xiongxiong Fu (Xi'an Jiaotong University, Xi'an, China), Jianying Zhong, Yonglin Li, Qing Liu (State Grid Pinggao Group Co.,Ltd., Pingdingshan, China), Xiaohua Wang, Mingzhe Rong(Xi'an Jiaotong University, Xi'an, China)

A4-P-8 **Numerical Calculation and Experimental Study on the Insulation Characteristics of SF6-N2 and SF6-CF4 Gas Mixtures (No. 753369)**

Xin LIN, Jia ZHANG, Xintao LI, Jianyuan XU, Zhenxin GENG, Luwei LI, Huili CHEN (Shenyang University of Technology, Shenyang, China)

A4-P-9 **Analysis and Experimental Study on Liquefaction Characteristics of SF6 / CF4 Mixture Gas (No. 754478)**

Liu Wen Kui, Zhao Xiao Min (State Grid Pinggao Group Co.LTD., Ping dingshan, China), Liu Zong Jie (State Grid Shandong Electric Power Company, Jining, China), Yao Yong Qi, Sun Ke Ke (State Grid Pinggao Group Co.LTD., Ping dingshan, China),Wang Yan Liang (State Grid Shandong Electric Power Company, Jining, China),Gao Yu Hang (Chengde Power Supply Company, State Grid Jibei Electric Power Company, Chengde, China)

A4-P-10 **Simulation of the decomposition pathways and products of Perfluoronitrile C4F7N（3M:Novec 4710） (No. 754546)**

Mengyuan Xu, Jing Yan, Zhiyuan Liu, Yingsan Geng, ZhenXing Wang (Xi'an Jiaotong University, Xi'an, China)

A4-P-11 **Effects of N2 contents on the non-equilibrium composition in SF6 decaying process (No. 753244)**

Qingqing Gao, Xiaohua Wang, Mingzhe Rong, Xi Li, Yuwei Fu, Aijun Yang (Xi'an Jiaotong University, Xi'an, China), Yubin Xu, Lei Gao (Shanxi provincial power company Changzhi power supply company, Shanxi, China)

H: Others

H-P-1 **Study on High-Frequency Transient Overvoltages Protection in Offshore Wind Farms Based on RC Snubbers (No. 752990)**
Xiao Yang, Fang Chun-en, Chen Chuanjiang, Li Wei, Zhang Bi-de, Ren Xiao (Xihua University, Chengdu, China)

H-P-2 **Study on Stray Gassing of Transformer Oil with Metal Deactivator under condition of coincident electric field and temperature (No. 752884)**
Huijuan Wang, Shujie Ma, Huimin Yu, Qi Zhang, Peng Wang (PetroChina Lanzhou Lubricating Oil R&D Institute, Karamay, China)

H-P-3 **Influence of System Transients on the Residual Flux of Three-phase Transformers (No. 753014)**
Diao Tishuai, Zhang Bi-de, Fang Chun-en, Li Wei, Ren Xiao, Chen Chuanjiang (Xihua University, Chengdu, China)

H-P-4 **Research on the Temperature Real-time Monitoring Technology of High Voltage Disconnectors (No. 753022)**
Yanmiao HE, Zhibing LI (High Voltage Department, China Electric Power Research Institute, Beijing, China), Yujie LI, Jinggang YANG, Hongtao LI,Shan GAO (State Grid Jiangsu Electric Power Company Research Insitute, Nanjing, China), Peng YANG (Shandong Zhiyang Electric Co.,Ltd, Zibo, China)

H-P-5 **Simulation of numerical calculation method for carrying capacity of urban underground cable group (No. 753111)**
Yao Zhoufei, Li Honglei (State Grid Shanghai Electrical Power Research Institute, Shanghai, China), Fu Chenzhao, Hu Jialei (Shanghai Jiaotong University, Shanghai, China)

H-P-6 **Fault Diagnosis for High Voltage Circuit Breaker Based on Hilbert-Huang Transform and Support Vector Machine (No. 753151)**
Chunguang Hou, Maoyuan Jia, Ying Han, Yundong Cao (Shenyang University of Technology, Shenyang, china)

H-P-7 **Fault Diagnosis Model for Circuit Breaker Based on Power Dispatching System (No. 752916)**
Zewen Meng, Lian Chen (Xiamen University of Technology, Xiamen, China), Yimin You, Liangxian Xiao (Xiamen Huadian Switchgear Co., Ltd, Xiamen, China)

Tuesday, October 24th, 10:30-11:30
Poster Session II & Coffee Break:
DC Switching Technologies + Fault Current Limiting Technologies + Fundamental Physics and Electrical Insulation in Switchgears + Emerging Switching Technologies + Operating Mechanisms
Chair:
Venue: Room A

B: DC Switching Technologies

B-P-1 **Investigation into Reliability Assessment of Power Semiconductor for Hybrid DC Switch Application (No. 752955)**
Jingcun Liu, Guozhang Zhang, Qian Chen, Lu Qi, Zheng Qin, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

B-P-2 **Experiment research on Current chopping on zero period of DC Vacuum Circuit Breaker breaking (No. 753000)**
Xianpeng Li, Jiyan Zou, Lixia Geng, Zeyu Bi (Dalian University of Technology, Dalian, China)

B-P-3 **A Quenching Recovery Time Test Method for Resistive Type Superconducting Fault Current Limiters Used in DC Circuit (No. 753005)**
Hanming Ge, Kun Yang, Muhammad Junaid, Yaxiong Tan, Zhiyuan Liu, Yingsan Geng, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

B-P-4 **Control Strategy for Photovoltaic Grid-connected Inverter with Harmonic Suppression (No. 753108)**
Sen Ouyang, Qingpai Ke, Wenjie Ma (South China University of Technology, Guangzhou, China)

B-P-5 **The Comparison of DC Semiconductor Circuit Breaker and SF6 Circuit Breaker with Transverse Magnetic Field for DC Transmission (No. 753156)**
Lei Gao, Bin Xiang, Kun Yang, Zhiyuan Liu, Yingsan Geng, Jianhua Wang, Satoru Yanabu (Xi'an Jiaotong University, Xi'an, China)

B-P-6 **Study on Factors Influencing the Characteristics of Arc in DC Contactors (No. 753190)**
Ying Han, Wenxiang Shang, Chunguang Hou, Aoxue Li, Yundong Cao (Shenyang University of Technology, Shenyang, China)

B-P-7 **Research on Integrated Design of Vacuum Switch Based on Permanent Magnetic Actuator for Hybrid DC Contactor (No. 753272)**
Lu Qi, Guogang Zhang, Jingcun Liu, Zheng Qin, Yingsan Geng, Jianhua Wang (Xi'an Jiaotong University Xi'an, China)

B-P-8 **Investigation of a Magnetic Induction Current Commutation Module for DC Circuit Breaker (No. 753286)**
Yi Wu, Yang Hu, Mingzhe Rong, Yifei Wu, Shehr Yar Aziz, Qiang Yi (Xi'an Jiaotong University, Xi'an, China)

B-P-9 **A New DC System Fault Detection Method Based on Improved Unbalanced Bridge (No. 753290)**
Mingang Tan, Han Cui (Southeast University, Nanjing, China), Bangcheng Wei (Nanjing Normal University, Nanjing, China), Chenlong Li, Yan Xu (Jiangsu Frontier Electric Technology Co, Ltd, Nanjing, China)

B-P-10 **DDL Algorith Based Short Circuit Current Detection in DC Circuit Breaker (No. 753296)**
Shehr Yar Aziz, Yang Hu, Yi Wu, and Yifei Wu (Xi'an Jiaotong University, Xi'an, China)

B-P-11 **High-speed Switch Driving Circuit Analysis of DC Medium Voltage Breaker (No. 753343)**
PANG Sumin, HAN Guiquan, WU Junhui, Lin Guangke, Wang Die, Wang Mingfei (State Grid Pinggao Group Co.,Ltd., Pingdingshan, China), Wu Yifei (Xi'an Jiaotong University, Xi'an, China)

B-P-12 **Analysis of Structure Strength in Medium Voltage DC system High-Speed Repulsing Mechanism (No. 753352)**
Jiahao Guo,Yifei Wu, Yi Wu, Yuxuan Liu, Fei Yang (Xi'an Jiaotong University, Xi'an, China), Junhui Wu, Guiquan Han, Die Wang (State Grid Pinggao Group Co.,Ltd., Pingdingshan, China)

B-P-13 **DC Vacuum Arc Lifetime of Contact Materials CuCr50 and CuCr25**
Jin Zhang (State Grid Corporation of China, Beijing, China), Linjing Chang, Guiquan Han (Pinggao Group Co.,Ltd. Pingdingshan, China), Shaohua He, Shimin Li (Xi'an Jiaotong University, Xi'an, China)

B-P-14 **Research of Grading for Series-connected Thyristor Valves of Solid-state Transfer Switch (No. 753004)**
Guan Pan, Fang Chun-en, Zeng Nanxun, Li Wei, Ren Xiao (Xihua University, Chengdu, China)

B-P-15 **Researches on Interruption Characteristics of a Hybrid HVDC Circuit Breaker (No. 753018)**
Li Li, Zhang Bi-de, Fang Chun-en, Li Wei, Ren Xiao, Diao Tishuai (Xihua University, Chengdu, China)

B-P-16 **Design of Power Source System Used on Wireless Power Supply for High Voltage Direct Current Switch (No. 752985)**

Zhihui Huang, Shukai Wang, Jiyan Zou (Dalian University of Technology, Dalian, China), Lin Zou, Ruihai Li (Grid Technology Research Center, China Southern Power Grid Company Limited, Guangzhou, China), Haidan Yu (State Grid Dalian Electric Power Supply Company, Dalian, China)

B-P-17 **Research and Design of a Layout Structure Suitable for Active Loop Used in DC Circuit Breaker Based on Artificial Current Zero Technology (No. 752991)**
Rui Cao, Wen Gao, Long Li, Xiying Zhao (Xi'an XD Electric Research Institute Co., LTD, Xi'an, China)

B-P-18 **Interruption Characteristics and Reignition Condition of Direct-Current Forced Current Zero (No. 753303)**
Huo Wenlei, Wu Jianwen, Jin Xinchen, Deng Yun (Beihang University, Beijing, China), Xin Chao (Eaton Cooper Electronic Technologies Co., Ltd, Shanghai, China)

B-P-19 **Assessment of Various Kinds of AC Black-Box Arc Models for DC Circuit Breaker (No. 753032)**
Kyu-Hoon Park, Ho-Yun Lee, Mansoor Asif, Bang-Wook Lee (Hanyang University, Korea), Tae-Yong Shin, Chi-Wuk Gu (VITZROTECH CO., Ltd., Korea)

C: Fault Current Limiting Technologies + Emerging Switching Technologies

C-P-1 **Simulation on the Overvoltage of 500 kV Fault Current Limiter Based on Fault Current Capture Technology (No. 752979)**
Lin Zou, Song Wang, Ruihai Li (Grid Technology Research Center, China Southern Power Grid Company Limited, Guangzhou, P. R. China), Zhihui Huang, Jiyan Zou (Dalian University of Technology, Dalian, China)

C-P-2 **Study on Fast Early Detecting and Rapid Accurate Fault Parameters Estimation Method for Short-circuit Fault (No. 753246)**
Qian Chen, Guogang Zhang, Jingcun Liu, Yingsan Geng, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

C-P-3 **Investigation of Liquid Metal Current Limiter Based on a Novel Topology (No. 753334)**
Zhuo Yang, Hailong He, Yi Wu, Peng Zhao (Xi'an Jiaotong University, Xi'an, China), Zirui Liu, Qing Wan(State Grid Shaanxi Electric Power Research Institute, Xi'an, China)

C-P-4 **A new Controlled Fault Limiting Algorithm for Vacuum Fault Current Limiter Based on Fault Current Zero-crossing Prediction Algorithm (No. 752983)**
Yanxia Zhang, Zhihui Huang, Jiyan Zou (Dalian University of Technology, Dalian, China), Lin Zou, Ruihai Li, Song Wang (Grid Technology Research Center, China Southern Power Grid Company Limited, Guangzhou, China)

C-P-5 **The Influence of M-effect Metal Arrangment on the overload current Pre-arcing time of DC current-limiting fuses (No. 754644)**
Xinjian Huang, Shimin Li, Zhiyuan Liu, Yingsan Geng, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

C-P-6 **Experimental Study on Controlled Unloaded Transformer Switching Considering Residual Flux (No. 752989)**
Chen Chuanjiang, Fang Chun-en, Xiao Yang,Li Wei, Zhang Bi-de, Ren Xiao (Xihua University, Chengdu, China)

C-P-7 **Experimental Investigation between Short Circuit Making Performance and Closing Speed of Direct Acting Earthing Switch (No. 753020)**
Jiang Cheng-bo, Zhu Yan-qing, Yuan Duan-lei, Zhu Zhi-hao, Hu Jing-jing, Ma Ming-le (State Grid Pinggao Group Co., Ltd, Pingdingshan, China)

D: Fundamental Physics and Electrical Insulation in Switchgears

D-P-1 **Dependence of Field Enhancement Factor on Power Frequency Voltage in Vacuum (No. 752868)**
Shimin Li, Yingsan Geng, Zhiyuan Liu and Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

D-P-2 **Experiment investigation on triggered vacuum arc under the different contact materials (No. 753069)**
Renjie Lin, Lijun Wang, Weixin Shi, Jie Deng, Zeyu Yan, Shenli Jia (Xi'an Jiaotong University, Xi'an, China)

D-P-3 **Vacuum arc behavior and its development process under micro-second scale (No. 753161)**
Zhenguo Li, Lijun Wang, Renjie Lin, Shenli Jia (Xi'an Jiaotong University, Xi'an, China)

D-P-4 **DC Vacuum Arc Voltage Characteristics Subjected to an External Transverse Rotating Magnetic Field (No. 753209)**
Xiuli Yi, Zaiqin Zhang, Zhiyuan Liu, Yingsan Geng, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

D-P-5 **Composition and Thermodynamic Properties of Air Thermal Plasmas Mixed with Ablated Copper and Polytetrafluoroethylene Vapor (No. 752900)**
Hao Lin, Junmin Zhang (Beihang University, Beijing, China)

D-P-6 **Investigation on Arcing Behaviors in High-voltage Switchgear with a Rotary Interruption Technology (No. 753159)**
Fu Si, Cao Yundong, Liu Kai, Hou Chunguang, Li Jing (Shenyang University of Technology, Shenyang, China)

D-P-7 **Secondary arc of LEO spacecraft solar array (No. 753305)**
Zhu Liying，Liu Zhigang，Zhang Xiaofeng (Institute of Spacecraft System Engineering CAST, Beijing，China), Wu Jianwen, Huo Wenlei (Beihang University, Beijing, China)

D-P-8 **The Influence of Liquid Viscosities on Bubble Breakdown (No. 754556)**
Zhenxing Wang, Wenlong Yan, Kun Yang, Liqiong Sun, Zhiyuan Liu, Yingsan Geng, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

G: Operating Mechanism

G-P-1 **Design and research of permanent magnet direct-driven motor for high voltage circuit breaker (No. 752583)**
Yuan Deng, Jianying Zhong, Yang Gao, Yu Liu (PINGGAO GROUP CO., LTD., Pingdingshan, China)

G-P-2 **Design and research of motor drive mechanism for high voltage circuit breaker (No. 752820)**
Yuan Deng, Jianying Zhong, Yu Liu, Yang Gao, Cheng Tang, Baoying He (PINGGAO GROUP CO., LTD., Pingdingshan, China)

G-P-3 **Research on the Vibration of CT20 Type Spring Operating Mechanism during Closing (No. 752993)**
Wenxiong Mo, Junxiang Liu, Tianwei Xiao (Guangzhou Power Supply Co., Ltd., Guangzhou, China), Yu Liu, Hu Luo, Yu Wang, Le Wang (Xi'an High Voltage Apparatus Research Institute Co., Ltd., Xi'an, China)

G-P-4 **Health Status Centered Mechanical Feature Extraction for High Voltage Circuit Breakers (No. 752997)**
Gaoyang Li, Xiaohua Wang, Mingzhe Rong (Xi'an Jiaotong University, Xi'an, China), Jianying Zhong (Henan Pinggao Electric Co.,Ltd, Pingdingshan, China)

G-P-5 **Comparison of Two Types of Electromagnetic Repulsive Force Actuators (No. 753002)**
Zeng Nanxun, Fang Chun-en, Guan Pan, Li Wei, Zhang Bi-de, Ren Xiao (Xihua University, Chengdu, China)

G-P-6 **Reliability Analysis of Permanent Magnetic Actuator Based on Performance Degradation Data (No. 753148)**
Yongxing WANG, Xujing ZHAO, Enyuan DONG, Jiyan ZOU (Dalian University of Technology, Dalian, China), Haidan YU, Xin HUANG (Dalian Power Supply Company, State Grid Corporation of China, Dalian, China)

G-P-7 **A Fast Current Zeroes Estimation Algorithm for Controlled Fault Interruption Based on an Improved BP Neural Network (No. 753201)**
Jiangang Ding, Bojian Zhang, Xiaofei Yao, Zhiyuan Liu, Haixia Zhang (Xi'an Jiaotong University, Xi'an, China)

G-P-8 **Development of an Electromagnetic Repulsion Mechanism for a 40.5kV Fast Vacuum Circuit Breaker (No. 753210)**
Li Ren, Xiaofei Yao, Bojian Zhang, Lixin Hong, Yingsan Geng, Zhiyuan Liu, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

G-P-9 **Simulation of High-Speed Mechanical Switch on Multi-field Coupling (No. 753347)**
Yu TIAN, Yu ZHU, Enyuan DONG (Dalian University of Technology, Dalian, CHINA), Yang tian, Zhibing Li (China Electric Power Research Institute, Beijing, CHINA)

G-P-10 **Design and Test of Vacuum Circuit Breaker with Hybrid Fast Operating Mechanism (No. 753396)**
Xu Xiaodong, Li Zhibing, Yan Xianlgian, Liu Beiyang,Tian Yang (China Electric Power Research Institute, Beijing, China)

G-P-11 **An Improvement of A Contact Spring Pin of a 126 kV Vacuum Circuit Breaker by Orthogonal Experimental Design (No. 754738)**
Haoqing Wang (China Electric Power Research Institute, Beijing, China; Xi'an Jiaotong University, Xi'an, China), Bojian Zhang (Xi'an Jiaotong University, Xi'an, China), Xiangyang Li (China Electric Power Research Institute, Beijing, China), Xiaofei Yao, Hao Zhang, Zhiyuan Liu, Yingsan Geng, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China), Junqi Cheng, Haifang Yang (China Electric Power Research Institute, Beijing, China)

Tuesday, October 24th, 15:00-16:00
Poster Session III & Coffee Break:
Simulation Technologies in Switchgears + Testing Technologies in Switchgears + Others
Chair:
Venue: Room A

E: Simulation Technologies in Switchgears

E-P-1 **Research on Alternating Current Series Arcing of in More Electric Aircraft System (No. 752648)**
JIANG Jun, HONG Yinqiu, ZHAO Mingxin, WU Shuqun, ZHANG Chaohai (Nanjing University of Aeronautics and Astronautics, Nanjing, China), XU Wanli, FENG Yuan (Jiangsu Nari Hengchi Electrical Equipment CO.,LTD., Wuxi, China)

E-P-2 **Multiple Re-Ignitions in Small Inductive Current interruption by Vacuum Circuit Breakers (No. 752816)**
Feng Wang (Xi'an University of Science & Technology, Xi'an, China), Zhongyi Wang (Xi'an Jiaotong University, Xi'an, China), Mengmeng Hao (Siemens electric drive equipment co., ltd, Shanghai, China)

E-P-3 **Electromagnetic force simulation of isolation knife switch (No. 752970)**
Min Li, Nannan, Wang, Meifang Xie (Pinggao Group Co., Ltd., Pingdingshan, China), Jiansheng Yuan (Tsinghua University, Beijing, China)

E-P-4 **Application of Computational Fluid Dynamics to Predict the Temperature-Rise of Gas Insulated Switchgears (No. 753090)**
Haoyong Song (Test & Research Institute of Guangzhou Power Supply, Guangzhou, China), Guobin Hou (Xi'an Jiaotong University, Xi'an, China), Wei Wang (Test & Research Institute of Guangzhou Power Supply, Guangzhou, China), Xiaofeng Deng (Xi'an Jiaotong University, Xi'an, China), Qingdan Huang, Wenxiong Mo

(Test & Research Institute of Guangzhou Power Supply, Guangzhou, China), Makoto Hasegawa (Chitose Institute of Science and Technology, Chitose, Japan), Xingwen Li (Xi'an Jiaotong University, Xi'an, China)

E-P-5 **Numerical Modeling of Contact Erosion Including both Vaporization and Sputter Erosion (No. 753091)**
Yunfeng Wang (Xi'an Jiaotong University, China), Haoyong Song (Test & Research Institute of Guangzhou Power Supply, Guangzhou, China), Yihong Wu (Xi'an Jiaotong University, China), Qian Wang (Xi'an University of Technology, Xi'an, China), Wei Wang, Qingdan Huang, Wenxing Mo (Test & Research Institute of Guangzhou Power Supply, Guangzhou, China), Xingwen Li (Xi'an Jiaotong University, China)

E-P-6 **Research and Design of an Innovative Medium Voltage Removable Metal-enclosed Switchgear (No. 753103)**
Zhi-hao Zhu, Duan-lei Yuan, Hai-yan Wang, Xiang Fei, Fang Yang, Mingle Ma (State Grid Pinggao Group Co., Ltd, Pingdingshan, China)

E-P-7 **Thermal analysis of switchgear using FEM considering the heat from the main circuit (No. 753275)**
Shuo Sun, Li-an Chen (Xiamen University of Technology, Xiamen, China), Yi-min You, Zong-xiong Ma (Xiamen Huadian Switchgear Co., Ltd, Xiamen, China)

E-P-8 **Optimum Design Method of Shunt Release Based on Ansoft maxwell (No. 753184)**
Zhu Tiansheng, Jia Shenli (Xi'an Jiaotong University, Xi'an, China), Liu Hongwu, Guan Ruiliang, Yin Nairui (Changshu switchgear Mfg.Co.,Ltd.(Former Changshu switchgear plant), Changshu, China)

E-P-9 **Modeling and Simulation of Hydraulic Buffer in Circuit Breaker (No. 753192)**
Liu Yu, Zhu Kelou, Han Guohui,Song Chao, Wang Lili , He Baoying, Du Liping (Pinggao Group Co., Ltd, State of Grid, Pingdingshan, China)

E-P-10 **Research on Power Loss Calculation and Temperature Rise Simulation of AC High Voltage GIS Busbar (No. 753229)**
Zhong Jianying, Zhang Bo, Guo Yujing, Yao Yongqi, Wang Zhijun, Zhang Hao (Pinggao Group Co., Ltd., Pingdingshan, China)

E-P-11 **Analysis and Optimization in Design of the Casting Enclosure in High Voltage Switchgear (No. 753239)**
Du Yingqian, Wang Saihao, Sun Yingjie, Zhan Xiaomeng, Chai Yinghui, Guo Liangchao ,Hu Yantao (PINGGAO GROUP Co.,Ltd, Pingdingshan City, China)

E-P-12 **Research on Impact Dynamics Simulation of High-voltage Circuit Breaker's Transmission System (No. 753240)**
WANG Saihao, WANG Zhijun, DU Yingqian, JIANG Jinghua, DONG Xiangyuan (PINGGAO GROUP Co.,Ltd, Pingdingshan City, China), QIN Zhengmin (Henan Pingzhi High Voltage Switchgear Co., Ltd, Pingdingshan, China)

E-P-13 **Research on Short-circuit Electromagnetic Force of MV ES with Different Structural Arrangements of Ground Loop (No. 753267)**
Yanqing Zhu, Chengbo Jiang, Duanlei Yuan, Mingle Ma, Zhihao Zhu, Ming Pan (State Grid Pinggao Group Co., Ltd, Pingdingshan, China)

E-P-14 **Effect of Grounded Coating on Insulation Performance for Solid Insulation Ring Main Unit (No. 753335)**
Shilei Guan, Xuefeng Bai, Zhixin Bai, Baikui Li (China Electric Power Research Institute, Beijing, China), Pei Liu, Jing Yan, Zhiyuan Liu, Yingsan Geng (Xi'an Jiaotong University, Xi'an, China)

E-P-15 **Dynamic Simulation of Circuit Breaker (No. 753392)**
Wang Gang, Yao Yongqi, Wang Zhijun, Liu, Yapei,Zhang Bo,Zhang hao, Hao xiangyu,Wang guan (Pinggao Electric Co.,Ltd., Pingdingshan, China), Li Jun (Maintenance of company of Oinghai Electric Company, Xining, China)

E-P-16 **A Reserach on Complex Network Model of Field Visibility of Electric Field in SF6 Circuit Breaker (No. 753425)**
Li-Ying Li, Hui Wang, Xiao-ming Liu (Shenyang University of Technology, Shenyang, China)

E-P-17 **Coupled Fluid-Mechanical Analysis Method in High-Voltage Circuit Breakers Design (No. 754291)**
M. Cui, C.Y. Bae, J.S. Ryu, J. Choi, Y.G. Kim (LSIS Co., Ltd., Cheongju-si, Chungcheongbuk-do, Korea)

E-P-18 **A Study on Dynamic Behavior of Multibody Dynamics Model on Ring Main Unit (No. 753445)**
Jin-Hyun PARK, Dong-Sik Lee, Hong-Ik Yang, Lyun Yu, Kil-Young Ahn, Young-Geun Kim (LSIS Co., Ltd., Cheongju-si, Chungcheongbuk-do, Korea)

E-P-19 **Numerical Analysis and Experiment of Corona Discharge due to Conductive Particle in High-Voltage System (No. 753458)**
Myung Ki Baek, and Hong Kyu Kim (Korea Electrotechnology Research Institute, Changwon-si, Gyeongsangnam-do, Korea)

E-P-20 **Power Transformer Transient Modeling Considering the Effects of On-Load Tap Changer (No. 752996)**
Asad Ahmad, Wanliang Fang, Jun Liu (Xi'an Jiaotong University, Xi'an, China)

F: Testing Technologies in Switchgears

F-P-1 **Research of Shunt Reactor Switching Test for 1100kV UHV Circuit-breakers (No. 752887)**
Gao Xiangxiang, Jia Zhuanzhuan, Liu Haojun, Zhang Jinbo, Li Gang, He bing (XI'AN High Voltage Apparatus Research Institute, XI'AN, China)

F-P-2 **Study on the Laser-induced Plasma Properties of Vacuum Interrupter Shield under Different Pressure (No. 752923)**
Huan Yuan, Lidong Song, Xiaonan Wang, Xiaohua Wang, Zhr Ye, Dingxin Liu, AijunYang (Xi'an Jiaotong University, Xi'an, China), Wanting Wang (Hangzhou Heng Xin Electric Co., Ltd, Hangzhou, China)

F-P-3 **Influence of Temperature Variation on the Accuracy of DC Voltage Measuring Device (No. 753031)**
Xie Tingting Yang Zhongzhou, Feng Jianhua Wang Lu (XI'AN High Voltage Apparatus Research Institute, Xi 'an China)

F-P-4 **Measurement and Analysis Method of Electromagnetic Signals for DC Arcing Fault (No. 753101)**
Zhao shuangle (Hebei University of Technology, Tianjin, China; Tianjin University of Science and Technology, Tianjin, China), Zhang yanfeng, Zhao yuan, Wang yao, Li kui (Hebei University of Technology, Tianjin, China)

F-P-5 **A New Method for Measuring the Speed Characteristics of High Voltage Circuit Breaker Based on Machine Vision Algorithm (No. 753123)**
Jinqiu Deng, Guogang Zhang, Yingsan Geng, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China), Jinggang Yang, Ke Zhao (State Grid Jiangsu Electric Power Company Research Institute, Nanjing, China)

F-P-6 **Research on PD detection of 12kV switchgear based on fuzzy logic algorithm (No. 753181)**
Hou chunguang, Fan weidong, Han Ying,Cao Yundong (Shenyang University of Technology, Shenyang, China)

F-P-7 **Design of a the multi-function experiments platform for the researches of circuit breakers (No. 753194)**
Qingkuan Xue, Xian Cheng (Zhengzhou University, Zhengzhou, China)

F-P-8 **The Study on Electric Strength Test Methods of Nozzle Material in Interrupter of High Voltage Circuit Breaker (No. 754728)**
ZHAO Xiao-min (Pinggao Group Co., Ltd., Pingdingshan, China), PEI Yu-qing (Division of Sci-tech & Information Shanghai Institute of Quality Inspection and Technical Research Shanghai, China), TONG Yong-gang , JIA Geng-feng, LIU Wen-kui, PENG Tao (Pinggao Group Co., Ltd., Pingdingshan, China)

F-P-9 **Experimental Research on Aging and Operating Life of O-ring Used in GIS (No. 752994)**
Chuang Zeng, Yu Liu, Hu Luo, Peiren Wang (Xi'an High Voltage Apparatus Research Institute Co., Ltd., Xi'an, China), Libo Lin, Wuhan Lin, Tianwei Xiao (Guangzhou Power Supply Co. Ltd., Guangzhou, China)

F-P-10 **A measurement of intrinsic outgassing rates in vacuum interrupters (No. 753219)**
Richard Reeves, Leslie T Falkingham (Vacuum Interrupters Ltd, Rugby, UK)

F-P-11 **Study on Tests of 40.5 kV Circuit Breakers for Back to Back Capacitor group Current Switching (No. 753271)**
Chaoke Zhang, Li-an Chen (Xiamen University of Technology, Xiamen, China), Yi-min You, Zong-xiong Ma (Xiamen Huadian Switchgear Co., Ltd, Xiamen, China)

F-P-12 **A Switching Arc Plasma Measurement Experimental System Using A Magnetic Sensor Array (No. 753274)**
Youdang Xu, Guogang Zhang, Jinlong Dong, Shuang Qie, Zhiqiang Zhang, Yingsan Geng, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

F-P-13 **Study on Temperature of Arc Interacting with Different Insulting Material according to Spectroscopic Measurement (No. 753302)**
Zhiqiang Zhang, Guogang Zhang, Shuang Qie, Jinlong Dong, Jianhua Wang (Xi'an Jiaotong University, Xi'an, China)

F-P-14 **Study on Inner Vacuum Pressure Measurement System of Vacuum Circuit Breakers (No. 754406)**
XiongYing Duan, FuBiao Li, EnYuan Dong, MinFu Liao, Yan Guo, JiYan Zou (Dalian University of Technology, Dalian, China)

F-P-15 **Design of Intelligent temperature control system of SF6 Circuit Breaker to Prevent SF6 from Liquefaction (No. 753164)**
Haitao Lin, Chuncheng Cao, Yongli Luo (Hulunbuir Power Supply Bureau, East Inner Mongolia Electric Power Limited Company, Hulunbuir, China), Qingkuan Xue, Xian Cheng (Zhengzhou Unviersity, Zhengzhou, China)

F-P-16 **Research of Precision Time Protocol in intelligent switchgears (No. 754408)**
Xiongying Duan, Yan Guo, Minfu Liao, Guanxiong Lv, Fubiao Li，Jiyan Zou (Dalian University of Technology, Dalian, China)

H: Others

H-P-8 **Analysis of Mapping Relationship between Motions of Transmission Loop of Circuit Breaker (No. 753191)**
Zhu Kelou, Zhong Jianying, Song Guangmin, LI Yusheng, Guo Liangchao, Ma Mingle, Zhang Weixing (Pinggao Group Co., Ltd, State of Grid, Pingdingshan, China)

H-P-9 **Numerical Analysis of Transient Overvoltages from Sequential Switching of 220 kV Tunnel Cables (No. 753270)**
Yanqun Liao, Tingxi Sun (Zhuhai Power Supply Bureau of Guangdong, Power Grid Limited Liability Company, Zhuhai, China), Dai Cao, Xuezhong Liu, Hao Liu, Man Xu (Xi'an Jiaotong University, Xi'an, China)

H-P-10 **Condition Evaluation of Circuit Breaker Based on Operational and Experimental Data (No. 753279)**
Wuhan Lin, Libo Lin, Tianwei Xiao (Guangzhou Power Supply Co., Ltd, Guangzhou, China), Hu Luo, Xing Wu, Chuang Zeng, Yu Liu, Gei Gao (Xi'an High Voltage Apparatus Research Institute Co., Ltd, Xi'an, China)

H-P-11 **Analysis and Verification of Strength of 110kV Porcelain Post Insulator (No. 753280)**

Songan Jin, Jingrong Wei, Xiyu Li, Chaofeng Liu, Chao Min, Zhenping Dang, Le Wang (Xi'an High Voltage Apparatus Research Institute Co., Ltd, Xi'an, China), Wenxiong Mo, Guojun Lu, Yong Wang (Guangzhou Power Supply Co., Ltd., Guangzhou, China)

H-P-12 **Calculation and Verification of Inner Hydraulic Strength of Basin-type Insulator (No. 753282)**

Yuqiang Chen, Yong Wang, Le Luan (Guangzhou Power Supply Co., Ltd., Guangzhou, China), SongAn Jin, Xiyu Li, Chao Min, Zhenping Dang, Hualiang Li (Xi'an High Voltage Apparatus Research Institute Co., Ltd., Xi'an, China)

H-P-13 **Optimal wavelet de-noising of acoustic emission signals caused by the impact between metal particles and grounding electrode in DC GIL (No. 753333)**

Guo Yujing (State Grid Ping gao Group Co.LTD, Pingdingshan,China), Yan Xianglian (China Electric Power Research Institute, Beijing, China), Zhang Yu, Dong Meng, Lv Fangcheng (North China Electric Power University, Beijing, China), Jin Guangyao (State Grid Ping gao Group Co.LTD, Pingdingshan,China)

H-P-14 **Research on the Influence of Thermal Shock on the Mechanical Strength of Basin-type Insulator Based on Multidimensional Data (No. 753490)**

Xiyu Li, Yizhou Shi, Songan Jin, Hu Luo, Zhenping Dang, Hualiang Li (Xi'an High Voltage Apparatus Research Institute Co., Ltd., Xi'an, China), Yi Rao, Xin Li, Haicheng Hong (Guangzhou Power Supply Co., Ltd., Guangzhou, China)