

2013 2nd International Conference on Electric Power Equipment – Switching Technology

Final Program

Hosted by University of the Ryukyus Nagoya University

Technically sponsored by IEEE-PES

Sponsored by TMEIC (Toshiba Mitsubishi-Electric Industrial Systems Corporation)

Matsue Japan October 20-23, 2013

Welcome Message from Conference Chairman

On behalf of the local organization committee, I would like to cordially invite all of you to the 2nd international conference on electric power equipment – switching technology, ICEPE-ST 2013.

In order to secure high reliability and safety in the modern society strongly dependent on electric power, switching technology is one of the indispensable science of the industrial arts in operating various types of electric equipment.

Therefore researching activities ranging in an extremely wide scope have been developed for many years, which have come to be called well-established and matured society. Since economic growth in Asian countries appears to be remarkable, a sharp increase in the demand for electricity will be expected more than before. Coping with such an increase in economy, development of electrical power equipment having higher reliability than now at lower cost is desirous. Especially in an Asian region, newly-investigated projects and works for development are urgently required, which should be deeply rooted into the economic climatic situations in these areas at present.

I sincerely hope that many young engineers in these regions will be willing to join the above-mentioned projects for engineering, and do their utmost to accomplish vigorous growth in these regions. Based on these projects, ICEPE-ST was founded to be held later in Xi'an, China in 2011 as the first conference of the said association.

The second conference is to be held in Matsue, Japan.

The field of interest of ICEPE shall be (1)the study and application of switching phenomena, behavior and development, (2)characterization and application of circuit breakers, such as merging HV switching technologies, (3)apparatus for power flow control in smart distribution grid, (4)fault current limiting technology, (5)semiconductor switching technology (including HVDC), (6)switching phenomena in ultra-high voltage systems, (7)digital design technologies in switchgear and (8)fundamental physics in switchgear.

To be utilized in the second conference, we classified the technologies in question into the following items.

- A. Plasma
- B. Current interruption in gases
- C. DC current interruption
- D. Electrical contacts
- E. Current interruption in vacuum
- F. Driving mechanism of circuit breakers
- G. Electrical insulation in vacuum
- H. Electrical insulation in gases
- I. Semiconductor circuit breakers
- J. Superconducting current limiters

- K. Current limiters (w/o superconductor)
- L. Fault current phenomena
- M. Smart grid
- N. CAE
- O. Low voltage circuit breakers
- Z. Surge phenomena, electromagnetic field, etc.

Matsue City, Shimane Prefecture, Japan is famous for its beautiful scenery, and is surrounded by many historic or prehistoric sites. We plan to visit "Izumo Taisha Shrine" on the final day of the conference. The Shrine, where "Prince Okuninushi" is enshrined, is one of the oldest revered places dedicated to Ancient Gods. The Japanese people are firmly under the impression that the prince created this country in olden times, and he is a god of "En-musubi" (a god in charge of connecting a man and woman who are anxious to be coupled throughout their lives). Very recently, a number of bronze swards were excavated in the vicinity of the shrine. The fact indicates that the place of excavation was utilized for a place of business transaction or industry center of Japan in the prehistoric age. The attempt of this time to invite you, the distinguished researchers from all over the world and from this country to the ancient place of creation, relation, trade and industry might be, I believe, very meaningful to the participants of this conference. With all my heart, I wish you will enjoy your stay in this country during the conference.

Eiji Kameko

Eiji Kaneko

Conference Chairman of ICEPE2013

At the beginning of ICEPE2013

ICEPE conference is organized to prepare for Asian countries where a lot of research works from now on will set up electric energy sources. Those interested from China, Korea and Japan have started this conference, because the switching control equipment is the most important in most modern electric energy condition and in most modern electric energy system in these countries. We called for papers from the fields of plasma, current interruption in gases, DC current interruption, electrical contacts, current interruption in vacuum, driving mechanisms of circuit breakers, electrical insulation in gases, semiconductor circuit breakers, superconducting current breakers, current limiters without superconductor, fault current phenomena, smart grid, CAE, low voltage circuit breakers, surge phenomena, electromagnetic field, etc. All subjects are related to power transmission and power delivery technologies.

I am attracted by satellite modern power electronics, DC transmission power systems for high current interruption, current limiting devices for superconducting equipment, smart grid and so on. All electric energy consumptions are based on these recent developments.

Next thing I would like to emphasize is language problems. I believe English is better to communicate and its ability is extremely high even in Asian countries where they speak their individual languages. IEEE contributes this item from collecting and publication of papers.

In India, Malaysia and other countries in Asia, their economies are developing very quickly, and we are looking forward to receiving contributions from these countries and sharing with technologies. If you look at the world, such as Africa and South America, their economies are advancing very quickly. Also USA, Canada and European countries have advantages in various fields and they must be also welcome.

Every energy transmission apparatus must include switching technology, and many things must be prepared for the future world. We must prepare many things together and let us work together for the future.

S. Yanabu, Xi`an Jiaotong University

Chairman of International Scientific Committee, ICEPE-ST

Conference Committees

International Scientific Committee :

Satoru Yanabu (Xi'an Jiaotong University), China (Chairman) Jianhua Wang (Xi'an Jiaotong University), China (Vice-Chairman) Kim Jae-Eon (Chungbuk National University), Korea (Vice-Chairman) Eiji Kaneko (University of the Ryukyus), Japan Mingzhe Rong (Xi'an Jiaotong University), China Yingsan Geng (Xi'an Jiaotong University), China Lee Bang-Wook (Hanyang University), Korea Rene P.P. Smeets (KEMA Testing, Inspection& Certification), Netherlamds Mietek Glinkowski (ABB Inc.), USA Leslie T. Falkingham (Vacuum Interrupters Limited), UK

Local Organizing Committee :

- S. Yanabu (Xi'an Jiaotong University)
- H. Fukagawa
- Y. Sekine
- H. Okubo (Nagoya University)
- E. Kaneko (University of the Ryukyus), Chairperson
- T. Matsumura (Nagoya University), Vice Chairperson
- H. Ohashi (The National Institute of Advanced Industrial Science and Technology)
- Y. Yokomizu (Nagoya University)
- H. Kojima (Nagoya University)
- O. Yamamoto (Kyoto University)
- Y. Yamano (Saitama University)
- M. Yumoto (Tokyo City University)
- H. Urai (Hitachi, Ltd.)
- T. Hikosaka (Fuji Electric Co, Ltd.)
- H. Saito (Meidensha Corporation)
- M. Toyoda (Toshiba Corporation)
- H. Hama (Mitsubishi Electric Corporation)
- E. Zaima (The Tokyo Electric Power Company, Incorporated)
- A. Kumada (The University of Tokyo)
- Y. Tanaka (Kanazawa University)
- K. Yukita (Aichi Institute of Technology)
- S. Ohtsuka (Kyushu Institute of Technology)
- J. Sato (Toshiba Corporation)
- Y. Niwa (Toshiba Corporation)
- M. Yamamoto (Shimane University)
- S. Harada (University of the Ryukyus)

Awards

Wang Jimei Award for Best Papers Endowed by Wang Jimei Foundation



The Wang Jimei Award is established in ICEPE2011 in honor of Professor Wang Jimei. The award will be given for the best, most significant contribution presented during the International Conference on Electric Power Equipment (ICEPE). The recipient is selected by a vote of the international scientific committee of the ICEPE.

Prof. Wang Jimei is a pioneer researcher on vacuum arc theory and fuse technology in China and he educated 2 generations of engineers in the field of vacuum switching and fuses technology in China. In 2003, he sponsored a "Wang Jimei Foundation" in Xi'an Jiaotong University to encourage young generation of researchers to conduct innovative research in the field of power switching technology.

First Recipient of Wang Jimei Award



The first recipient was Dr. Li Yu of Xi'an Jiaotong University. He was awarded at the closing ceremony banquet of last ICEPE-ST in Xi'an, 2011.

Li Yu was born in Jiangxi Province, China, in 1987. He held the B.S. degree and the Ph. D. degree in electrical engineering in, 2006, 2011, from Xi'an Jiaotong University, Xi'an, China. During his Ph.D career, he won the Wang Jimei Best Paper Award of 1ST ICEPE, 2011, Xi'an, China.

He is currently a lead engineer in Global Research and Technology, Eaton (China) Investment Co., Ltd, Shanghai, China. (E-mail: liyu2@eaton.com). He conducted research in the field of vacuum interrupters and vacuum circuit breakers. His background also includes contact materials, vacuum arc physics, spring drive operating mechanism, closing impact and bounce, and reliability of mechanism.

Topics

- A. Plasma
- B. Current interruption in gases
- C. DC current interruption
- D. Electrical contacts
- E. Current interruption in vacuum
- F. Driving mechanism of circuit breakers
- G. Electrical insulation in vacuum
- H. Electrical insulation in gases
- I. Semiconductor circuit breakers
- J. Superconducting current limiters
- K. Current limiters (w/o superconductor)
- L. Fault current phenomena
- M. Smart grid
- N. CAE
- O. Low voltage circuit breakers
- Z. Surge phenomena, electromagnetic field, etc.

Location

The ICEPE2013 will be held at Matsue Kunibiki Messe in Matsue City, Shimane Prefecture, Japan. Matsue is a very clean and beautiful city. It is not a busy, crowded city. The time passes slowly and people are very friendly. You can enjoy an atmosphere unique in this traditional Japanese city.

Conference Location : Matsue Kunibiki Messe (Shimane Prefectural Convention Center)

Telephone : +81-852-24-1111 Facsimile : +81-852-22-9219 E-mail : kunibiki@kunibikimesse.jp



Connection to Matsue

Matsue City



7minutes by foot from JR Matsue station.

Conference Rooms



Registration & Reception

Registration desk will be located in the lobby of Matsue Kunibiki Messe, and will be opened as below.

Day	Date	Registration hour
Sunday	October 20 th , 2013	16:00 - 20:00
Monday	October 21 st , 2013	09:00 - 18:00
Tuesday	October 22 nd , 2013	09:00 - 17:30
Wednesday	October 23 rd , 2013	09:00 - 11:00

At registration, a participant will receive a copy of the conference proceedings and all other printed materials.

Local Organizing Committee

LOC members stay at the registration desk. In case of any kind of troubles or inconvenient matters, you are welcome to consult the LOC there.

Conference welcome reception will be taken place at the restaurant "Pomodoro" of Matsue Kunibiki Messe. It will start from 17:30 to 19:30 on October 20th, 2013. LOC sincerely welcome all participants there.

Accommodation

Participants will be able to reserve through the web site : https://amarys-jtb.jp/icepe/

But in terms of participants those who wish other accommodation, please use another web site. All bookings are the responsibility of individual participants. ICEPE2013 will not bear the cost of cancellations and non-appearances.

Lunch & Banquet

All participants and accompanying persons can have lunch at the Multipurpose Hall, Matsue Kunibiki Messe. Additionally, the banquet and conference tour (Banquet tour) are included in registration fee.

Coffee Break

Coffee, tea and refreshments will be provided during the coffee breaks at the Multipurpose Hall.

Information of Common Social Program

Welcome Reception : 17:30-19:30, Sunday, October 20th, 2013, at the restaurant "Pomodoro" of Matsue Kunibiki Messe

Conference Tour, Banquet and Award Ceremony : Wednesday, October 23rd, 2013

(The schedule)

12:30-12:35	Group photo
12:45-13:30	Matsue Kunibiki Messe → Izumo-taisha
15:00-17:00	The Shimane Museum of Ancient Izumo
17:00-17:45	Matsue Vogel Park
18:00-20:00	Iwami Kagura (Theatre of Japan) and Banquet
20:15-	Matsue Vogel Park \rightarrow Matsue New Urban Hotel
20:45-	Toyoko-Inn Matsue

Post Conference Tours :

Thursday, October 24th, 2013, gathering at Matsue Kunibiki Messe.

LOC recommends all participant of the conference to join the tours, especially for the persons who would like to go to the Kansai International Airport on their way back to their own countries, because these tours will bring them to Osaka.

Route 1 : SPring-8

Departure Time	e : 08:45
Departure Plac	e : Matsue Kunibiki Messe
09:00-	Matsue Kunibiki Messe \rightarrow Lunch in bus
13:00-15:00	"SPring-8", the world's largest synchrotron radiation facility in Hyogo
17:00	Shin-Osaka station
18:00	Kyoto station

Route 2 : Nijo castle and Kiyomizu temple

Departure Time: 08:45

Departure Place : Matsue Kunibiki Messe

09:00- Matsue Kunibiki Messe \rightarrow Lunch in bus

14:00-15:00 Nijo castle, UNESCO World Heritage site in Kyoto

15:30-16:30 Kiyomizu temple, UNESCO World Heritage site in Kyoto

- 17:00 Kyoto station
- 18:00 Shin-Osaka station

* The bus schedules are not including getting back to Matsue Kunibiki Messe.

*Minimum number of person: 30 persons

*LOC recommends registration for the post conference tour through WEB page. Charges of these post conference tours are shown in the WEB page.

Instructions for Speakers

Oral Presentation

Presentations of contributed papers must be made in 15 minutes:

10 minutes for the presentation, 4 minutes for questions and 1 minute for the change of the presenters.

The equipment provided for the speakers will include :

- 1 : one lectern
- 2 : one screen
- 3 : one personal computer with a projector
- 4 : one micro phone
- 5 : one laser-pointer

A staff of LOC will be present to supervise all oral presentations.

"Microsoft Power Point 2012" is provided for presentation. The presentation should be saved onto USB flash memory as a power point format, and will be copied onto the personal computer.

If you have any questions, please inform LOC secretary at

E-mail: icepe13@echo.nuee.nagoya-u.ac.jp

Accompanying Person's tour

Matsue is the capital city of Shimane prefecture in southwest of Japan. It is well-known as "City of Water", and it stands by the sea of Japan where *Lake Shinji* and *Nakaumi*, these two rivers are confluent in the middle of *Shimane Peninsula*. Matsue is also known as the adopted home of a writer, Lafcadio Hearn, who became one of the first Westerners to take Japanese citizenship under the name of Yakumo Koizumi.

Date : Monday, October 21st, 2013 Museum and Japanese cake cooking course "Half day"

Departure Time : 13:15

Departure Place : Matsue Kunibiki Messe

- 13:30 Matsue Kunibiki Messe
- 13:45 Japanese cake cooking
- 15:00 Matsue history museum
- 16:30 Matsue Kunibiki Messe

*Tour fee: 2,000 JPY *transportation fee not included.

*Minimum number of person: 1 person

*Maximum number of person: 25 persons

* This tour includes English guide fee, and the cooking class. Please register until the date before the tour date.

Matsue History Museum :

The museum is built next to Matsue castle and is made to resemble a samurai residence. The museum showcases the history and culture of the 400-year old castle town of Matsue. Inside the museum's café, visitors can enjoy original Japanese confectionary and green tea with a view over a traditional Japanese garden.

Date : Tuesday, October 22nd, 2013 Museum course "Full day"

Departure Time : 08:45

Departure Place : Matsue Kunibiki Messe

- 09:00 Matsue Kunibiki Messe
- 09:45 Adachi museum
- 12:00 Yuushien Garden (Lunch)
- 13:00 Yuushien Garden (Walking)
- 14:30 Shimane Art Museum
- 16:15 Matsue Kunibiki Messe

Tour fee: 3,500 JPY

*Transportation fee, lunch not included.

*Minimum number of person : 1 person

* This tour includes English guide fee, and the cooking class. Please register until the date before the tour date.

Adachi Museum of Art :

Arts belong to this museum is well-known for both its superb Japanese gardens and its collection of Modern Japanese painting, comprising approximately 1,500 of the country's most highly regarded paintings produced after the Meiji period and centering on the works of Taiken Yokoyama. The praiseworthy Japanese gardens are changeable in each season, and the six gardens, which about 165,000 square meters in total, show you various scenery.



<u>Yuushien Garden :</u>

Yuushien Garden was opened in 1975 by the Kadowaki family after a five-year initial construction period. It is located on *Daikon-shima island* in *Nakaumi* which is historically famous for peony and ginseng production. The 40,000 square meters Japanese garden surrounding a pond is full of seasonal flowers. The peonies are displayed throughout the year for visitors' enjoyment by adjusting the flowering time.



Shimane Art Museum :

Most magnificent building and sunset panorama, located at the south east end of *Lake Shinji*, the biggest lake in *the Shimane peninsula*. Designed by Kiyonori Kikutake and built in 1999, floor space 12,500 square meters. It houses works by Monet, Gauguin, Sisley, Corot, Rodin, and the pottery of Kanjiro Kawai, Bernard Leach, Shinji Hamada, Kiyoshi Hara and Japanese water colors.

Date : Wednesday, October 23rd, 2013 Matsue city tour "Half day"

Departure Time : 08:45

Departure Place : Matsue Kunibiki Messe

- 09:00 Matsue Kunibiki Messe
- 09:15 Matsue castle
- 10:30 Horikawa pleasure boat
- 11:45 Matsue Kunibiki Messe
- *Tour fee: 2,000 JPY *transportation fee not included.

*Minimum number of person: 1 person

*Please register until the departure of this tour.

* This tour includes English guide fee, the castle entrance fee and boarding pass.

Matsue Castle :

Completed in 1611 and one of only 12 remaining original castles nationwide, Matsue Castle was built over a five-year period by Yoshiharu Horio, feudal lord and founder of Matsue city. The elegance of the castle's swooping roofs are often compared to the wings of a plover bird ("chidori"), which has led to the castle's alternative name as the Plover Castle.



<u>Hirokawa pleasure boat :</u>

This boat tour circles the castle's historical inner and outer moats, passing points of interest.

Conference Tour(Banquet Tour), Banquet and Award Ceremony

Date : Wednesday, October 23rd, 2013

12:30-12:35	Group photo
12:45-13:30	Matsue Kunibiki Messe → Izumo Taisha
15:00-17:00	The Shimane Museum of Ancient Izumo
17:45	Matsue Vogel Park
18:00-20:00	Iwami Kagura(Theatre of Japan) and Banquet
20:15	Matsue Vogel Park \rightarrow Matsue New Urban Hotel
20:45	Toyoko-Inn Matsue

<u> Izumo Taisha :</u>

Currently, Izumo Taisha is undergoing its renovation, which is called Heisei-no-dai-Sengu (a period of massive repair work). It is being conducted for the first time in 60 years. In May of 2013, the renovation work on the main structure, which will have taken 5 years to complete, will conclude and the *Hon-den senza-sai* (a ritual ceremony) will be held. The current main structure (a national treasure) of Izumo Taisha was built in 1744. As a rule, a Sengu has been conducted every 60 years, making this its fourth Sengu.



conducted every 60 years, making this its fourth Sen

Shimane Museum of Ancient Izumo :

This museum's permanent collection focuses on Izumo Taisha, Izumo-Fudoki and bronze artifacts of the Kofun period including National Treasures from the Kojindani site as well as the history of life in Shimane prefecture.

Matsue Vogel Park :



This is a park full of flowers and birds such that are in Japan. The greenhouse is the largest in the world, and there are thousands of varieties of begonia and fuchsia blooming all year long. Iwami Kagura (Japanese cultural show) as below is held in this park.

<u>Iwami Kagura :</u>

In ancient times, the Kagura was religious service performed by priests to pacify the hearts of the gods, but from the start of the Meiji Era (1869-1912), it became a thing of the people and came to be performed as a type of folk entertainment. The Kagura invites the audience into the world of mythology with the vibrant and brisk tempo, which is called Hacchoushi. The Iwami Kagura also displays within its episodes a distinct characteristic in that it is said to be extremely rare for a country style



Kagura to have classical lyrics carried with such grace and elegance with its folklore poetry.

Post Conference Tours

Date : Thursday, October 24th, 2013

Route 1 : (08:45-18:00)

Departure Time : 08:45	5	
Departure Place : Matsue Kunibiki Messe		
09:00	Matsue Kunibiki Messe \rightarrow Lunch in bus	
13:00-15:00	"SPring-8", The world's largest synchrotron radiation facility in Hyogo	
17:00	Shin-Osaka station	
18:00	Kyoto station	
The base set of the second include base to Materia Vanihila Maraa		

The bus schedules does not include back to Matsue Kunibiki Messe.

Spring-8 (The world's largest synchrotron radiation facility) : (13:00-15:00)

Spring-8 was opened in 1997 to industrial, academic and government users, domestic and international. This is a largest synchrotron radiation facility which delivers the most powerful synchrotron radiation currently available and managed by RIKEN/JASRI. Consisting of narrow, powerful beams of electromagnetic radiation, synchrotron radiation is



produced when electronic beam, which is accelerated to nearly the speed of light, are forced to travel in a curved path by magnetic field. The research conducted at Spring-8, which is located in Harima Science Park City, Hyogo prefecture. The institution includes nanotechnology, biotechnology and industrial applications. The name "Spring-8" is derived from "Super Photon ring-8 GeV (8 GeV, or 8 giga electron volts, being the power output of the ring)."

Route 2 : (08:45-18:00)

Departure Time: 08:45

Departure Place : Matsue Kunibiki Messe		
09:00-13:00	Matsue Kunibiki Messe \rightarrow Lunch in bus	
14:00-15:00	Nijo castle, UNESCO World Heritage site in Kyoto	
15:30-16:30	Kiyomizu temple, UNESCO World Heritage site in Kyoto	
17:00	Kyoto station	
18:00	Shin-Osaka station	

*The bus schedules are not including getting back to Matsue Kunibiki Messe.

Nijo Castle (The UNESCO World Heritage in Kyoto) : (14:00-15:00)

The castle was originally built in 1603 to be the official Kyoto residence of the first Tokugawa Shogun Ieyasu, and it was completed in 1626 by the third Shogun Iemitsu, who transferred some structures from Fushimi Castle, which built in the Momoyama Prieod (1573-1614). Consequently, lavished decorated Nijo Castle is representative of the height of Momoyama architecture. In its day, it served as a symbol of the power and authority of the Tokugawa shogun. When Yoshinobu, the fifteenth



Tokugawa Shogun, returned sovereignty to the Emperor in 1867, the Castle was given to the Imperial family. It was renamed Nijo Detached Palace in 1884 and donated to the City of Kyoto renamed Nijo Castle and opened to the public in 1939.

Kiyomizu Temple (The UNESCO World Heritage temple in Kyoto) : (15:30-16:30)

This temple is located halfway up Otowa Mountain in the eastern part of Kyoto city, Kiyomizu temple is a historical temple that was established in 778, even before Kyoto became the capital of Japan. Since its foundation, the temple has burned down many times. Most of the current buildings were rebuilt by the third Tokugawa Shogun Iemitsu in the early Edo period 1631-1633. The main Hall of the temple is designated as a national treasure. The



temple has many other important cultural properties including the Deva gate, west gate, three-storied pagoda and bell tower. In1994, it registered on the UNESCO World Heritage List.

Information for Authors

Accepted manuscripts will be distributed in the Conference Proceedings (USB memory).

A special issue of IEEE Transactions on Power Delivery based on the conference is a possibility, but not automatic. It depends on the quality of conference papers. The authors who are in having his/her manuscripts reviewed for IEEE Transactions are required to extend his/her paper by 60% for a submission. Details will be announced on the conference Web page.

Sponsors

Hosted by

University of the Ryukyus Nagoya University

Technically sponsored by

IEEE-PES

Sponsored by

TMEIC (Toshiba Mitsubishi-Electric Industrial Systems Corporation)

Program Overview

Sunday, October 20th, 2013

16:00 - 20:00 Registration

(Note: At registration, participants will receive a copy of the conference proceedings and all other printed materials; Registration can be made during the conference)

17:30 – 19:30 Welcome Reception

(Venue: "Pomodoro" of Matsue Kunibiki Messe)

Monday, October21st, 2013

Conference Room: Small Hall

- 09:00-09:15 **Opening Ceremony** (*Chairperson: A. Prof Y. Yokomizu, Nagoya University*) **Opening Address from Local Organizing committee and Chairman of International Scientific committee**
- 09:15-10:15 Invited talks from China, Korea and Japan
- 10:15-10:40 Coffee Break

10:40-12:10 Oral Sessions

1-a-P (Small Hall)	1-a-Q (Room 501)	
Chair: Y. Matsui	Chair: T. Hikosaka	
Current Interruption in Vacuum (E-1)	Electrical Insulation in Gases (H-1)	

12:10-13:00 Lunch

(Venue: Multipurpose Hall)

13:00-14:15 Oral Sessions

1-p1-P (Small Hall)	1-p1-Q (Room 501)
Chair: S. Yanabu	Chair: Y. Tanaka
Current Interruption in Vacuum (E-2)	Electrical Insulation in Gases (H-2)

14:15-14:35 Coffee Break

14:35-16:05 Oral Sessions

1-p2-P (Small Hall)	1-p2-Q (Room 501)
Chair: Y. Niwa	Chair: T. Hikosaka
Current Interruption in Vacuum (E-3)	Electrical Insulation in Electric Power Equipment
	(H-3)

16:05-16:25 Coffee Break

16:25-17:45 Special Session on Semiconductor Circuit Breakers

(Chairperson Dr. H Ohashi, AIST) (Venue: Small Hall)

Tuesday, October 22nd, 2013

09:00-10:15 Oral Session

2-a1-P (Small Hall)	2-a1-Q (Room 501)	2-a1-R (Room 601)
Chair: S. Yanabu	Chair: H. Kojima	Chair: Y. Yamano
Current Interruption in Vacuum	Superconducting Fault Current	DC Current Interruption (C-1)
(E-4)	Limiters (J)	

10.15-10:35 Coffee Break

10:35-12:05 Oral Session

2-a2-P (Small Hall)	2-a2-Q (Room 501)	2-a2-R (Room 601)
Chair: Y. Matsui	Chair: J. Sato	Chair: O. Yamamoto
Current Interruption in Vacuum	Fault Current Phenomena (L, D)	CAE (N)
(E-5, B)		

12:05-13:00 Lunch

(Venue: Multipurpose room)

13:00-14:30 **Oral Session**

2-p1-P (Small Hall)	2-p1-Q (Room 501)	2-p1-R (Room 601)
Chair: Y. Tanaka	Chair: T. Hikosaka	Chair: M. Yamamoto
Current Interruption in Gases	Electrical Insulation (G-1)	Semiconductor Circuit Breakers
(B-1)		(I)

14:30-14:50 Coffee Break

14:50-15:50 Oral Session

2-p2-P (Small Hall)	2-p2-Q (Room 501)	2-p2-R (Room 601)		
Chair: H. Urai	Chair: A. Kumada	Chair: Y. Yamano		
Current Interruption in Gases	Electrical Insulation (G-2, Z)	Fault Current Limiters (K)		
(B-2, A)				

15:50-16:10 Coffee Break

16:10-17:30 Special Lecture: High Voltage VCB

(Lecturer : Prof. R.P.P.Smeets, Eindhoven University) (Venue: Small Hall)

Wednesday, October 23rd, 2013

09:15-10:15 Oral Session

3-a1-P (Small Hall)	3-a1-Q (Room 501)				
Chair: Y. Yokomizu	Chair: A. Kumada				
Low Voltage Circuit Breakers (O-1)	Electromagnetic Field (Z)				

10:15-10:35 Coffee Break

10:35-12:05 Oral Session

3-a2-P (Small Hall)	3-a2-Q (Room 501)				
Chair: H. Urai	Chair: Y. Niwa				
Low Voltage Circuit Breakers (O-2, D)	Driving Mechanism of Circuit Breakers (F)				

Conference Tour and Banquet

12:30-12:35	Group photo
	(Venue: in front of Matsue Kunibiki Messe)
12:45-17:45	Conference Tour (Izumo Ttaisha, Shimane Museum of Ancient Izumo)
	Bus departure time: 12:45
18:00-20:00	Banquet (Vogel Park)

Thursday, October 24th, 2013

Post-conference Tours

Oral Sessions

Room: Small Hall

Time: 10:40-12:10, Oct. 21(Mon)

- Session: 1-a-P, "Current Interruption in Vacuum (E-1)" Chair: Y. Matsui (Meidensha Corporation)
- 1-a-P-1 Effect of Arcing Time on the Current Breaking Capability of Vacuum Interrupters E.D. Taylor, A. Lawall, J. Genzmer, T. Heydenreich Siemens AG, Germany
- 1-a-P-2 Review of Numerical Simulation Methods Used in Interrupting Process of Vacuum Switch Arc Shengwen Shu, Jiangjun Ruan, Daochun Huang School of Electrical Engineering, Wuhan University, Wuhan, China
- **1-a-P-3** Simulation of Heat Transfer and Fluid Flow in an Anode Melting Pool under High-current Vacuum Arcs

Yunbo Tian, Zhenxing Wang, Yingsan Geng, Zhiyuan Liu

State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China

- 1-a-P-4 University Research Approach to Switchgear Technology Arc quenching Phenomena Hisatoshi Ikeda, Akiko Kumada, Kunihiko Hidaka University of Tokyo, Tokyo, Japan
- 1-a-P-5 The Arc model Simulation of Vacuum Switch with Triple-break Xiongying Duan ,Minfu Liao, Guowei Ge, Jiyan Zou School of Electrical Engineering, Dalian University of Technology, Dalian, China
- **1-a-P-6** Improvement of Breaking Capability of Vacuum Circuit Breaker Using Controlled Fault Interruption

Huang Zhihui, Duan Xiongying, Wan Huiming, Zou Jiyan Dalian University of Technology, Dalian, China

Time: 10:40-12:10, Oct. 21(Mon)

- Session: 1-a-Q, "Electrical Insulation in Gases (H-1)" Chair: T. Hikosaka (Fuji Electric Co, Ltd.)
- 1-a-Q-1 Study on Propagation Characteristics of Partial Discharge-induced UHF Signal in GIS with L Shaped Structure

Tianhui Li, Mingzhe Rong, Dingxin Liu, Xiaohua Wang State Key Laboratory of Electrical Insulation and Power Equipment, School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, China

1-a-Q-2 Experimental Investigation of Partial Discharge Detection in Medium-voltage Switchgear Based on Ultra-High-Frequency Sensor

Liuhuo Wang⁽¹⁾, Wenjun Ning⁽²⁾, Lijun Wang⁽²⁾, Haijing Wang⁽²⁾, Shenli Jia⁽²⁾

(1) Electric Power Research Inst. of Guangdong Power Grid Corp., Guangzhou, Guangdong, China, (2) State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China

1-a-Q-3 Experimental investigation of Transient Earth Voltage and Acoustic Emission Measurements of Partial Discharge Signals in Medium-voltage Switchgears

Liuhuo Wang⁽¹⁾, Haijing Wang⁽²⁾, Lijun Wang⁽²⁾, Wenjun Ning⁽²⁾, Shenli Jia⁽²⁾

(1) Electric Power Research Inst. of Guangdong Power Grid Corp., Guangzhou, Guangdong, China, (2) State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China

1-a-Q-4 Transient Electric Field Analysis of disk insulator for Gas Insulated Switchgear Geng Zhenxin ⁽¹⁾, Lin Xin ⁽¹⁾, Si Binge ⁽²⁾

(1) School of Electrical Engineering, Shenyang University of Technology, Shenyang, China, (2) TBEA Shenyang Transformer Co., Ltd., Shenyang, China

1-a-Q-5 Dielectric Strength and Insulating Property on Surface of Spacer for Particle Contamination under Dry Air Gas

D.H.Jeong, K.R. Kwon, K.B. Seo, J.H. Kim

Hyosung Corporation R&D Center, Changwon-City, Korea

1-a-Q-6 The Insulation Properties of Dielectric Coating in Gases

Su-Youl Woo, Kyoung-Bo Seo, Jin-Ho Kim

Hyosung Corporation R&D Center Switchgear Research Team, Seoul, Korea

Room: Small Hall Time: 13:00-14:15, Oct. 21(Mon)

- Session: 1-p1-P, "Current Interruption in Vacuum (E-2)" Chair: S. Yanabu (Xi'an Jiaotong University)
- 1-p1-P-1 Design Study for Decreasing Impact Forces of an Axial Type Vacuum Interrupter in Vacuum Circuit Breaker Considering the Dynamic Characteristics

Woo-Jin Park, Jong-Man Son, Seong-Tae Kim, Kil-Young Ahn

Electro Technology R&D Center, LSIS Co., Ltd., Cheongju, Korea

- 1-p1-P-2 Fundamental Research of Uniform Vacuum Arc Control and Its Application to Vacuum Interrupter for High Current Interruption Yoshimitsu Niwa, Wataru Sakaguchi, Kosuke Sasage, Hiromichi Somei *Toshiba Corporation, Tokyo, Japan*
- 1-p1-P-3 Influence of Fault Parameters on Breaking Performance of Vacuum Circuit Breaker Shengwen Shu, Jiangjun Ruan, Daochun Huang School of Electrical Engineering, Wuhan University, Wuhan, China
- **1-p1-P-4** Evaluation of Current Interruption Performance with Axial Magnetic Field at Current Peak and Current Zero of Vacuum Circuit Breakers

Kunihiko Tomiyasu, Kazuhiro Sato, Takashi Sato Hitachi, Ltd., Hitachi, Japan

1-p1-P-5 Critical Axial Magnetic Field for Prevention of Anode Spot Formation in Vacuum Interrupters

Guowei Kong, Zhiyuan Liu, Yingsan Geng, Jianhua Wang

State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China

Room: 501 Time: 13:00-14:15, Oct. 21(Mon)

- Session: 1-p1-Q, "Electrical Insulation in Gases (H-2)" Chair: Y. Tanaka (Kanazawa University)
- 1-p1-Q-1 Research on Discharge Behaviors of Short SF₆-gap with Dielectric-covered Electrodes under Standard Lightning Impulse

Zheng Dianchun, Yang Renxu, Chen Chuntian, Wang Qian, Yang Weiguo Harbin University of Science and Technology, Harbin, China

- 1-p1-Q-2 Dynamic Behaviors of Charged Particles in SF₆-N₂-CO₂ Discharge Process
 Zheng Dianchun, Wang Jia, Li Zhi, Zhao Dawei, Yang Weiguo
 Key Laboratory of Engineering Dielectrics and Its Application, Ministry of Education
 Harbin, China
- 1-p1-Q-3 AC and Impulse Breakdown Characteristics of Dry-air with Regard to Different Moisture Jae-Kyu Seong ⁽¹⁾, Kyung-Bo Seo ⁽²⁾, Dong-Hoon Jeong ⁽²⁾, Bang-Wook Lee ⁽¹⁾
 (1) Hanyang University, Ansan-si, Korea, (2) Hyosung Corporation, Changwon-si, Korea
- **1-p1-Q-4** Development of Discharge Inception Simulator Considering Environmental Factors Using Advection-Diffusion Model

Atsushi Ohtake ⁽¹⁾, Kinya Kobayashi ⁽¹⁾, Tatsuro Kato ⁽¹⁾, Norihiro Yanagita ⁽¹⁾, Toshiaki Rokunohe ⁽¹⁾, Hiroki Kojima ⁽²⁾, Naoki Hayakawa ⁽²⁾, Hitoshi Okubo ⁽³⁾

(1) Hitachi Ltd., Hitachi, Japan (2) Nagoya University, Nagoya, Japan (3) Aichi Institute of Technology, Aichi, Japan

Room: Small Hall Time: 14:35-16:05, Oct. 21(Mon)

- Session: 1-p2-P, "Current Interruption in Vacuum (E-3)" Chair: Y. Niwa (Toshiba Corporation)
- 1-p2-P-1 Effects of High Oxygen-affinity Elements on Microstructure of Cu-Cr alloy Ingots Jianrong Gao ⁽¹⁾, Shixi Liu ⁽¹⁾, Xiaojun Wang ⁽²⁾, Wenbin Wang ⁽²⁾
 (1) Key Laboratory of Electromagnetic Processing of Materials (Ministry of Education) Northeastern University, Shenyang China, (2) Shaanxi Sirui Industries Co., Ltd., Xi'an China
- **1-p2-P-2** Back-to-back Capacitor Bank Switching Performance of Vacuum Interrupters: Comparison of Three Contact Materials

He Yang ⁽¹⁾, Yingsan Geng ⁽¹⁾, Zhiyuan Liu ⁽¹⁾, Yonghui Li ⁽¹⁾, Yingyao Zhang ⁽¹⁾, Xiaojun Wang ⁽²⁾, Wenbin Wang ⁽²⁾

(1) State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, (2) Shaanxi Sirui Industries Co., Ltd., China

- 1-p2-P-3 Simulation of Breakdown in Cu-Cr Metal Vapor after Vacuum Arc Extinctions Zhenxing Wang, Yunbo Tian, Yingsan Geng, Zhiyuan Liu State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China
- 1-p2-P-4 Study on Structures to Support AMF Electrodes and Compensate for AMF Loss by Itself Hyeong Goo Lee⁽¹⁾, Jong Sung Kang⁽¹⁾, Chul Hyun Ahn⁽²⁾, Byungsan Baek⁽¹⁾, Man Gyu Cho⁽²⁾

(1) Hyundai Heavy Industries Co., Ltd., Yongin-si, Korea, (2) Hyundai Heavy Industries Co., Ltd., Ulsan-si, Korea

1-p2-P-5 An Appraisal of the Insulation Capability of Vacuum Interrupters After Long Periods of Service

Richard Reeves, Leslie T Falkingham Vacuum Interrupters Limited, UK

Room: 501 Time: 14:35-16:05, Oct. 21(Mon)

Session: 1-p2-Q, "Electrical Insulation in Electric Power Equipment (H-3)" Chair: T. Hikosaka (Fuji Electric Co, Ltd)

1-p2-Q-1 Electric Field Calculation and Insulation Analysis of High Voltage Insulating Bushing Jin Lijun⁽¹⁾, Xue Yifei⁽¹⁾, Zhao Bonan⁽²⁾, Chen Jie⁽²⁾, Zhang Wenhao⁽¹⁾ (1) College of Electronics and Information Engineering, Tongji University, Shanghai, China, (2) Shanghai Xi'an High Voltage Apparatus Research Institute Co., Ltd., Shanghai, China 1-p2-Q-2 Electric Field Calculation of Dry DC Bushing under Complicated Voltage Wen Miao, Lin Xin, Shen Wen, Ji Tian School of Electrical Engineering, Shenyang University of Technology, Shenyang, China 1-p2-Q-3 A Fault Diagnosis of Transmission Line Spacers Based on Visible-light Images Yan Shujia⁽¹⁾, Jin Lijun⁽¹⁾, Duan Shaohui⁽²⁾, Zhao Ling⁽²⁾, Hu Juan⁽¹⁾, Zhang Wenhao⁽¹⁾ (1) College of Electronic and Information Engineering, Tongji University, Shanghai, China, (2) Shenzhen Power Supply Co., Ltd., Shenzhen, China 1-p2-Q-4 Dielectric Breakdown Characteristics of Environment-Friendly Insulating Fluids Xiang Bin, Liu Zhiyuan, Satoru Yanabu Xi'an Jiaotong University, Xi'an, China 1-p2-Q-5 Research on Pulse Oscillating Circuit of Turn-to-turn Over-voltage Test for Reactors Hongyan Nie^(1,2), Jiaqian Liang⁽¹⁾, Yonghong Wang⁽²⁾, C.H. Zhang⁽¹⁾, X.S. Liu (1) Harbin Institute of Technology, Harbin, China (2) Harbin University of Science and Technology, Harbin, China 1-p2-Q-6 Temperature Rising Recognition of IR Image of Electrical Equipment Based on Seeded Region Jin Lijun⁽¹⁾, Xia Jing⁽¹⁾, Duan Shaohui⁽²⁾, Yao Senjing⁽²⁾, Zhao Ling⁽²⁾

> (1) College of Electronic and Information Engineering, Tongji University, Shanghai, China, (2) Shenzhen Power Supply Co., Ltd., Guangdong, Shenzhen, China

Room: Small Hall

Time: 9:00-10:15, Oct. 22(Tue)

- Session: 2-a1-P, "Current Interruption in Vacuum (E-4)" Chair: S. Yanabu (Xi'an Jiaotong University)
- 2-a1-P-1 Interruption Behaviors with 84/72-kV VCB and GCB
 - Sho Tokoyoda, Toshinobu Takeda, Kenji Kamei, Daisuke Yoshida, Hiroki Ito Mitsubishi Electric Corporation, Hyogo, Japan
- 2-a1-P-2 110 kV Three-Phase Circuit Breaker Gennady V. Krylov, Victor V. Mullin NPP Kontakt, JSC, Saratov, Russia
- 2-a1-P-3 Axial Magnetic Field Strength Needed for a 126kV Single-Break Vacuum Circuit Breaker During Symmetrical Current Switching

Yingyao Zhang ⁽¹⁾, Xiaofei Yao ⁽¹⁾, He Yang ⁽¹⁾, Zhiyuan Liu ⁽¹⁾, Yingsan Geng ⁽¹⁾, Ping Liu ⁽²⁾

(1) State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China, (2) Xi'an High-voltage Apparatus Research Institute Co., Ltd., Xi'an, China

- 2-a1-P-4 Development of 72/84 kV Dead-tank VCB with Rated Normal Current of 3000 A Hitoshi Saito, Kazuhiro Nagatake, Kazuki Yamauchi, Yukihiro Takeshita, Tooru Kobayashi, Terumichi Cho, Kiyohito Katsumata, Masayuki Sakaki Meidensha Corporation, Numazu, Japan
- 2-a1-P-5 Development of a 126kV Single-break Vacuum Circuit Breaker and Type Test Xiaofei Yao ⁽¹⁾, Jianhua Wang ⁽¹⁾, Yingsan Geng ⁽¹⁾, Jing Yan ⁽¹⁾, Zhiyuan Liu ⁽¹⁾, Jianjun Yao ⁽²⁾, Ping Liu ⁽³⁾

(1) State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China, (2) Shaanxi Industrial Technology Research Institute, Xi'an, China, (3) Xi'an High-voltage Apparatus Research Institute Co., Ltd., Xi'an, China

Time: 9:00-10:15, Oct. 22(Tue)

- Session: 2-a1-Q, "Superconducting Fault Current Limiters (J)" Chair: H. Kojima (Nagoya University)
- 2-a1-Q-1 Design and Implementation of Field Suppression Unit in DC Excitation System for Saturated Iron-core Superconducting Fault Current Limiter Jibin Cui, Yuwei Sun, Hui Hong, Xiaoye Niu, Bo Tian, Qiang Li, JingYin Zhang, Weizhi Gong, Ying Xin Innopower Superconductor Cable Co., Ltd., Beijng, China
- 2-a1-Q-2 Periodic Behavior of Magnetic Flux Density in Flat-Type Inductive Fault Current Limiter with YBCO Thin Film Discs during AC Over-Current Carrying Period
 Masayuki Harada, Kohei Okuda, Yasunobu Yokomizu, Toshiro Matsumura
 Nagoya University, Nagoya, Japan
- 2-a1-Q-3 Role of Superconductors in Fault current limiter Technology for Future Smart-Grids Sunil Kedia, Manglesh Dixit, Sandeep Kulkarni, Lalichan Andrews CG Global R&D Center, Crompton Greaves Limited, Mumbai, India

Time: 9:00-10:15, Oct. 22(Tue)

- Session: 2-a1-R, "DC Current Interruption (C-1)" Chair: Y. Yamano (Saitama University)
- 2-a1-R-1 Characteristics of the DC Arc Forcing Interruption and Reignition Conditions
 Liu Bin, Wu Jianwen, Xin Chao
 School of Automation Science and Electrical Engineering, Beihang University, Beihang
 China
- 2-a1-R-2 Application of a Validated AC Black-box Arc Model to DC Current Interruption
 R.P.P. Smeets, V. Kertész
 DNV KEMA TIC, the Netherlands
- 2-a1-R-3 HVDC Hybrid Circuit Breaker Based on SF₆ Interrupter and Vacuum Interrupter in Series Guowei Ge, Minfu Liao, Xiongying Duan, Jiyan Zou School of Electrical Engineering, Dalian University of Technology, Dalian, China
- 2-a1-R-4 Development of Intelligent Protection System for Photovoltaic Systems Tomoki Kinno ⁽¹⁾, Kohta Sakai ⁽¹⁾,Kazuto Yukita ⁽¹⁾, Kenji Ando ⁽²⁾, Yasuyuki Goto ⁽¹⁾ Katsuhiro Ichiyanagi ⁽¹⁾

(1) Aichi Institute of Technology, Aichi, Japan, (2) Nitto Kogyo Corporation, Aichi, Japan

Room: Small Hall Time: 10:35-12:05 Oct 22(Tu

Time: 10:35-12:05, Oct. 22(Tue)

- Session: 2-a2-P, "Current Interruption in Vacuum (E-5, B)" Chair: Y. Matsui (Meidensha Corporation)
- 2-a2-P-1 The Impact of Switching Capacitor Banks with Very High Inrush Current on Vacuum R.P.P. Smeets, S. Kuivenhoven DNV KEMA TIC, the Netherlands
- 2-a2-P-2 Vacuum Interrupter for a Generator Circuit BreakerR. S. ParasharAlstom Grid Research & Technology, Stafford, UK
- 2-a2-P-3 Back-to-back Capacitor Switching Performance of Vacuum Interrupters after High Frequency Sub-microsecond Voltage Impulse Conditioning

He Yang, Yingsan Geng, Zhiyuan Liu, Yingyao Zhang, YongHui Li, Yong Xiang State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China

- 2-a2-P-4 A New Type of Laser Triggered Multistage Gas-Vacuum Mixed Switch
 - Minfu Liao ⁽¹⁾, Wenhao Li ⁽¹⁾, Xiongying Duan ⁽¹⁾, Jiyan Zou ⁽¹⁾, Haoyong Gong⁽²⁾

(1) School of Electrical Engineering, Dalian University of Technology, Dalian, China

- (2) Yiyang Housing Provident Fund Management Center, Yiyang, China
- 2-a2-P-5 Aviation Arc Fault Diagnosis Based on Weight Direct Determined Neural Network Huang Yuanhang, Wang Yongxing, Dong Enyuan, Zou Jiyan Dalian University of Technology, Dalian, China

Time: 10:35-12:05, Oct. 22(Tue)

- Session: 2-a2-Q, "Fault Current Phenomena (L, D)" Chair: J. Sato (Toshiba Corporation)
- 2-a2-Q-1 A Method for Arc Fault Detection Based on the Analysis of Signal's Characteristic Frequency Band with Wavelet Transform

Yuan Wu, Zhengxiang Song, Xue Li

Xi'an Jiaotong University, College of Electrical Engineering, Xi'an, China

2-a2-Q-2 Statistical Characteristics for Parameters of Transient Processes at Arcing Ground Faults in Cable Networks

Andrey I. Shirkovets, Andrey V. Telegin

Limited Liability Company BOLID, Novosibirsk, Russia

2-a2-Q-3 Modeling of Transient Processes at Ground Faults in the Electrical Network with a High Content of Harmonics

Andrey I. Shirkovets, Andrey V. Telegin

Limited Liability Company BOLID, Novosibirsk, Russia

- 2-a2-Q-4 Research on Rapid Diagnosis Technique of Series Fault Arc with Waveform Comparison Sun Peng, Qin Meng
 Special Motor and High Voltage Apparatus Laboratory, Shenyang University of Technology, Shenyang, China
- 2-a2-Q-5 Research on Key Influence Factors of Current -Transfer Process Based on Paralleled Breaking

Xiang Zheng ^(1,2), Zhihui Huang ⁽¹⁾, Enyuan Dong ⁽³⁾, Minfu Liao ⁽³⁾, Zhuo Cheng ⁽⁴⁾ Shengkai Hou ⁽³⁾, Chenxu Niu ⁽²⁾

(1) Post-doctoral Mobile Research Station of Control Science and Engineering, Dalian University of Technology, Dalian, China, (2) School of Electronics and Information Engineering, Dalian Jiaotong University, Dalian, China, (3) School of Electrical Engineering, Dalian University of Technology, Dalian, China, (4) Department of Computer Science and Technology, Dalian Neusoft Institute of Information, Dalian, China

2-a2-Q-6 Numerical Research on the Electrical Contact Model and Thermal Analysis of the Roll-ring Junxing Chen ⁽¹⁾, Mingzhe Rong ⁽¹⁾, Fei Yang ^(1,2), Yi Wu ⁽¹⁾, Hao Sun ⁽²⁾, Yun Yang ⁽¹⁾
(1) State Key Laboratory of Electrical Insulation and Power Equipment, School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, China, (2) State Grid Pinggao Group Co., LTD., China

Time: 10:35-12:05, Oct. 22(Tue)

Session: 2-a2-R, "CAE (N)"

Chair: O. Yamamoto (Kyoto University)

2-a2-R-1 Numerical Analysis of the Short-time Current Withstand Performance of the DC Circuit Breaker

Hao Sun⁽¹⁾, Haiyan Wang⁽²⁾, Delong Dong⁽¹⁾, Chunping Niu⁽¹⁾, Fei Yang^(1,2), Mingzhe Rong⁽¹⁾

(1) State Key Laboratory of Electrical Insulation and Power Equipment, School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, China, (2) State Grid Pinggao Group Co., Ltd., China

2-a2-R-2 A Numerical Model of Mechanical, Thermoelectric and Magnetic Coupling Fields for Stationary Electric Contact

Zhu Tiansheng ^(1,2), Liu Hongwu ⁽²⁾, Yin Nairui ⁽²⁾, Guan Ruiliang ⁽²⁾, Shenli Jia ⁽²⁾

(1) State key laboratory of electrical insulation and power equipment, Xi'an Jiaotong University, Xi'an, China, (2) Changshu switchgear company, Changshu, Jiangsu, China

2-a2-R-3 Simulation of the Contact Resistance of High Voltage Apparatus with the Method of Coupling Contact Surface

Ruochen Qiang, Mingzhe Rong

Xi'an Jiaotong University, Xi'an, China

2-a2-R-4 Experimental Investigation on Impact Phenomena in a Permanent Magnetic Actuator of a 126kV Vacuum Circuit Breaker
 Liqiong Sun, Zhenxing Wang, Saina He, Yingsan Geng, Zhiyuan Liu
 State Key Laboratory of Electrical Insulation and Power Equipment Xi'an liaotong

State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China

- 2-a2-R-5 Interaction of Coil Type Axial Magnetic Field Electrodes Applied to Vacuum Interrupters Li Yu⁽¹⁾, Martin Leusenkamp⁽²⁾, Yucheng Li⁽²⁾, Shilpa Pohnerkar⁽³⁾
 (1) Eaton Global Research and Technology, Shanghai, China, (2) Eaton Corp. R&D Center, Suzhou, China, (3) Eaton India Engineering Center, Pune, India
- 2-a2-R-6 Coupled Simulation of Flow and Dynamic Analysis for Prediction of the Performance in GIS Youns Su Lee, Boo Hyung Bang, Hee Sub Ahn, Jong Ung Choi, Seok Won Park Electro Technology R&D Center, LSIS Co., Ltd., Cheongju, Korea

Room: Small Hall Time: 13:00-14:30, Oct. 22(Tue)

- Session: 2-p1-P, "Current Interruption in Gases (B-1)" Chair: Y. Tanaka (Kanazawa University)
- 2-p1-P-1 Analysis of Arc Plasma During Small Capacitive Current Interruption in a SF₆ Circuit Breaker Wang Liang ⁽¹⁾, Lin Xin ⁽¹⁾, Wang Feiming ⁽¹⁾, Terry Yan ⁽²⁾, Xu Jianyuan ⁽¹⁾
 (1) School of Electrical Engineering, Shenyang University of Technology, Shenyang, China, (2) Department of Mechanical Engineering, Southern Illinois University Edwardsville, Illinoi, USA
- 2-p1-P-2 Development of a Thermally and Chemically Non-equilibrium Model for Decaying SF₆ Arc Yasunori Tanaka ⁽¹⁾, Katsumi Suzuki ⁽²⁾, Takanori Iijima ⁽²⁾, Takeshi Shinkai ⁽²⁾
 (1) Kanazawa Univ., Kanazawa, Japan, (2) Toshiba, Corporation, Tokyo, Japan.
- **2-p1-P-3** Prediction and Improvement of dielectric breakdown between arc contacts in Gas Circuit Breaker

B H Bang, Y S Lee, J U Choi, H S Ahn, S W Park

Power T&D R&D Center, LSIS Co., Ltd., Cheongju, Korea

2-p1-P-4 Research about Influence of Contact Ablation on Dielectric Recovery Characteristic for SF₆ Circuit Breaker

Li Xintao⁽¹⁾, Lin Xin⁽¹⁾, Xu Jianyuan⁽¹⁾, Wang Feiming⁽¹⁾, Zhou Yutian

(1) School of Electrical Engineering, Shenyang University of Technology, Shenyang, China,

- (2) Liaoning Dandong Power Supply Company, Dandong, China
- 2-p1-P-5 Measurement of Hot Gas Exhaust Characteristics in SF6 Circuit Breaker with Small Model Interrupter

Hajime Urai, Makoto Koizumi, Yoichi Ooshita, Noriyuki Yaginuma, Masanori *Hitachi, Ltd. Hitachi, Japan*

2-p1-P-6 University Research Approach to Switchgear Technology - Circuit Switching Phenomena Eiichi Haginomori, Hisatoshi Ikeda University of Tokyo, Tokyo, Japan

Time: 13:00-14:30, Oct. 22(Tue)

Session: 2-p1-Q, "Electrical Insulation (G-1)"

Chair: T. Hikosaka (Fuji Electric Co, Ltd.)

2-p1-Q-1 Understanding Surface Discharge Activity in Copper Sulphide Diffused Transformer Insulation under Harmonic AC Voltages

R. Sarathi, I.P. Merin Sheema

Department of Electrical Engineering, Indian Institute of Technology Madras, Chennai, India

2-p1-Q-2 Power Line Image Segmentation and Extra Matter Recognition based on Improved Otsu Algorism

Yan Shujia ⁽¹⁾, Jin Lijun ⁽¹⁾, Duan Shaohui ⁽²⁾, Zhao Ling ⁽²⁾, Yao Chunyu ⁽¹⁾, Zhang Wenhao ⁽¹⁾

(1) College of Electronic and Information Engineering, Tongji University, Shanghai, China, (2) Shenzhen Power Supply Co. ,Ltd., Guangdong, Shenzhen, China

2-p1-Q-3 Cathode Electric Field Preceding Flashover of a Bridged Vacuum Gap Hiroki Naruse ⁽¹⁾, Yousuke Ooura ⁽¹⁾, Hitoshi Saito ⁽²⁾, Masayuki Sakaki ⁽²⁾, Osamu Yamamoto ⁽³⁾

(1) Kyoto University, Kyoto, Japan, (2) Meidensha Co., Numazu, Japan, (3) Research Institute for Applied Sciences, Kyoto, Japan

2-p1-Q-4 Inception and Expansion Process of Surface Flashover on Solid Dielectrics in Vacuum

Yusuke Nakano⁽¹⁾, Hiroki Kojima⁽¹⁾, Naoki Hayakawa⁽¹⁾, Kenji Tsuchiya⁽²⁾, Hitoshi Okubo⁽³⁾

(1) Nagoya University, Nagoya, Japan, (2) Hitachi Ltd., Hitachi, Japan, (3) Aichi Institute of Technology, Aichi, Japan

2-p1-Q-5 Relationship Between Vacuum Surface Flashover and Charging Characteristics for Alumina Ceramics of Lowered Resistivity

Hideaki Fukuda ⁽¹⁾, Yasushi Yamano ⁽¹⁾, Shinichi Kobayashi ⁽¹⁾, Shinichiro Michizono ⁽²⁾, Yashio Saito ⁽²⁾, Takeshi Maeda ⁽³⁾

(1) Saitama University, Saitama, Japan, (2) High Energy Accelerator Research Organization, Ibaraki, Japan, (3) KYOCERA Corporation, Kyoto, Japan

2-p1-Q-6 Partial Discharge Characteristics and Mechanisms in Consideration of Charge Behavior on Alumina Dielectrics under AC Voltage in Vacuum

H. Kojima ⁽¹⁾, M. Ishida ⁽¹⁾, N. Hayakawa ⁽¹⁾, M. Hanai ⁽¹⁾, J. Ikeda ⁽²⁾, T. Shioiri ⁽²⁾, H. Okubo ⁽³⁾

(1) Nagoya University, Nagoya, Japan, (2) Toshiba Corporation, Tokyo, Japan, (3) Aichi Institute of Technology, Aichi, Japan

Time: 13:00-14:30, Oct. 22(Tue)

- Session: 2-p1-R, "Semiconductor Circuit Breakers (I)" Chair: M. Yamamoto (Shimane University)
- 2-p1-R-1 Experimental Study of High-speed Hybrid Circuit Breaker Used in Fast Isolation of Faulty Power

Enyuan Dong, YuShuo Chen, Yongxing Wang, Jinhu Zhao, Jiyan Zou Dept. of Electrical and Electronics Engineering, Dalian University of Technology, Dalian, China

2-p1-R-2 Direct Current Interruption on Small AC Relay Using IGBT Commutation Circuit with Surge Protection Element

Akira Sugawara ⁽¹⁾, Tatsuya Goso ⁽¹⁾, Teppei Sato ⁽¹⁾, Syuji Tada ⁽¹⁾, Kenji

(1) Niigata University, Niigata, Japan, (2) Daito communication Apparatus Co.,Ltd, Tokyo, Japan

- 2-p1-R-3 Development of a New Topology of DC Hybrid Circuit Breaker Yifei Wu, Mingzhe Rong, Yi Wu, Fei Yang, Mei Li, Yang Li State Key Laboratory of Electrical Insulation and Power Equipment, School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, China
- 2-p1-R-4 Gate Drive Circuit for Normally On Type GaN FET Takashi Yoshida, Hirokatsu Umegami, Fumiya Hattori, Masayoshi Yamamoto ⁽¹⁾, Atsushi Yamaguchi ⁽²⁾
 (1) Shimane University, Shimane, Japan (2) ROHM Co., Ltd., Shimane, Japan
- 2-p1-R-5 Basic Investigation on Core Loss Calculation Method under Square Wave Voltage Magnetizing Condition Shota Kimura, Jun Imaoka, Masayoshi Yamamoto Shimane University, Shimane, Japan

37

Room: Small Hall

Time: 14:50-15:50, Oct. 22(Tue)

- Session: 2-p2-P, "Current Interruption in Gases (B-2, A)" Chair: H. Urai (Hitachi, Ltd.)
- 2-p2-P-1 Effect of N₂/O₂ Inclusion on Polymer Ablation and Spallation Phenomena from Polyamide during Thermal Plasma Irradiation Tomoyuki Nakano, Naoki Shinsei, Masahiro Ishida, Yasunori Tanaka, Yoshihiko Uesugi,

Tatsuo Ishijima

Kanazawa University, Kanazawa, Japan

2-p2-P-2 Simulation of Very Fast Transient Overvoltage Caused by Disconnector Switch Operation in SF₆ Gas Insulated Switchgear using Multi-Restrike Arcing Model

Weifeng Xin, Guoguang Zhang, Weiguang Yuan, Jie Wu, Yingsan Geng

State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China

2-p2-P-3 Estimation of Sparking Voltage in High-Temperature Nitrogen Gas Present under a Constant Volume Condition

H. Sugimoto, Y. Yokomizu, T. Kobayashi, T. Matsumura

Department of Electrical Engineering and Computer Science, Nagoya University, Nagoya, Japan

2-p2-P-4 Characteristics of Dielectric Strength under the Atmospheric Pressure in Electric Power Equipment Controlled by Dielectric Barrier Discharge

Wang Yulong, Zhang Zhonglin, Wang Chunsheng, Jiang Binhao

Department of Electrical Engineering, Harbin Institute of Technology, Harbin, China

Time: 14:50-15:50, Oct. 22(Tue)

- Session: 2-p2-Q, "Electrical Insulation (G-2, Z)" Chair: A. Kumada (University of Tokyo)
- 2-p2-Q-1 Development of Vacuum Interrupter with AMF Contacts for High Voltage Circuit Breaker Jaeseop Ryu, Jongung Choi, Seokweon Park

T&D Power R&D Center, LS Industrial Systems, Chungbuk, Korea

2-p2-Q-2 Breakdown Characteristics of CuCr Electrode after Electron Beam Irradiation and Current Conditioning

Naoki Asari, Yo Sasaki, Tetsu Shioiri, Junichi Sato, Junichi Ikeda Toshiba Corporation, Tokyo, Japan

2-p2-Q-3 Conditioning Process of Multi-gap Electrode System with Cu-Cr Rod Electrode in Vacuum Yasutomo Otake ⁽¹⁾, Hiroki Kojima ⁽¹⁾, Naoki Hayakawa ⁽¹⁾, Kosuke Hasegawa ⁽²⁾, Hitoshi Saito ⁽²⁾, Masayuki Sakaki ⁽²⁾, Hitoshi Okubo ⁽³⁾

(1) Nagoya University, Nagoya, Japan, (2) Meidensha Corporation, Numazu, Japan, (3) Aichi Institute of Technology, Aichi, Japan

- 2-p2-Q-4 Analysis of Seismic Performance for High-voltage Switchgear Equipment of GIS Xia Yalong ^(1,2), Xu Jianyuan ^(1,2), Wang Yu ⁽³⁾
 - (1) School of Electrical Engineering, Shenyang University of Technology, Shenyang China,
 - (2) Liaoning Province Key Laboratory of Safe Operation and Monitoring of Power Grid,
 - Shenyang, China, (3) Liaoning Dandong Power Supply Company, Dandong, China

Time: 14:50-15:50, Oct. 22(Tue)

- Session: 2-p2-R, "Fault Current Limiters (K)" Chair: Y. Yamano (Saitama University)
- 2-p2-R-1 Application of Fault Current Limiter to Looped Distribution Network Yoshitaka Suzuki, Junichi Arai
 Kogakuin University, Tokyo, Japan
- 2-p2-R-2 Development of a Fault Current Limiter for 22.9 kV Distribution Power Line Min Jee Kim ⁽¹⁾, Wonjoon Choe ⁽¹⁾, Seung-Hyun Bang ⁽¹⁾, Hae Yong Park ⁽¹⁾, Gyeong-Ho Lee ⁽¹⁾, Jungwook Sim ⁽¹⁾, Kil-Young Ahn ⁽¹⁾, Young-Geun Kim ⁽¹⁾, Soo Bong Kim ⁽²⁾ (1) Electro Technology R&D Center, LSIS Co., Ltd., Cheongju, Korea, (2) Korea Electric Power Corporation (KEPCO), Seoul, Korea
- **2-p2-R-3** Basic Research on the Fuse Element Pattern Changing a Current Pathway in the Process of Current Interruption

Masaki Tsuchiya ⁽¹⁾, Yasushi Yamano ⁽¹⁾, Shinichi Kobayashi ⁽¹⁾, Kengo Hirose ⁽²⁾ (1) Saitama University, Saitama, Japan, (2) Fuji Labs., Tokyo, Japan

2-p2-R-4 Experimental Investigation of GaInSn Current Limiter Based on a Novel Principle H. He⁽¹⁾, M. Rong⁽¹⁾, Y. Wu⁽¹⁾, Y. Liu⁽¹⁾, J. Man⁽¹⁾, G. Yu⁽²⁾

(1) State Key Lab of Electrical Insulation and Power Equipment, Xi'an Jiaotong University,

Xi'an, China, (2) Wuhan Institute of Marine Electric Propulsion, Wuhan, China

Room: Small Hall Time: 9:15-10:15, Oct. 23(Wed)

Session: 3-a1-P, "Low Voltage Circuit Breakers (O-1)" Chair: Y. Yokomizu (Nagoya University)

 3-a1-P-1 Studies on Transient Response of the Arc and Influence of Application Magnetic Field to the Arc in a Small Direct Current Vacuum Arc Seibo Miyamoto, Yusuke Kuroki, Eiji Kaneko

University of the Ryukyus, Okinawa, Japan

3-a1-P-2 Investigation of DC Arc in hydrogen and air Xin Chao, Wu Jianwen, Liu Bin School of Automation Science and Electrical Engineering, BeiHang University, Beijing, China

3-a1-P-3 Numerical Investigation on Arc Characteristics During Arc Motion in Medium-voltage DC Circuit Breaker

Ruiguang Ma⁽¹⁾, Mingzhe Rong⁽¹⁾, Duanlei Yuan⁽²⁾, Hao Sun⁽¹⁾, Yi Wu⁽¹⁾, Fei Yang^(1,2) (1) State Key Laboratory of Electrical Insulation and Power Equipment, School of

Electrical Engineering, Xi'an Jiaotong University, Xi'an, China, (2) State Grid Pinggao Group Co., LTD., Henan, China

3-a1-P-4 Influences of Contact Opening Speeds on Break Arc Behaviors of Ag and AgSnO₂ Contacts in DC Load Circuits

Makoto Hasegawa

Chitose Institute of Science and Technology, Hokkaido, Japan

Time: 9:15-10:15, Oct. 23(Wed)

Session: 3-a1-Q, "Electromagnetic Field (Z)"

Chair: A. Kumada (The University of Tokyo)

3-a1-Q-1 Research on Interference Characteristics of Cables in Secondary Circuits Due to Lightning Stroke in Grounding Grid of Substation

Li Bing ^(1,2), Xu Jianyuan ^(1,2), Li Junming ⁽³⁾

- School of Electrical Engineering, Shenyang University of Technology, Shenyang, China,
 Liaoning Province Key Laboratory of Safe Operation and Monitoring of Power Grid,
 Shenyang, China, (3) Liaoning Dandong Power Supply Company, Dandong, China
- 3-a1-Q-2 Calculation of Transient Electromagnetic Fields Generated during Switching Operation in Power Substation by the Method of Moment and Superposition Principle Weifeng Xin, Guoguang Zhang, Weiguang Yuan, Jie Wu, Yingsan Geng State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China
- **3-a1-Q-3** The Change of Electromagnetic Environments in the Smart Grid Joong-sun Ahn ⁽¹⁾, Young-geun Kim ⁽¹⁾, Gyu-hwan Han ⁽¹⁾
 (1) Electro Technology R&D Center, LSIS Co., Ltd., Cheongju, Korea
- **3-a1-Q-4** 2D Fully Coupled Analysis with Magneto-Thermal Model for Prediction of Temperature Distribution on UHV GIB

H.S. Sohn⁽¹⁾, N.K. Kim⁽²⁾, J.J. Chae⁽¹⁾, C.H. Yeo⁽²⁾, J.H. Kim⁽²⁾

- (1) Power & Industrial Systems R&D Center, Hyosung Corporation, Anyang-si, Korea,
- (2) Power & Industrial Systems R&D Center, Hyosung Corporation, Changwon-si, Korea

Room: Small Hall

Time: 10:35-12:05, Oct. 23(Wed)

- Session: 3-a2-P, "Low Voltage Circuit Breakers (O-2, D)" Chair: H. Urai (Hitachi, Ltd.)
- **3-a2-P-1** Study on Polymer Insulators in Air Discharge

Okano Yuta⁽¹⁾, Eiji Kaneko⁽¹⁾, Takehiro Hayashida⁽²⁾ (1) Department of electrical and electronics engineering, faculty of engineering, University of the Ryukyus, Okinawa, Japan, (2) Togami Electric Mfg. Co., Ltd., Saga, Japan

3-a1-P-2 Experimental Investigations of Internal Pressure in Quenching Chamber of Low Voltage MCCB

Lijun Wang ⁽¹⁾, Hongwu Liu ⁽²⁾, Chonglong Ge ⁽¹⁾, Ruiliang Guan ⁽²⁾, Lin Chen ⁽²⁾, Shenli Jia ⁽¹⁾

(1) State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, China, (2) Changshu Switchgear Company, Changshu, China

3-a2-P-3 Simulation of arc in molded-case circuit breaker with metal vapor and moving electrode Yoshiaki Enami ⁽¹⁾, Masayoshi Sakata ⁽²⁾

> (1) Application Technology Research Center, Advanced Technology Laboratory, Fuji electric Co., Ltd., Tokyo, Japan, (2) Products Development Div., Technology & Manufacturing Div., Fuji Electric FA components & Systems Co., Ltd., Tokyo, Japan

3-a2-P-4 Accelerated Life Test of Electromagnetic Contactor Using a Transient Recovery Voltage Jun-Sik Oh, Young-Geun Kim

Power Testing & Technology Institute of LS Industrial Systems, Cheongju, Korea

Time: 10:35-12:05, Oct. 23(Wed)

- Session: 3-a2-Q, "Driving Mechanism of Circuit Breakers (F)" Chair: Y. Niwa (Toshiba Corporation)
- **3-a2-Q-1** Dynamic Simulation and Closing Bouncing Analysis on the 12kV Vacuum Circuit Breaker with Permanent Magnetic Actuator

Cao Chen $^{(1,2)}$, Lin Xin $^{(1,2)}$

(1) Shenyang University of Technology, Shenyang, China, (2)Liaoning Province Key Laboratory of Safe Operation and Monitoring of Power Grid, Shenyang, China

3-a2-Q-2 Research on the Action Stability of Vacuum Circuit Breakers with Permanent Magnet Actuator

Tang Geng ^(1,2), Xu Janyuan ^(1,2), Lin Xin ^(1,2), Sin Kejian ^(1,2)

(1) School of Electrical Engineering, Shenyang University of Technology, Shenyang, China,
(2) Liaoning Province Key Lab of Power Grid Safe Operation and Monitoring, Shenyang, China

3-a2-Q-3 Research on Velocity Control Methods for Driving Motor of 126kV High Voltage Circuit Breaker

Teng Yun^(1,2), Wang Yifei^(1,2), Lin Xin^(1,2), Li Junming⁽³⁾

(1) School of Electrical Engineering, Shenyang University of Technology, Shenyang, China,
(2) Liaoning Province Key Laboratory of Safe Operation and Monitoring of Power Grid,
Shenyang, China, (3) Liaoning Dandong Power Supply Company, Dandong, China

3-a2-Q-4 Research on Dynamic Characteristics of Permanent Magnet Brushless DC Motor Operating Mechanism in 126kV Vacuum Circuit Breaker

Li Haomin⁽¹⁾, Lin Xin⁽²⁾

(1) Liaoning Province Key Laboratory of Safe Operation and Monitoring of Power Grid, Shenyang, China, (2) School of Electrical Engineering, Shenyang University of Technology, Shenyang, China

3-a2-Q-5 Research on Permanent Magnetic Actuator Characteristics Considering Eddy Current Effect Liu Aimin ^(1,2), Yang Yanhui ^(1,2), Zhang Bo ^(1,2)

> (1) School of Electrical Engineering, Shenyang University of Technology, Shenyang, China, (2) Liaoning Province Key Laboratory of Safe Operation & Monitoring of Power Grid, Shenyang, China

3-a2-Q-6 Monitoring and Recording System of Mechanical Characteristics of High Voltage Circuit Yang Zhuangzhuang ^(1,2), Xu Jianyuan ^(1,2), Li Junming ⁽³⁾

> (1) School of Electrical Engineering, Shenyang University of Technology, Shenyang, China, (2) Liaoning Province Key Laboratory of Safe Operation and Monitoring of Power Grid, Shenyang, China, (3) Liaoning Dandong Power Supply Company, Dandong, China

Important Dates

October 20th, 2013ReceptionOctober 21st-23rd, 2013ConferenceOctober 23rd, 2013Conference Tour, BanquetOctober 24th, 2013Post-conference tour

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Schedule for ICEPE2013

Day	Time		Small Hall		501		601	Multipurpose Hall	Restaurant 'Talkrest Pomodoro''	L obby
Oct. 20 (Sun)	16:00-									Registration
	17:30-19:30								Welcome Reception	
	- 20:00									
	09:00-10:15	Ope	ening Ceremony							Registration
	10:15-10:40							Coffee Break		
	10:40-12:10	1-a-P	'Current Interruption in Vacuum (E-1)''	1-a-Q	"Electrical Insulation in Gases (H-1)"					
	12:10-13:00				:			Lunch		
Oct. 21	13:00-14:15	1-p1-P	"Current Interruption in Vacuum (E-2)"	1-p1-Q	'Electrical Insulation in Gases (H-2)''					
(Mon)	14:15-14:35							Coffee Break		
	14:35-16:05	1-p2-P	"Current Interruption in Vacuum (E-3)"	1-p2-Q	'Electrical Insulation in Electric Power Equipment (H-3)''					
	16:05-16:25							Coffee Break		
	16:25-17:45	S-1	Special Session on Semiconductor Circuit Breakers							
	9:00-10:15	2-a1-P	'Current Interruption in Vacuum (E-4)''	2-a1-Q	"Superconducting Fault Current Limiters (J)"	2-a1-R	"DC Current Interruption (C-1)"			Registration
	10:15-10:35						_	Coffee Break		
	10:35-12:05	2-a2-P	'Current Interruption in Vaccum (E-5, B)''	2-a2-Q	'Fault Current Phenomena (L, D)''	2-a2-R	"CAE (N)"			
	12:05-13:00							Lunch		
Oct. 22 (Tue.)	13:00-14:30	2-p1-P	"Current Interrutpion in Gases (B-1)"	2-p1-Q	"Electrical Insulation (G-1)"	2-p1-R	"Semiconductor Circuit Breakers (I)"			
	14:30-14:50							Coffee Break		
	14:50-15:50	2-p2-P	"Current Interruption in Gases (B-2, A)"	2-p2-Q	"Electrical Insulation (G-2, Z)"	2-p2-R	"Fault Current Limiters (K)"			
	15:50-16:10							Coffee Break		
	16:10-17:30	S-2	Special Lecture: High Voltage VCB							
Oct. 23 (Wed)	09:15-10:15	3-a1-P	"Low Voltage Circuit Breakers (O-1)"	3-a1-Q	"Electrom agnetic Field (Z)"					Registration (until 11:00)
	10:15-10:35							Coffee Break		
	10:35-12:05	3-a2-P	"Low Voltage Circuit Breakers (O-2, D)"	3-a2-Q	"Driving Mechanism of Circuit Breakers (F)"					
	12:30-12:35									Group photo
	12:45-17:45	Conference Tour (Izum o-taisha, Shimane Museum of Ancient Izum o) Bus departure time: 12:45								
	18:00-20:00	Representation of Iwami Kagura and Banquet (Vogel Park)								
Oct. 24 (Thu)	08:45-18:00	Post-conference Tour								



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