

The 12th IET International Conference on **AC and DC Power Transmission**



Day 1 Morning, Saturday, 28 May 2016

Plenary Session (ALL DELEGATES) Zhonghua Hall 2

- 08:30 --- 09:20 **Registration**
- 09:20 --- 09:40 **Chair's welcome and introduction**
Professor Rong ZENG, Tsinghua University, China
- 09:40 --- 10:00 **IET representative welcome speech**
Mr. Ian MERCER, IET head of international operations & China country manager
- 10:00 --- 10:30 **Keynote Speech**
Dr. Jinliang HE, Tsinghua University, Chin. Technical Committee chair of ACDC 2016
[Deeply Controlling Overvoltage of UHV AC System by Advanced Surge Arresters of Low-Residual-Voltage](#)
- 10:30 --- 11:00 **Keynote Speech**
Dr. Ziming SONG, Chief specialist for HVDC at Toshiba international (Europe) Ltd
[The Power of VSC Technology for a Future Low Carbon Grid](#)
- 11:00 --- 11:30 **Poster Session and Refreshments**
Photo shooting for all speakers, chairs, VIP guests (In front of backdrop)
- 11:30 --- 12:00 **Keynote Speech**
Dr. Andrew KUSIAK, Professor and chair of the department of mechanical and industrial engineering at the University of Iowa, USA
[Big Data in Renewable Energy Generation and Control](#)
- 12:00 --- 12:30 **Keynote speech**
Hong RAO, Director of State Key Laboratory of HVDC, President of the Electric Power Research Institute of China Southern Power Grid Co., Ltd. China
[VSC-HVDC application in CSG](#)
- 12:30 --- 13:00 **Keynote speech**
Dr. Ahmed ZOBAA, Senior lecturer and MSc course director at Brunel University, UK
[Worldwide renewable energy outlook and the impact of power electronics](#)
- 13:00 --- 14:00 **Poster Session and Lunch**

Day 1 Afternoon, Saturday, 28 May 2016

Session A1 & A1 continue: Recent important projects Zhonghua Hall 2

Session Chair: TBC

14:00 --- 14:30 *Session Chair Speech: tbc*

14:30 --- 14:45 **A1.1 (0007)**
Influence of Aging Characteristics of Conductor Surface on Resultant Electric Field of $\pm 800\text{kV}$ UHVDC Transmission Lines

Y Yi, C Y Zhang, Z Y Chen, L M Wang

14:45 --- 15:00 **A1.2 (0017)**
Feasibility Research of Lightning Rods Installed on the Frames of Main Transformers in 1000kV UHV Substation

Liuchun Zhang, Yu Yin, Dong Ge, Shuchun Du

15:00 --- 15:15 **A1.3 (0018)**
Harmonics Analysis and Simulation of NLM in MMC

Ye Wang, Zhechen Huang, Yubo Yuan, Lei Gao, Peng Li

15:15 --- 15:30 **A1.4 (0042)**
Cost Analysis and Comparison of HVAC, LFAC and HVDC for Offshore Wind Power Connection

X Xiang, M M C Merlin, T C Green

15:30 --- 15:45 **A1.5 (0064)**
Coordinated Power Control Strategy for the Multi-Terminal VSC-HVDC System
WEI YUE, XIAOYONG LIU, SHICHAO ZHANG, TAO CHEN, SONGGUANG ZHANG

15:45 --- 16:15 **Poster Session and Refreshments**

16:15 --- 16:30 **A1.6 (0066)**
DC Resonance Suppression Method of Hybrid HVDC Transmission System
GUOQIANG WANG, HAIQING WENG, RONG YI, LEI JIN, YU LUO, TING HOU

16:30 --- 16:45 **A1.7 (0073)**
Secondary Arc Characteristics and Single-phase Autoreclosure Scheme of UHV Transmission Line with Hybrid Reactive Compensation

Bin Li, Qingquan Li, Hongshun Liu, Tingting Lv, Runchang Li, Songyan Li

16:45 --- 17:00 **A1.8 (0093)**
A Real-time Simulator capable of studying dynamic insulation coordinate in a MMC-HVDC system

W Wang, W Li, C Dufour, J Bélanger

18:00 --- 20:00 **Evening Drink Reception**

Session B1 & B1 continue: Future innovation and international projects Zhejiang Hall

Session Chair: TBC

14:00 --- 14:30 *Session Chair Speech: TBC*

- 14:30 --- 14:45 **B1.1 (0006)**
An Optimal Reactive Power Control for Isolated Modular DC/DC Converter System
 Yi Zhang, Binbin Li, Shaolei Shi, Dianguo Xu
- 14:45 --- 15:00 **B1.2 (0023)**
A New Pilot Distance Protection Scheme for Teed Lines
 T Zheng, Y T Zhao, J Li, X H Wei, Y P Wang, C Chen, Z P Wang
- 15:00 --- 15:15 **B1.3 (0041)**
Optimization of Reactive Power and Voltage for Hybrid AC / VSC-HVDC System
 Chenzhi Wei, Min Mou, An Wen, Weifang Huang, Xin Jin, Huan Ye, K. Liu, Y. F. Zhang
- 15:15 --- 15:30 **B1.4 (0056)**
Mitigation on requirement of DCCB by DC reactor for multi-terminal HVDC operation
 K Tahata, R Uda, K Kuroda, K Kikuchi, R Yamamoto, H Ito, F Page, G P Adam, L Xu, S J Finney, B W Williams, D Holliday
- 15:30 --- 15:45 **B1.5 (0082)**
Microwave reflection method for composite insulator internal defect detection
 Hongwei Mei, Jie Chen, Xiangyun Fu, Liming Wang, Zhicheng Guan
- 15:45 --- 16:15 **Poster Session and Refreshments**
- 16:15 --- 16:30 **B1.6 (0117)**
The effect of different filters connected to DC-DC converters in Multi-Terminal HVDC system for offshore wind farms
 XIAOYUN RONG, Ewen Macpherson
- 16:30 --- 16:45 **B1.7 (0137)**
Reactive Power Control in MMC HVDC System during ac Fault
 Xiuyu Chen, Garth Irwin, Dennis Woodford, Aniruddha Gole
- 16:45 --- 17:00 **B1.8 (0141)**
Supplementary damping control of VSC-HVDC for interarea oscillation using goal representation heuristic dynamic programming
 Y Shen, W B Chen, W Yao, S W Liao, J Y Wen
- 17:00 --- 17:15 **B1.9 (0131)**
Ultra-fast Electromagnetic Transient Model of the Modular Multilevel Converter for HVDC Studies
 Xu Jianzhong, Ding Hui, Fan Shengtao, Aniruddha M. Gole, Zhao Chengyong, Xiong Yan
- 17:15 --- 17:30 **B1.10 (0004)**
Insulation coordination optimization study for $\pm 660\text{kV}$ EHVDC project with increased transmission capacity
 L C Zhang, C X Zhang, Y Y

18:00 --- 20:00 Evening Drink Reception

Session C1 & C1 continue: Real implications and applications
Jiangsu Hall

Session Chair: tbc

14:00 --- 14:30 *Session Chair Speech: tbc*

14:30 --- 14:45 **C1.1 (0012)**
The AC Side Fault Characteristics and Protection Scheme of the Unified Power Flow Controller Based on MMC

T Zheng, D Wu, K T Wang, H T Zeng, H H Qi

14:45 --- 15:00 **C1.2 (0014)**
The Effects of the Current Transformer Saturation on Mal-operation Under the DC Magnetic Bias Caused by HVDC

G Y Lu, T Huang, F F Zhang, T Zheng, L G Liu

15:00 --- 15:15 **C1.3 (0020)**
Interlayer Affect on Re-coating of External Insulation Anti-pollution Paints in HVAC/HVDC

Longji Li, Qinghua Tang, Minglei Wu, Xilin Wang, Zhidong Jia

15:15 --- 15:30 **C1.4 (0025)**
Analysis of an DC Trip Accident Based on a deductive and inductive method in Nan'ao VSC-MTDC Project

Daoqing Fan, Songguang Zhang, Shuguang Guo, Xiaoyi Su

15:30 --- 15:45 **C1.5 (0039)**
Economic Viability of Price Arbitrage Operation of Vanadium Redox Battery in Alberta's Energy market

Abiola Adebayo, Payam Zamani-Dehkordi, Hamidreza Zareipour, Andy Knight

15:45 --- 16:15 **Poster Session and Refreshments**

16:15 --- 16:30 **C1.6 (0052)**
Impact of Surface Conditions on Corona-generated Audible Noise for Long-term Operating Conductors in UHVDC Transmission Lines

Y Yi, C Y Zhang, Z Y Chen, L M Wang

16:30 --- 16:45 **C1.7 (0069)**
Active Power and Ac Voltage Slope Control for VSC Connected to Ac System with Low SCR

Chengyong Zhao, Bin Yuan, Jianzhong Xu

16:45 --- 17:00 **C1.8 (0075)**
The Research of Difference Frequency Disturbance in Parallel Switching Power Supply System

N Yin, L M Li, Y Q Pei, D W Hu

17:00 --- 17:15 **C1.9 (0081)**
IGBT technology for future high-power VSC-HVDC applications

Heng Wang, Kwok-Wai Ma

17:15 --- 17:30 **C1.10 (0090)**
Study on Reverse Recovery Characteristics of Thyristors Used in HVDC Converter Valve

W F Li, D Z Kong, K Yue, S B Li, Q G Zhang, X D Liu, L Pang, W Sun, J Peng, K Wang, X Y Tan

18:00 --- 20:00 Evening Drink Reception

Day 2 Morning, Sunday, 29 May 2016

08:30 --- 09:30 **Registration**

Session A2 & A2 continue: Recent important projects Zhonghua Hall 2

Session Chair: tbc

09:30 --- 10:00 *Session chair Speech: tbc*

10:00 --- 10:15 **A2.1 (0094)**

HV SubModule Technology based on Press Pack IGBT for Largest Scale VSC-HVDC Application

Paolo Bordignon, HAITAO ZHANG, WEI SHI, Nicola Serbia, Alessandro Premoli, Alberto Coffetti

10:15 --- 10:30 **A2.2 (0096)**

STATCOM control scheme for solving problems of Power and T&D systems

Kenji Masaki, Koji Temma, Masashi Kitayama

10:30 --- 10:45

A2.3 (0110)

Research on Optimization of Valve Hall Grounding Switches Configuration in ± 1100 kV Converter Station

Wenxia Sima, Xue Han, Ming Yang, Licheng Li, Rong Wang

10:45 --- 11:00

A2.4 (0113)

Stability of a modular multilevel converter based HVDC system considering dc side connections

Tan Li, Ani Gole, Chengyong Zhao

11:00 --- 11:30

Poster Session and Refreshments

11:30 --- 11:45

A2.5 (0140)

Research on flexible graphite-cooper composited electrical grounding material

R H Gong, J J Ruan, Y C Hu, Y C Wu, S Jin

11:45 --- 12:00

A2.6 (0144)

A calculation method for maximum steady-state loss of VSC-HVDC grounding resistor in Luxi back-back HVDC interconnector

W H Huang, Y X Lu, X L Li, Y Huang, S K Xu, M Li, T Liu

12:00 --- 12:15

A2.7 (0157)

A fault redundancy strategy between bridge arms of the modularized APF

Yifan Wang, QING yang, Hongyan Zhan, Jinlong Gong, Qunwei Xu

12:15 --- 12:30

A2.8 (0161)

Positive- and negative-sequence control strategy of grid-connected PV systems under balanced and unbalanced voltage sags

C J Gu, H S Wei, K Jia, T S Bi, B H Liu

12:30 --- 12:45

A2.9 (0211)

Protection Method and Coordination with DC Circuit Breaker in DC Distribution Power Grid

Z Q Yu, T Zhu, R Zeng, G Lyu, Z Y Chen, X Y Zhang

12:45 --- 14:30

Poster Session and Lunch

Session Chair: tbc

14:30 --- 15:00 *Session Chair Speech: tbc*

15:00 --- 15:15	A2.10 (0212) Simulation on Transient Characteristics of Medium Voltage DC Distribution System Q Zhan, R Zeng, G Lyu, Z Y Chen, X Y Zhang
15:15 --- 15:30	A2.11 (0223) System Stability Analysis of Xiamen Bipolar MMC-HVDC Project H Ding, Y K Wu, Y Zhang, Y L Ma, R Kuffel
15:30 --- 15:45	A2.12 (0224) Data analysis of electromagnetic environment of UHVDC transmission lines Z Q Yu, Y Fu, R Zeng, F Tian, M Li, L Liu, R H Li, Z Y Gao
15:45 --- 16:00	Poster Session and Refreshment
16:00 --- 16:15	A2.13 (0229) Synchronization of PCP and VBC for Xiamen Bipole MMC HVDC Project Y K Wu, H Ding, Y Zhang, Y L Ma, R Kuffel
16:15 --- 16:30	A2.14 (0230) Amelioration of the Ionized Field Distribution near the Field Mill under the HVDC Conductor Zhilong Zou, Xiang Cui, Tiebing Lu
16:30 --- 16:45	A2.15 (0231) Impact of Aerosols on the Ionized Field of Positive HVDC Conductor in a Cylindrical Cage Y J Zhu, Y Ju, T B Lu, X M Bian, Z L Zou, X Zhang
16:45 --- 17:00	Poster Session and Refreshments End of Conference Day 2

Session B2 & B2 continue: Future innovation and international projects
Zhejiang Hall

Session Chair: tbc

09:30 --- 10:00	<i>Session Chair Speech: tbc</i>
10:00 --- 10:15	B2.1(0118) Control of two LCC-HVDC Interconnected through DC-DC Autotransformer Shuangyang Lu, Weixing Lin, Wei Yao, Jinyu Wen
10:15 --- 10:30	B2.2 (0122) Extended Topologies and Technologies of DC-DC Autotransformer Weixing Lin, Wei Yao, Jinyu Wen, Ashok Nampally
10:30 --- 10:45	B2.3 (0156) Reliability Evaluation and Comparison for Different Topologies of VSC-HVDC Distribution Networks Using Analytical and Simulation Methods An Wen, Min Mou, Chenzhi Wei, Hua Yang, Shuairong Deng, Weifang Zhao, K. Liu
10:45 --- 11:00	B2.4 (0177) Analysis and Control of Hybrid Modular Multilevel Converter with Scheduled DC Voltage Reducing in HVDC Systems Kecheng Xu, Jiabing Hu
11:00 --- 11:30	Poster Session and Refreshments
11:30 --- 11:45	B2.5 (0179) On Hybrid Modular Multilevel Converters with Active DC Fault Ride-Through Capability Maozeng Lu, Jiabing Hu, Muchao Xiang

- 11:45 --- 12:00 **B2.6 (0181)**
Improved Autonomous Converter Control for Multi-Terminal HVDC Networks Considering Line Impedance Effect in Long-Distance Interconnections
Wanning Zheng, Jiabing Hu, Meiqing Zhang, Miao Miao
- 12:00 --- 12:15 **B2.7 (0188)**
A VSC-HVDC based flexible controller for improving the performance of looped electromagnetic networks in Guangzhou power grid.
Y Liu, X Yu, K Wang, X Xie, W Xiong, H Shang
- 12:15 --- 12:30 **B2.8 (0199)**
PWM plus Phase-Shift Controlled DC-DC Converter for Use in Series-Connected DC Wind Farm
Changjiang Sun, Gang Shi, Jianwen Zhang, Xu Cai
- 12:30 --- 12:45 **B2.9 (0204)**
All-DC Offshore Wind Farm with Parallel Connection-An Overview
Gang Shi, Xu Cai, Changjiang Sun, Yiran Chang, Renxin Yang
- 12:45 --- 13:00 **B2.10 (0207)**
Research on DC Electric Field measurement considering ion flow near HVDC transmission line
Zhanqing Yu, Kaitian Huang, Rong Zeng, Zhiye Gao, Min Li, Lei Liu, Bin Lou, Qing Ma, Zheyao Wang, Bo Zhang, Jinliang He
- 13:00 --- 13:15 **B2.11 (0234)**
Hierarchical Control and Experimental Verification of a Novel DC Substation
Jianjun MA, Miao ZHU, Liangzhong YAO, Jianwen ZHANG, Xu CAI
- 13:15 --- 14:30 **Poster Session and Lunch**

Invited Session

Session Chair:

Prof. Qixin Chen, Associate Professor at Department of Electrical Engineering, Tsinghua University

- 14:30 --- 15:00 **Session Chair 's introduction**
Prof. Qixin Chen
- 15:00 --- 15:20 **Topic: Storage in the electricity market**
Speaker: Prof. Richard Green
- 15:20 --- 15:40 **Topic: Optimal storage investment and management under uncertainty – it is costly to avoid outages**
Speaker: Dr. Joachim Geske
- 15:40 --- 16:00 **Poster Session and Refreshments**
- 16:00 --- 16:20 **Topic: Operation and Economics for Storage in Electricity Markets**
Speaker: Prof. Qixin Chen
- 16:20 --- 16:40 **Topic: Value of energy storage with multiple service provision**
Speaker: Dr. Fei Teng
- 16:40 --- 17:00 **Poster session**
End of Conference Day 2

Session C1 & C1 continue: Real implications and applications
Jiangsu Hall

Session Chair: tbc

09:30 --- 10:00 *Session Chair Speech: tbc*

10:00 --- 10:15 **C2.1 (0109)**
Grid Power Flow Impact on the On-state Losses of the Modular Multilevel Converter

Abel António-Ferreira, Oriol Gomis-Bellmunt, Miquel Teixidó

10:15 --- 10:30 **C2.2 (0120)**
24-pulse rectifier for harmonic management in HVDC diode rectifier-connected wind power plants

Salvador Añó-Villalba, Soledad Bernal-Perez, Ruben Pena, Ricardo Vidal-Albalade, Enrique Belenguer, Nestor Aparicio, Ramon Blasco-Gimenez

10:30 --- 10:45 **C2.3 (0132)**
Fast, Simple, and Accurate Fundamental Frequency Estimation

Peerawat Yutthagowith, Anantawat Kunakorn

10:45 --- 11:00 **C2.4 (0133)**
Effective Circuit Parameter Determination in Lightning Impulse Voltage Tests of Air Core Inductors

Peerawat Yutthagowith, Piyapon Tuethong, Norasage Pattanadech

11:00 --- 11:30 **Poster Session and Refreshments**

11:30 --- 11:45 **C2.5 (0173)**
Fault Line Detection Based on Optimized Cascaded Bistable System for Distribution Network

Jie Gao, Xiaowei Wang, Qiming Cheng, Xiangxiang Wei, Dechang Yang

11:45 --- 12:00 **C2.6 (0182)**
Commutation Failure Analysis Considering Direct Current Dynamics in LCC-HVDC Systems

Jun Lu, Jiabing Hu, Meiqing Zhang, Miao Miao

12:00 --- 12:15 **C2.7 (0200)**
Nonlinear Load Characteristics of HVDC Converters

Yi Zhang, A. M. Gole

12:15 --- 12:30 **C2.8 (0203)**
The study on sympathetic inrush current of converter transformers in HVDC system and its identification method

Kanjun Zhang, Xuanwei Qi, Shiyun Zhang, Wenbin Cao, Fan Yang, Xianggen Yin

12:30 --- 12:45 **C2.9 (0205)**
The study on CT saturation caused by the circulating current in the delta-winding of converter transformer and its impact on the protection in HVDC system

Kanjun Zhang, Xuanwei Qi, Xianggen Yin, Kun Chen, Wei Hu, Shiyun Zhang

12:45 --- 13:00 **C2.10 (0214)**
Dielectric Diagnosis of 24kV XLPE Cable Using Polarization and Depolarization Current, Conventional Partial Discharge Measurements and High Frequency Current Measurement

P Nimsanong, N Pattanadech, P Yutthagowith

13:00 --- 13:15

C2.11 (0221)

Low frequency resonance analysis of 1100kV HVDC system.

Yunchao WANG, Zhanqing YU, Jun HU, Jinliang HE, Shuiming CHEN

13:15 --- 14:30

Poster Session and Lunch

End of Conference Day 2