欢迎辞

各位同仁、朋友:

“国际新能源发电与电能质量技术论坛”是由安徽大学、教育部电能质量工程研究中心、高节能电机及控制技术国家地方联合工程实验室、工业节电与电能质量控制安徽省级协同创新中心共同主办，上海合凯电力保护设备有限公司、阳光电源股份有限公司、国网安徽省电力公司电科院协办。

作为本次论坛的承办方，我诚挚地欢迎您出席国际新能源发电与电能质量技术论坛。

论坛邀请了来自美国田纳西大学、美国西佛罗里达大学、加拿大新布伦瑞克大学、澳大利亚皇家墨尔本理工大学、新加坡南洋理工大学、中国电力科学院、上海交通大学、西安交通大学、南京航空航天大学、山东大学、华北电力大学、合肥工业大学和安徽大学等国内外大学从事本领域研究的教授和行业专家做有关专题报告，报告的主题将涉及现代智能电网、电力电子技术在可再生能源中的应用、并网技术、新能源汽车等。我们期望通过本次论坛给来自于新能源发电、电能质量等领域的专家学者提供一个良好的交流互动平台。

安徽大学是国家“211 工程”及安徽省与教育部共建高校，拥有教育部工程研究中心、国家地方联合工程实验室以及省级协同创新中心等创新平台，长期以来在新能源发电及电能质量领域开展了诸多研究工作，承担和完成了一批国家科技支撑计划课题、国家重大仪器专项、国网公司重点科研课题、国家基金项目和企业委托技术攻关课题，并获多项省部级以上科技奖励，为国家和区域经济社会建设与发展做出了自己的贡献。我们将与国内外同行一起，在该领域继续推进科技创新，深化产学研合作，打造工业节电与电能质量控制领域的创新高地。

预祝本次论坛取得圆满成功！希望各位嘉宾在合肥期间身体健康、生活愉快，度过一段美好时光！

王群京 教授

安徽大学副校长

国际新能源发电与电能质量技术论坛大会主席

Welcoming Speech

Ladies and gentlemen,

International Technology Forum on New Energy Power Generation and Power Quality is hosted by Anhui University, Power Quality Engineering Research Center，Ministry of Education，PRC, National and Local Joint Engineering Laboratory of Energy-saving Motor & Control Technique, Anhui Provincial Collaborative Innovative Center of Industrial Energy-saving and Power Quality Control. It's sponsored by Shanghai Hekai Power Protection Equipment Co., Ltd，Sungrow Power Supply Co., Ltd，SGCC Electric Power Research Institute of Anhui Province.

As one of the hosts, we welcome you to this Forum. Our honored guests include professors and scholars from University of Tennessee-Knoxville in U.S.A, University of West Florida in U.S.A, New Brunswick University in Canada, RMIT University in Australia, Nanyang Technological University in Singapore, China Electric Power Research Institute, Shanghai Jiao Tong University, Xi'an Jiao Tong University, Nanjing University of Aeronautics and Astronautics, Shandong University, North China Electric Power University, Hefei University of Technology and Anhui University. At this forum presentations will cover the following fields, modern intelligent grid system, power electronics applications in renewable energy, on-grid techniques, new-energy driven automobiles and so on. We hope this forum may provide a communication platform for those who specialize in new energy power and power quality.

Anhui University is supported by National 211Project, Anhui Province and Chinese Education Ministry. We have innovative platforms like Education Ministry Engineering Research Centre, State-City Joint Engineering Lab, Collaborative Innovative Center of Industrial Energy-saving and Power Quality Control in Anhui Province. We have been working on research into new energy power and power quality, undertaking and accomplishing a large number of national technological programs, key programs supported by State Grid Corporation and enterprise-commissioned programs. With the award-winning programs we take pride in our contribution to the national and regional economic development and social construction. We will work side by side with our colleagues home and abroad. We will work together to promote the technological innovation in our research into the industrial energy-saving and power quality and spare no effort to promote the cooperation between research and production.

We wish a fruitful and successful forum! We wish everyone a pleasant time and a nice memory here in Hefei!

Thank you!

Prof. Wang Qunjing
Vice President of Anhui University
Chair of the International Technology Forum

基本信息

会址

安徽省合肥市安徽大学国际学术交流中心（磬苑宾馆）4 楼多功能厅。

地址：合肥市经济技术开发区九龙路 111 号。

参会报到及信息咨询台

10 月 24 日 9:00-21:00 在安徽大学国际学术交流中心（磬苑宾馆）入口大厅有专门报到及信息咨询台，负责参会代表报到及信息咨询等工作。

住宿

邀请专家：

统一安排在国际学术交流中心（磬苑宾馆）。

其他参会人员住宿标准：

普通标间（双人）：208 元/天；

普通单间：228 元/天；

豪华套房：428 元/天或 598 元/天；

交通

火车站乘坐出租车，车程约 40 分钟，40 元左右。

机场乘坐出租车，车程约 60 分钟，100 元左右。

联系方式

会务组

网站：http://www3.ahu.edu.cn/jdcx/

Email：hcg@ahu.edu.cn

联系人：胡存刚 博士

电话：+86 551 63861633

手机：15855115115　　18919663757

宾馆

联系人：朱经理

手机：13637095644

固话：0551-63861690/63861888

会议期间其他活动

早餐

请在磬苑宾馆辅楼二楼自助餐厅凭就餐券或房卡用餐；

早餐时间：7:00~8:30。

午餐、晚餐

10 月 24 日-26 日午餐请在磬苑宾馆辅楼二楼凭就餐

券用餐；

10 月 24 日晚餐（VIP 专家除外）请在磬苑宾馆辅楼二楼凭就餐券用餐；

午餐时间：12:00~13:00；晚餐时间：6:00~7:00；

VIP 晚宴

10 月 24 日晚，VIP 专家请在磬苑宾馆就餐；

招待晚宴

10 月 25 日晚 6:30，全体参会代表请在磬苑宾馆辅楼二楼就餐；

参观及旅游

1、 实验室参观

①理工楼 A226　新能源发电研发中心

②理工楼 B 楼　地下一楼 电动汽车传动实验室

③理工楼 B111　展示室

④理工楼 B120　光伏发电与电力电子研究室

⑤理工楼 B130　变频调速控制研究室

2、周边旅游介绍

①黄山三日游 550 元/人；

②黄山西递宏村三日游 760 元/人；

③九华山二日游 400 元/人；

④天柱山一日游 98 元/人；

⑤天柱山二日游 418 元/人。

联系人：崔玲

手机：15056959590

Basic Information

Location

Anhui University International Academic Centre (Qingyuan Hotel) Multifunctional Hall

Address

111Jiulong Road, Hefei, Anhui Province

Reception Centre

9:00 - 21:00, 24th, Oct.

Entrance Hall of the Anhui University International Academic Centre (Qingyuan Hotel)

Accommodation

Honored Guests: Qingyuan Hotel

Others: the general standard for twin beds: ￥208/per day
the general standard for single bed: ￥228/per day
deluxe suite: ￥428 or ￥598/per day

Transportation

Taxi from the railway station, 40-mins drive, about 40 yuan

Taxi from the airport, 60-mins drive, about 100 yuan

Please contact

http://www3.ahu.edu.cn/jdcx/

Email：hcg@ahu.edu.cn

Dr.Hu Cungang

Phone +86 551 63861633

Mobile phone: 15855115115 18919663757

Hotel Manager

Manager Zhu

Phone:0551-63861690/63861888

Mobile phone: 13637095644

Other Activities

Breakfast: 7:00-8:00 am

the cafeteria on the 2nd floor in Qingyuan Hotel Fulou, by luncheon voucher or room card

Lunch (12:00-13:00) (24th, Oct. -26th, Oct.) the restaurant on the 2nd floor in Qingyuan Hotel Fulou, by luncheon voucher

Dinner (18:00-19:00) (24th, Oct. -26th, Oct.) the restaurant on the 2nd floor in Qingyuan Hotel Fulou, by voucher

VIP guests have their dinner Qingyuan Hotel on 24th, Oct.

All the guests have dinner at 18:30 on the 2nd floor in Qingyuan Hotel Fulou, 25th, Oct.

Visits and tourism

1. Visiting the labs

①┌ Science and Technology Building, A226, New Energy Generation R & D Center

② Science and Technology Building, Basement-1, Electric Vehicle Drive Laboratory

③ Science and Technology Building, B111, Exhibition Room

④ Science and Technology Building, B120, Research Laboratory of Photovoltaic Generation and Power Electronics

⑤ Science and Technology Building, B130, Research Laboratory of Variable Frequency Speed Control

2. nearby place of interest

① 3-day tour in Huangshan Mountain ￥550/ each person

② 3-day tour in Huangshan Mountain, xidi and hongcun ￥760/each person

③ 2-day tour in Jiuhuashan Mountain ￥400/each person

④ 1-day tour in Tanzhushan, Mountain ￥98/each person

⑤ 2-day tour in Tanzhushan, Mountain ￥418/each person

Please contact: Cuilin mobile phone 15056959590

会议日程安排

星期五，10 月 24 日 9:00-21:00	
嘉宾签到	
第一天,星期六，10 月 25 日，上午	
08:30-08:45	大会主办方致辞
会场主席：张榴晨 教授，加拿大新不伦瑞克大学；朱淼 教授，上海交通大学	
08:45-09:25	环境、可再生能源以及电力电子技术的重要性，Bimal K. Bose 博士，美国田纳西大学教授，IEEE Fellow
09:25-10:05	智能电网下用于可再生能源集成的直接负载控制，张榴晨 博士，加拿大新不伦瑞克大学教授，加拿大工程院院士
10:05-10:20	中场休息（茶歇）
10:20-10:45	智能电网用电力电子器件的发展与展望，温家良 博士，国网智能电网研究院电工新材料及微电子研究所副所长，教授级高级工程师
10:45-11:10	先进阻抗型 Z 源功率变换器理论的新发展,朱淼 博士,上海交通大学电气工程系，研究员/博士生导师，国家能源智能电网（上海）研发中心副主任，“青年千人计划”入选者
11:10-11:35	一种基于相量测量辨识的现代配电网故障建模方法，李令冬 教授，教育部电能质量工程研究中心顾问，中国电力行业电能质量与柔性输电标准化技术委员会顾问
11:35-12:00	母线电压快速恢复技术，李俭华 高级工程师，上海合凯电力保护设备有限公司，技术研发总工
12:00-13:00	午餐
第一天,星期六，10 月 25 日，下午	
会场主席：罗方林 教授，安徽大学/南洋理工大学；张兴 教授，合肥工业大学	
14:00-14:40	电力电子技术在可再生能源中的应用，Muhammad H. Rashid 博士，西佛罗里达大学教授，IET Fellow，IEEE Fellow
14:40-15:20	基于 ARM 32 位微处理器的电能质量检测，蒋全 博士，新加坡数据存储研究院，高级科学家
15:20-15:35	中场休息(茶歇)
15:35-16:00	并网逆变器改进 LCL 滤波器研究，张兴 博士，合肥工业大学电气与自动化工程学院副院长，教授/博士生导师

16:00-16:25	推进宽禁带半导体材料的应用——挑战和机遇,杨旭 博士,西安交通大学电气工程学院,教授/博士生导师
16:25-16:50	安徽电网电能质量问题研究与分析，徐斌，国网安徽省电力公司电力科学研究院，电网技术中心系统技术室副主任，高级工程师
16:50-17:50	参观实验室
18:00-19:00	晚宴
第二天,星期日，10 月 26 日，上午	
会场主席：余星火 教授,澳大利亚皇家墨尔本理工大学;张承慧 教授，山东大学	
08:30-09:10	智能电网中若干多重复杂网络理论及应用问题，余星火 博士，澳大利亚皇家墨尔本理工大学终身教授及工业技术研究院院长，IEEE Fellow，教授/博士生导师
09:10-09:35	电动汽车动力电池状态估计与均衡控制，张承慧 博士，山东大学控制科学与工程学院，教授/博士生导师
09:35-10:00	新型双凸极无刷直流发电机技术，张卓然 博士，南京航空航天大学自动化学院电气工程系，教授/博士生导师
10:00-10:15	中场休息（茶歇）
10:15-10:40	含分布式光伏与电动汽车的微电网能量管理方法，刘念 博士，华北电力大学电气与电子工程学院，副教授
10:40-11:05	光伏逆变器发展及其对电能质量的影响，赵为博士，阳光电源股份有限公司副总裁，光伏产品线总监
11:05-11:30	光伏发电接入配电网电能质量解决方案，齐东流，天沃电气技术有限公司总工程师
11:30-11:50	论坛闭幕式
12:00-13:00	午餐

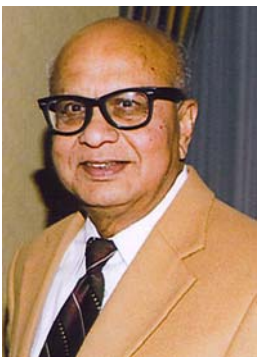
Forum Schedule	
9:00-21:00, Oct. 24, Friday	
Conference Registration	
1st Day, A.M., Oct. 25, Saturday	
08:30-08:45	Welcoming Speech
Chair: Prof. Liuchen Chang, University of New Brunswick Professor, and Prof. Miao Zhu, Shanghai Jiao Tong University	
08:45-09:25	Environment, Renewable Energy And Importance of Power Electronics
	Dr. Bimal K. Bose, University of Tennessee Condra Chair Professor/Emeritus in Power Electronics, IEEE Fellow
09:25-10:05	Direct Load Control for Renewable Energy Integration under Smart Grid Environment,
	Dr. Liuchen Chang, University of New Brunswick Professor, Canadian Academy of Engineering (FCAE) Fellow
10:05-10:20	Coffee Break
10:20-10:45	Power Electronic Device Applications in Smart Grid: Development and Prospect
	Dr. Jialiang Wen, Vice Director of Novel Electrical Material and Microelectronics of SGCC Smart Grid Research Institute, Senior Engineer
10:45-11:10	New Progress of Advanced Z-Source Power Converters
	Dr. Miao Zhu, Shanghai Jiao Tong University, Research Professor/Doctoral Supervisor, Vice Director of State Energy Smart Grid (Shanghai) R&D Centre(Shanghai), Thousand Youth Talents Plan
11:10-11:35	A Fault Modeling Method for Modern Power Distribution Network based on the Identification of Phasor Measurement
	Prof. Lingdong Li, senior adviser of Power Quality Engineering Research Center，Ministry of Education, PRC, member of the Chinese power industry power quality and flexible transmission Standardization Technical Committee.
11:35-12:00	Rapid Recovery Technology of Bus Voltage
	Jianhua Li, Senior Engineer, Shanghai Hekai Power Protection Equipment Co., Ltd
12:00-13:00	Lunch
1st Day, P.M., Oct. 25, Saturday	
Chair: Prof. Fanglin Luo, Anhui University/Nanyang Technology	

University, and Prof. Xing Zhang, Hefei University of Technology

14:00-14:40	Power Electronics Applications in Renewable Energy
	Dr. Muhammad H. Rashid, University of West Florida, Professor, Fellow IET, Life Fellow IEEE
14:40-15:20	Measurement of Power Supply Voltage Frequency and Total Harmonic Distribution with ARM Based 32 bit MCUs
	Dr. Jiang Quan, Drive and Technology Division, Data Storage Institute, Singapore Senior Scientist
15:20-15:35	Coffee Break
15:35-16:00	Study on the Improved LCL Filters for Grid-Tied Inverter
	Dr. Xing Zhang, Vice Dean of School of Electrical Engineering and Automation, Hefei University of Technology, Professor/Doctoral Supervisor
16:00-16:25	Pushing forward to the applications of Wide Band gap Material devices- challenge and opportunities,
	Dr. Xu Yang, School of Electrical Engineering, Xi'an Jiaotong University, Professor/Doctoral Supervisor
16:25-16:50	Research and Analysis on Power Quality of Anhui Grid
	Bin Xu, Senior Engineer, Deputy Director of System Engineering Office of Grid technology center, Electric Power Research Institute of Anhui Electric Power Corporation, SGCC.
16:50-17:50	Visit to Laboratory
18:00-19:00	Welcome Banquet
2nd Day, A.M. Oct. 26, Sunday	
Chair: Prof. Xinghuo Yu Royal Melbourne Institute of Technology University, and Prof. Chenghui Zhang, Shandong University	
08:30-09:10	Complex Networks in Smart Grids: Present and Future
	Dr. Xinghuo Yu, Tenured Professor of Royal Melbourne Institute of Technology University and Director of RMIT Platform Technologies Research Institute, IEEE Fellow, Professor/Doctoral Supervisor
09:10-09:35	Electric Vehicle Power Battery State Estimation and Equalization Control
	Dr. Chenghui Zhang, School of Control Science and Engineering, Shandong University, Professor/Doctoral Supervisor

09:35-10:00	Novel Technology of Doubly Salient Brushless DC Generator
	Dr. Zhuoran Zhang, Department of Electrical Engineering, Nanjing University of Aeronautics and Astronautics, Professor/Doctoral Supervisor
10:00-10:15	Coffee Break
10:15-10:40	Energy Management Method for Microgrids with Distributed PV and Electric Vehicles
	Dr. Nian Liu, School of Electrical & Electronic Engineering, North China Electric Power University, Associate Professor
10:40-11:05	The Developments of the PV inverter and their impact on the grid
	Dr. Wei Zhao, Vice President and the Director of PV production line in Sungrow Power Supply Co., Ltd.
11:05-11:30	Solution to Power Quality of Distributed photovoltaic power generation accessing to distribution network
	Dongliu Qi, Chief Engineer of Tipworld Electrical Technology Co., Ltd
11:30-11:50	Closing Ceremony
12:00-13:00	Lunch

Expert CV& Report Abstract
专家简介及报告摘要
1. Dr. Bimal K. Bose



Dr. Bimal K. Bose (*Life Fellow, IEEE*) held the Condra Chair of Excellence (Endowed Chair) in Power Electronics at the University of Tennessee, Knoxville since 1987, where he was responsible for teaching and research program in power electronics and motor drives. Concurrently, he was the Distinguished Scientist (1989-2000) and Chief Scientist (1987-1989) of Electric Power Research Institute (EPRI)-Power Electronics Applications Center, Knoxville,TN. Prior to this, he was a Research Engineer in the General Electric Corporate Research and Development (now GE Global Research Center), Schenectady, NY, for 11 years (1976-1987), an Associate Professor of Electrical Engineering, Rensselaer Polytechnic Institute, Troy, NY, for five years (1971-1976), and a faculty member at Bengal Engineering and Science University (now Indian Institute of Engineering Science and Technology) for 11 years (1960-1971). He is specialized in power electronics and motor drives, specially including power converters, PWM techniques, microcomputer/DSP control, electric/hybrid vehicle drives, renewable energy systems, and artificial intelligence (expert system, fuzzy logic and neural network) applications in power electronics and motor drives. He has been power electronics consultant in a large number of industries. He holds a Honorary Professorship in Shanghai University (1991), China University of Mining and Technology (1995), X'ian Mining University (1998) (also Honorary Director of Elec. Engg. Institute) and Huazhong University of Science and Technology (2002). He has authored more than 250 papers and holds 21 U.S. patents. He has authored/edited seven books in power electronics: *Power Electronics and Motor Drives – Advances and Trends* (Academic Press, 2006), *Modern Power Electronics and AC Drives* (Prentice-Hall, 2001), *Power Electronics and AC Drives* (Prentice-Hall, 1986), *Power Electronics and Variable Frequency Drives* (Wiley/IEEE Press, 1997), *Modern Power Electronics* (IEEE Press, 1992), *Microcomputer Control of Power Electronics and Drives* (IEEE Press,

1997), and *Adjustable Speed AC Drive Systems* (IEEE Press, 1981) some of which have been translated into Chinese. He has given tutorials, keynote addresses and invited seminars extensively throughout the world, particularly in IEEE sponsored programs and conferences. He has served as a Distinguished Lecturer of both the IEEE Industry Applications Society and Industrial Electronics Society. Dr. Bose is a recipient of a number of awards, including IEEE Power Electronics Society Newell Award (2005), IEEE Millennium Medal (2000), IEEE Meritorius Achievement Award in Continuing Education (1997), IEEE Lamme Medal (1996), IEEE-IES Eugene Mittelmann Award (for lifetime achievement in power electronics and motor drives) (1994), IEEE Region 3 Outstanding Engineer Award (1994), IEEE-IAS Outstanding Achievement Award (1993), IEEE Life Fellow (1996), Calcutta University Mouat Gold Medal (1970), GE Silver Patent Medal (1986), GE Publication Award (1985), and a number of IEEE prize paper awards. He also received the Distinguished Alumnus Award (2006) and honorary D.Sc. degree (2013) from Bengal Engineering and Science University, India. The IEEE Industrial Electronics Society Magazine published a special issue (June 2009) "*Honoring Dr. Bimal Bose and Celebrating His Contributions in Power Electronics*". (See also http://en.wikipedia.org/wiki/Bimal_Kumar_Bose)

Title: ENVIRONMENT, RENRWABLE ENERGY AND IMPORTANCE OF POWER ELECTRONICS

Dr. Bimal K. Bose, *Life Fellow, IEEE*

Department of Electrical Engineering and Computer Science

The University of Tennessee

Knoxville, TN 37996-2100, USA

E-mail: bbose@utk.edu

Home Page: http://www.eecs.utk.edu/people/fasculty/bbose

Wikipedia: http://en.wikipedia.org/wiki/Bimal_Kumar_Bose

IEEE GHN: http://www.ieeeghn.org/wiki/index.php/Bimal_K._Bose

Abstract: Energy is the life-blood for continuing progress of human civilization. Since the beginning of industrial revolution more than two hundred years ago, the global energy consumption has increased dramatically to cater the need of growing population and to accelerate our living standard. Today, the major portion of world's energy is generated from fossil fuel and nuclear power plants. Fossil and nuclear fuel resources are limited. Burning of fossil fuels causes environmental pollution problems, particularly the global warming or climate change. One significant effect of global warming is the sea level rise due to melting of glaciers and polar ice caps that causes inundation of low-lying areas of earth displacing millions of people. In addition, global warming causes adverse effects on world climate that brings droughts, hurricanes, floods, spread of diseases and extinction of some animal species, besides affecting the marine life by acidity of ocean water. Solving global warming problems remains a serious problem in our society. Note that nuclear energy does not cause environmental pollution like fossil fuels, but it has safety and radioactive waste disposal problems. For these reasons, the whole world is now exploring safe and environmentally clean renewable energy sources. Some of these resources are cheap and abundant in nature. Electric and hybrid vehicles, instead of traditional ICE vehicles, that use clean energy sources also help solving the problem. Widespread conservation of energy with energy-efficient applications is also important to mitigate our environmental problems. The advancement of power electronics technology has brought significant impact on renewable energy

systems, electric and hybrid vehicles, modern smart grid, bulk energy storage and energy efficiency of appliances, besides the usual applications in industrial automation and efficient energy systems.

The presentation will start with a brief review of evolution of industrial civilization and increasing demand of energy due to rising world population and the quest for betterment of our living standard. The environmental pollution, particularly global warming by greenhouse gases due to burning of fossil fuels will be discussed. Some example scenarios as predicted by United Nations will be discussed. Then, the methods of solving or mitigation of the global warming problems will be reviewed. The features of various renewable energy sources, such as wind, photovoltaic, wave, tidal and geothermal will discussed with example applications. Then, with a brief review of bulk energy storage techniques and modern smart or intelligent grid system, the presentation will be concluded with the future scenario.

个人简介：

Dr. Bimal K. Bose（IEEE 终身会员）自 1987 年以来，担任美国田纳西大学电力电子学科“康德拉杰出讲座”教授，承担教学以及电力电子技术和电机驱动的研究工作。同时，他分别于 1987-1989 年和 1989-2000 年担任了田纳西大学电力电子技术研究院（EPRI）电力电子技术应用中心的首席科学家和杰出科学家。在此之前，他于 1976-1987 年在通用电气公司研发部（现通用电气全球研究中心）担任研究工程师；1971-1976 年在伦斯勒理工学院电气工程系担任副教授，1960-1971 年任教于孟加拉工程科技大学（现印度工程科技大学）。他的研究方向为电力电子技术和电机驱动，包括功率变换器，PWM 技术，单片机/DSP 控制，电动/混合动力汽车驱动，可再生能源系统以及人工智能（专家系统，模糊控制和神经网络）在电力电子和电机驱动中的应用。他在很多企业担任电力电子技术顾问，并分别在上海大学（1991）、中国矿业大学（1995）、西安矿业学院（1998，现西安科技大学）和华中科技大学（2002）担任荣誉教授，其中在西安矿业学院同时担任电气工程研究院荣誉院长的职务。他发表论文 250 余篇，发明专利 21 项，并著有《Power Electronics and Motor Drives – Advances and Trends 》（Academic Press, 2006）《Modern Power Electronics and AC Drives》（Prentice-Hall, 2001）《Power Electronics and AC Drives （Prentice-Hall, 1986）《Power Electronics and Variable Frequency Drives》（Wiley/IEEE Press, 1997）《Modern Power Electronics》（IEEE press, 1992）《Microcomputer Control of Power Electronics and Drives》（IEEE Press, 1997）《Adjustable Speed AC Drive Systems》（IEEE Press, 1981），共 7 本专著，其中一些已经被翻译成中文。他广泛地在全球教授课程，开展主题讲座，参加研讨会，特别是对于 IEEE 资助的项目和会议。他同时在 IEEE 工业应用协会和 IEEE 工业电子协会担任杰出演讲家。Dr. Bose 曾获得过很多奖项，其中包括 IEEE 工业电子协会纽厄尔奖（2005）、IEEE 千禧奖章（2000）、IEEE 继续教育成就奖（1997）、IEEE 兰姆奖章（1996）、IEEE 工业电子协会 Eugene Mittelmann 博士成就奖（1994）、IEEE 工业应用协会杰出成就奖（1993）、IEEE 终身会员（1996）、加尔各答大学 Mouat 金质奖章（1970）、通用电气专利银奖（1986）、通用电气著作奖（1985）以及相当数量的 IEEE 论文奖。另外，他还获得了孟加拉工程与科学学院杰出校友奖（2006）和荣誉博士学位（2013）。IEEE 电子工业协会曾刊登一篇特别报道《向 Dr. Bimal Bose 致敬并表彰他为电力电子技术做出的贡献》（2009.6）。

报告题目：环境、可再生能源以及电力电子技术的重要性

摘要：能源是人类文明进步进程中的血液。自 200 多年前工业革命开始以来，全球能源消耗大幅提升，以满足不断增长的人口需要并且提高我们的生活质量。现今，世界能源主要来自于化石燃料和核电厂。然而，化石燃料和核燃料资源是有限的。并且，化石燃料的燃烧还会带来环境污染问题，特别是全球气候变暖问题。全球气候变暖的一个显著影响是海平面上升，冰川和极地冰盖的融化，导致地球低洼地区数以百万计的人淹没。此外，全球气候变暖导致的世界气候带来许多不良影响，例如干旱、飓风、洪水、疾病传播以及一些动物物种的灭绝，除此之外，还会改变海水酸度使海洋生物受到影响。解决全球气候变暖问题仍然是我们社会的一个严重问题。即使核能源不会像化石燃料那样造成环境污染，但是它在安全性和放射性废料的处理上仍有一些问题。出于这些原因，现今全球都在研究既安全又对环境友好的清洁可再生能源，其中一些资源廉价且丰富。用以清洁能源为动力的电动和混合动力汽车代替传统的内燃机汽车也有助于解决环境问题。有利于广泛保护能源的节能设备的应用对减轻环境污染问题也很重要。电力电子技术的进步给可再生能源系统、电动和混合动力汽车、现代智能电网、大容量储能设备、节能装置以及应用于工业自动化和高效能源系统的一般应用设备都带来了显著的影响。

该报告首先简要回顾了工业文明的展以及由世界人口增长和生活质量提高所带来的能源需求，讨论了由化石燃料燃烧所带来的环境污染问题，尤其是由温室气体造成的全球气候变暖问题，以及联合国预测的一些场景事例。然后，报告回顾了一些减轻或解决全球气候变暖问题的方法，结合应用实例，讨论了诸如风能、太阳能、波浪、潮汐能和地热能等可再生能源的特征。最后，报告将对大型储能技术和现代智能电网系统做简要的回顾，并且展望未来的发展前景。

2. Muhammad H. Rashid

Muhammad H. Rashid is employed by the University of West Florida as a *Professor of Electrical and Computer Engineering*. Previously, he was employed by the University of Florida as *Professor and Director* of UF/UWF Joint Program. Rashid received B.Sc. degree in Electrical Engineering from the Bangladesh University of Engineering and Technology, and M.Sc. and Ph.D. degrees from the University of Birmingham in UK. Previously, he worked as Professor of Electrical Engineering and the Chair of the Engineering Department at Indiana University- Purdue University at Fort Wayne. Also, he worked as Visiting Assistant Professor of Electrical Engineering at the University of Connecticut, Associate Professor of Electrical Engineering at Concordia University (Montreal, Canada), Professor of Electrical Engineering at Purdue University Calumet, and Visiting Professor of Electrical Engineering at King Fahd university of Petroleum and Minerals (Saudi Arabia), as a design and development engineer with Brush Electrical Machines Ltd. (England, UK), a Research Engineer with Lucas Group Research Centre (England, UK), a Lecturer and Head of Control Engineering Department at the Higher Institute of Electronics (in Libya & Malta).

Dr. Rashid is actively involved in teaching, researching, and lecturing in electronics, power electronics, and professional ethics. He has published 18 books listed in the US Library of Congress and more than 160 technical papers. His books are adopted as textbooks all over the world. His book, *Power electronics* has translations in Spanish, Portuguese, Indonesian, Korean, Italian, Chinese, Persian, and Indian edition. His book, *Microelectronics* has translations in Spanish in Mexico and in Spain, Italian, and Chinese.

He has received many invitations from foreign governments and agencies to give keynote lectures and consult, by foreign universities to serve as an external examiner for undergraduate, master's and Ph.D. examinations, by funding agencies to review research proposals, and by U.S. and foreign universities to evaluate promotion cases for professorship. Dr. Rashid has worked as a regular employee or consultant in Canada, Korea, United Kingdom, Singapore, Malta, Libya, Malaysia, Saudi Arabia, Pakistan, and Bangladesh. Dr. Rashid has traveled to almost all States in USA and many countries to lecture and present papers (Japan, China, Hong Kong, Indonesia, Taiwan, Malaysia, Thailand, Singapore, India, Pakistan, Turkey, Saudi Arabia, United Arab Emirates, Qatar, Libya, Jordan, Egypt,

Morocco, Malta, Italy, Greece, United Kingdom, Brazil, and Mexico).

He is a *Fellow* of the Institution of Engineering & Technology (IET, UK) and a *Life Fellow* of the Institute of Electrical and Electronics Engineers (IEEE, USA). He was elected as an IEEE Fellow with the citation "*Leadership in power electronics education and contributions to the analysis and design methodologies of solid-state power converters*." Dr. Rashid is the recipient of the *1991 Outstanding Engineer Award* from The Institute of Electrical and Electronics Engineers (IEEE). He received the 2002 IEEE Educational Activity Award (EAB) Meritorious Achievement Award in Continuing Education with the following citation *"for contributions to the design and delivery of continuing education in power electronics and computer-aided-simulation*". He is the recipient of the 2008 IEEE Undergraduate Teaching Award with citation*: For his distinguished leadership and dedication to quality undergraduate electrical engineering education, motivating students and publication of outstanding textbooks*. He is also the recipient of the IEEE 2013 Industry Applications Society *Outstanding Achievement Award*.

Dr. Rashid is an ABET program evaluator for electrical and computer engineering (and also from 1995-2000) and was an engineering evaluator for the Southern Association of Colleges and Schools (SACS, USA). He is also an ABET program evaluator for (general) engineering program. He is the Series Editors of *Power Electronics and Applications*, and *Nanotechnology and Applications* with the CRC Press. He serves as the Editorial Advisor of *Electric Power and Energy* with Elsevier Publishing. He lectures and conducts workshops on Outcome-Based Education (OBE) and its implementations including assessments.

Dr. Rashid is a Distinguished Lecturer for the IEEE Education Society and a Regional Speaker (previously Distinguished Lecture) for the IEEE Industrial Applications Society. He also authored a book on "The Process of Outcome-Based Education Implementation, Assessment and Evaluations".2012 UiTM Press, Malaysia

Title: Power Electronics Applications in Renewable Energy

Prof. Dr. Muhammad H. Rashid
Fellow IET (UK), Life Fellow IEEE (USA)
Department of Electrical and Computer Engineering
University of West Florida
11000 University Parkway
Pensacola, Florida 32514-5754, USA
E-mail: mrashid@uwf.edu

***Abstract*:** Power electronics has developed continuously over the years and are finding increasing applications. There are many power converter circuits some of which have become standard topologies and are available asmodules from the manufacturers. The demand for the development of environmentally clean, reliable and affordable energy technologies has prompted renewed interest in renewable energy systems worldwide. The renewable energy sources are generally converted to dc or ac electric voltages or currents. Many renewable energy technologies today are well developed, reliable, and cost competitive with the conventional fuel generators. The power electronics is finding increasing applications in renewable energy technologies to process efficiently and produce a flexible ac or dc output to match a variable or fixed load demand. This presentation reviews the chronological development of power electronic circuit and explains why power electronics is an integral part of energy storage and renewable energy systems for power conversion, transmission and distribution of electric power.

个人简介：

Muhammad H. Rashid ，教授，任职于美国西弗洛里达大学电气与计算机工程学院。此前，他作为 UF/UWF 联合项目主任教授受聘于西弗洛里达大学。Rashid 在孟加拉工程技术大学获得了电气工程学士学位，并在伯明翰大学获得硕士和博士学位。在此之前，他作为教授任教于电气工程系，并担任印第安大学-普渡大学工程学院院长。同时，他还是加拿大康考迪亚大学电气工程系的客座教授、普渡大学盖莱默分校电气工程系教授以及沙特阿拉伯 King Fahd university of Petroleum and Minerals 电气工程系客座教授。此外，他作为设计研发工程师受聘于英国普氏电机有限公司、作为研究工程师受聘于卢卡斯集团研究中心以及高级电子学会控制工程分会的会长和讲座学者。

Dr. Rashid 一直活跃在电子、电力电子学科的教学、研究和讲学领域中。他出版了 18 部著作，收录于美国国家图书馆，发表了 160 余篇科技论文。他的著作被采用为课本传遍世界。其中，《Power Electronics》已经翻译成西班牙语、葡萄牙语、印度尼西亚语、汉语、意大利语、中文、波斯语和印度语；《Microelectronics》被翻译为西班牙语、墨西哥语和中文。

他已经收到了许多来自外国政府和机构的邀请做主题讲座和顾问，受邀作为国外大学本科、硕士和博士考试的外部考官，为财政机构审查研究计划，为美国和国外大学评价教授职位晋升的案子。Dr. Rashid 曾作为正式员工或顾问任职于加拿大、韩国、英国、新加坡、马耳他、利比亚、马来西亚、沙特阿拉伯、巴基斯坦和孟加拉国。Dr. Rashid 在美国几乎所有的州和许多其他国家开展讲座、发表论文（日本、中国、香港、印尼、台湾、马来西亚、泰国、新加坡、印度、巴基斯坦、土耳其、沙特阿拉伯、阿拉伯联合酋长国、卡塔尔、利比亚、约旦、埃及、摩洛哥、马耳他、意大利、希腊英国、巴西和墨西哥）。

他是英国 IET 会员，美国 IEEE 终身会员，并表彰了其在电力电子技术教育中的领头作用以及对固态功率转换器的分析和设计方法做出的贡献。Dr. Rashid 在 1991 年获得了 IEEE 颁发的杰出工程师奖，2002 年获得了 IEEE 教育活动奖（EAB）和功勋成就奖，表彰了其在电力电子技术和计算机辅助仿真继续教育的设计与推广领域做出的贡献。2008 年，他获得了 IEEE 大学教学奖，表彰其对于他

在优质本科电气工程教育、激励学生以及出版优秀教科书方面所表现出的杰出领导才能和奉献精神。2013 年，他获得了 IEEE 工业应用协会杰出成就奖。

Dr. Rashid 是 ABET 项目中电气与计算机工程的评估师（1995-2005），曾担任美国南部院校协会（SACS, USA）的工程评估师，同时也是 ABET 项目中通用工程项目的评估师。他是《Power Electronics and Applications》《Nanotechnology and Applications》的系列编辑。他担任《Electric Power and Energy》杂志的编辑顾问。他的讲座和开展的成果为基础的教育（OBE）和它的实现，包括评估研讨会。他为成果本为教育及其具体实施开办讲座并组织研讨会。Dr. Rashid 是 IEEE 教育协会的杰出讲座学者，并且是 IEEE 工业应用协会的区域发言人（前杰出讲座学者）。除此之外，他还著有《The Process of Outcome-Based Education - Implementation, Assessment and Evaluations》（2012 年出版）。

报告题目：电力电子技术在可再生能源中的应用

摘要：电力电子技术已经持续发展多年并被越来越多地应用。现在有很多功率转换器电路，其中一些已经成为标准拓扑结构，并被制造成模块。应环境友好型、清洁型、可靠型、节能型能源发展的需要，可再生能源系统在世界受到广泛关注。现今，相较于传统的燃油发电机，已经发展了很多既可靠又廉价的可再生能源技术。可再生能源通常被转换为直流或交流的电压或电流。电力电子技术越来越多地应用在可再生能源技术上，提高处理效率，实现灵活的交流或直流输出来匹配可变的或固定的负载需要。该报告回顾了电力电子电路的发展轨迹，并且通过说明电力转换、传输和分配在能量储存和可再生能源系统中的应用，解释了电力电子技术为什么是能量储存和可再生能源系统中不可或缺的一部分。

3. Xinghuo Yu

Professor **Xinghuo Yu** is the Founding Director of RMIT Platform Technologies Research Institute. His research interests include variable structure and nonlinear control, complex and intelligent systems and industrial applications. He has published over 500 refereed papers in technical journals, books and conference proceedings.

Professor Yu has served as an Associate Editor of IEEE Transactions on Circuits and Systems Part I, IEEE Transactions on Industrial Informatics, IEEE Transactions on Industrial Electronics and several other scholarly journals. He received a number of awards and honours for his achievements, including 2013 Dr.-Ing Eugene Mittelmann Achievement Award of IEEE Industrial Electronics Society and 2012 IEEE Industrial Electronics Magazine Best Paper Award.

Professor Yu is a Fellow of the IEEE, Vice-President for Publications and an IEEE Distinguished Lecturer of IEEE Industrial Electronics Society. He is also a Fellow of Engineers Australia, Institution of Engineering and Technology, Australian Computer Society and Australian Institute of company Directors.

Title: Complex Networks in Smart Grids: Present and Future

Abstract: Smart Grids are electric networks that employ innovative and intelligent monitoring, control, communication, and self-healing technologies to deliver better connections and operations for generators and distributors, flexible choices for consumers, and reliability and security of electricity supply. Smart Grids are complex networks in nature that face many new technological challenges for the future developments. In this talk, we will first give a brief overview of Smart Grids in the context of complex networks, focusing on recent developments and challenges from temporal and spatial perspectives. We will then report some of our recent projects on complex networks approach for typical problems such as network vulnerability analysis, structural controllability and application in smart grid design, and economic energy dispatch in smart grids.

个人简介：

余星火教授，现为澳大利亚皇家墨尔本理工大学终身教授及先进技术研究院院长，东南大学自动化学院博士生导师，教育部“长江学者奖励计划”讲座教授（2009）,千人计划国家特聘专家入选者（2010 年）。现担任 IEEE 工业电子学会副主席。获得多项国际奖励，包括 2013 年 IEEE 工业电子学会 Dr.-Ing. Eugene Mittelmann 成就奖，2012 年 IEEE 工业电子学杂志最佳论文奖。现为 IEEE Fellow,英国工程与技术学会会士,澳大利亚工程师学会会士，澳大利亚公司董事协会会士，澳大利亚计算机学会会士和国际能源基金会会士。

报告题目：智能电网中若干多重复杂网络理论及应用问题

摘要：智能电网通过先进的信息与通讯技术，自动控制及智能系统方法的应用，保证实现可靠、安全、经济、高效电力能源网络系统，使其具有自愈、不同发电机制嵌入、及促进电力市场及资产优化运行。实现智能电网的长远目标，还需要相关理论技术的大力发展。智能电网本身是一个超复杂网络系统。本报告首先介绍一下当前国际上智能电网发展的现状及趋势，然后侧重讨论从多重复杂网络系统角度来看智能电网，介绍目前在该领域的一些相关工作及存在的问题及未来挑战。

4. Liuchen Chang

Liuchen Chang received B.S.E.E. from Northern Jiaotong University in 1982, M.Sc. from China Academy of Railway Sciences in 1984, and Ph.D. from Queen' University in 1991.

He joined the faculty of University of New Brunswick in 1992 and is a professor in Electrical and Computer Engineering. He held the position of NSERC Chair in Environmental Design Engineering for the Atlantic Canada Region during 2001-2007, and was a recipient of CanWEA R.J. Templin Award in 2010 for his contribution in the development of wind energy technologies. He is a fellow of Canadian Academy of Engineering (FCAE), and registered member of Association of Professional Engineers and Geoscientists of the Province of New Brunswick (APEGNB). He chairs the Sustainable Energy Committee and is an executive of the Standards Committee of the IEEE Power Electronics Society He has published over 240 refereed technical papers in journals and conference proceedings.

As a leading researcher, Dr. Chang has focused on research, development, demonstration and deployment of renewable energy and distributed generation systems, including wind, hydraulic, solar and microturbine systems. He has established the Sustainable Power Research Group at the University of New Brunswick, where large-scale, multi-institutional and multi-disciplinary R&D projects have been conducted in close collaboration with industry and government. He initiated NSERC Wind Energy Strategic Network (WESNet) and is the Principal Investigator of this 16-university consortium across Canada. His research projects have been funded by NSERC, Atlantic Innovation Fund, Sustainable Development Technology Canada, Canadian Foundation of Innovation, Clean Energy Fund, New Brunswick Innovation Foundation, NRCan and industry partners. Dr. Chang has commercialized numerous innovative technologies in grid-connected power converters and direct load controls

Title: Direct Load Control for Renewable Energy Integration under Smart Grid Environment

Dr. Liuchen Chang, University of New Brunswick, Fredericton, Canada

Abstract: With increasing penetration of distributed generators and renewable energy systems, power systems need additional resources for integration of wind, solar, and other intermittent renewable energy power generators into the existing electrical grids. In particular, more resources are needed for ancillary services such as reserve, regulation and load following. Traditionally, ancillary services are provided by central generation stations.

A new approach has been investigated and demonstrated inmultiple utilities in Atlantic Canada. Taking advantage of smart grid infrastructures, customer loads with thermal energy storage capacities are utilized in an aggregated manner to "create" new ancillary services for power systems, particularly for integration of wind energy into the grids. Provision of services to power systems will not have negative impact to the normal usage of the customers.

This presentation introduces the fundamentals of the direct load control for renewable energy integration, modeling of typical thermal loads, aggregated load control, function and structure of a virtual power plant, wind forecast toolset, and pilot operation of aggregated direct load control systems under a smart grid environment.

The presentation focuses on details in estimation of customers' water usage and thermal storage capacity from AMI data and models of electrical domestic water heaters, and aggregated direct load control system to provide new resources for power systems.

个人简介：

张榴晨，1982 在北方交通大学获工学学士，1984 在铁道部科学研究院获工学硕士，1991 在加拿大皇后大学获博士学位。1992 起在加拿大新布伦瑞克大学任教，现任电气与计算机工程系教授。他在 2001-2007 曾任加拿大自然科学与工程基金环境设计工程讲席教授，曾获加拿大风能协会的 R.J. Templin 杰出贡献奖。他是加拿大工程院院士，IEEE 电力电子协会可持续能源系统技术委员会主席。他发表了 240 篇杂志和会议论文。他的主要研究方向为电力电子变换技术，可再生能源发电系统，分布式发电与智能电网技术。

报告题目：智能电网下用于可再生能源集成的直接负载控制

摘要：随着越来越多的分布式发电和可再生能源系统的入网，电力系统需要投入更多的资源，用于可再生能源系统的电网集成。电力系统特别需要资源来提供电网的辅助服务，如备份、调节和负载跟踪等等服务项目。电网的辅助服务通常由大型发电站提供。

加拿大大西洋地区的三个省份正在研究和示范一种新型辅助服务方案。利用智能电网的设施，具有热能存储容量的负载可以集中起来，从而为电力系统创造出新的辅助服务资源，用于风力发电的集成。整个过程不会影响用户对负载的正常使用。

张榴晨将阐述用于可再生能源集成的直接负载控制的概念，以电热水器为例介绍负载建模、整合控制、虚拟发电机、风电预测等环节，并将展示整个直接负载控制系统的初步运行结果。

5. JIANG Quan

Since 1985, **Dr. JIANG Quan** has started his career in electrical machines, inclusive of optimum design, finite element method, electromagnet field, power electronics inverter, encoder-based variable frequency control, sensorless FOC control, and computer-aided auto-measurement of sensorless brushless DC motors, synchronous motors, switched reluctance motors, non-contacting characteristics measurement of electrical machines, and nanometer-displacement vibration of hard disk drives. He is excellent at motor optimum designs, analysis of electrical machine electromagnetic field, application and firmware programming of DSP/MCU and FPGA, prototyping of motors and controllers, and developments of motor testers. He has a lot of engineering experiences on motor design, prototyping, control and testing. His developed motor testers and motor controllers have been used by many famous companies in Singapore, China, USA, Japan, South Korea, Thailand and Hong Kong. In 2006, he won Singapore National Technology Award as the 2nd member of the three person team due to their achievements on HDD motor design, control and testing. He was co-author of the book “Handbook of Mechatronics” (One Chapter) in 1993, and the book of “Modern Electric Vehicles: Engineering Philosophy and key Technology” in the book of “1999/2000 Science and Technology at the Frontier in China” in 2000. He also has published more than 100 academic papers. Till now he holds 2 US patents, 1 Japan Patent, 5 Singapore patents and 5 pending patent applications. He is IEEE member and the member of IEEE Magnetics Society Technical Committee and the committee member of IEEE Magnetics Society Singapore Chapter.

Title: Measurement of Power Supply Voltage Frequency and Total Harmonic Distribution with ARM Based 32 bit MCUs

Li Guoli[1] and Jiang Quan[2]
[1] Anhui University and [2]A*Star Data Storage Institute

Abstract: In modern society, more and more electricity is applied and power quality is very important to many equipment and devices. At the same time, more and more power electronic devices are applied from industry facilities to domestic appliances. This intensifies the power quality (PQ) issues. Renewable energy power supplies, such as, solar electrical generating stations and wind turbine generators, often make the power quality even more complex.

Power quality actually means the voltage quality of the power supply, which is usually defined as the stability of the voltage frequency and total harmonic distortion (THD). In this topic, methods to measure the voltage frequency and THD based on low cost ARM Based 32 bit MCU is introduced.

Firstly the voltage frequency of a power grid is not constant as we assume. It dynamically changes although its fluctuation is very small. To measure the voltage frequency precisely is the fundamental task of power quality monitoring because the measured frequency is further used to calculate THD. The simple way is to detect the zero crossing points of the voltages through an analogue comparator with low pass filter and a digital counter to measure the time between each three zero crossing points. However, with an ARM based 32 bit and 8 channel 12 bit MCU, the voltage waveform can be converted to a series of digital values, which contains the information of the zero-crossing points but no exact zero crossing moments. In order to measure the exact moments of the voltage zero crossing points, a linear curve fit method based on the least square estimation is proposed. The method employs the sampling data close to zero value to generate the approximate line. Through solving the line, the exact zero crossing points can be predicted and applied to calculate the frequency.

Secondly THD is a key index of the power quality. Normally, FFT or FT with a period-fixed window is used to calculate THD. However, the fixed period may be not the integer multi-cycles of the voltage when the power supply voltage frequency is not constant. Maybe several cycles plus a partial cycle of the voltage are used to calculate THD. This gets bigger THD than the actual situation even the windows are applied. In order to calculate THD more precisely, the whole multi-cycle FFT is proposed in this topic.

In general, the sampling number during the multi-cycle voltage is not equal to 2^m, where m is an integer. In order to apply FFT, the interpolation is suggested to regenerate the equivalent discrete sampled signals in the number of 2^m during the provided that the voltage is continuous. In other words, the whole-cycle FFT will determine the duration of the signal to be detected according to the voltage frequency and the resolution requirement. Then the sampling rate is defined based to the upper limitation of the spectrum frequency. At last, the sample lines will be selected according to the power value m of 2, which makes 2^m is the closest to the sampling number. In such a way, only the voltage sampling values during the integer multi-cycles of the voltage are applied to calculate THD through FFT or FT. Therefore, an accurate THD can be detected.

Now ARM based 32-bit MCU with 8 channel 12 bits ADCs are quite cheap. This topic also explores the possibilities to apply the low cost but high performance MCU. Infineon XCM4400 will be used as an example to introduce how to build a low cost but high performance power quality

个人简介:

蒋全博士现任新加坡数据存储研究院高级科学家，电机项目负责人。他分别于1983年、1986年和1991年在合肥工业大学和东南大学获得学士、硕士和博士学位。自1985年起他开始从事电机及其控制的学术研究和技术开发工作。研究内容主要有永磁电机无位置传感器的矢量控制和BLDC控制、硬盘旋转系统振动特性的精密测量、开关磁阻电机及其驱动系统的设计与控制、磁阻同步电机的设计与控制。他对电机设计及优化技术、DSP、MCU、FPGA的编程和应用、电机电磁场有限元数值计算、电机集成测控系统的设计和制作及其软件开发、多路多物理量的实时信号数字测量和处理等方面都有很深的造诣和丰富的工程经验。现已公开发表的论文100多篇，其中期刊论文40多篇，多次参加国际学术会议并宣讲论文，1993年曾参加编著机械工业出版社《机电一体化手册》和1999年参著中国工程院《2000年中国科学技术前沿》一书，拥有美国、日本、新加坡专利共 6 项，并有5项专利正在进行申请中。成功主持开发了3种电机控制和测试系统并销往多家国际著名公司，曾被邀到多个国际著名公司介绍永磁无刷直流电机的控制和测试技术。由于其杰出的成就和贡献，他曾荣获了2006年度新加坡国家科技奖， 并2006、2008年两次荣获所在研究院的最佳研发奖、2012年度研究特别贡献奖。

蒋全博士现在也是IEEE会员，IEEE MAGS技术委员会委员，并曾任IEEE MAG新加坡分会的副主席。

报告题目：基于 ARM 32 位微处理器的电能质量检测

李国丽[1]、蒋 全[2]

1 安徽大学、2 新科研数据存储研究院

摘要：在现代社会，电力应用越来越普及。对许多直接采用电网供电的设备与仪器来说，符合要求的电能质量非常重要。而电力电子装置和太阳能电站、风力发电等新型能源的广泛应用对电能质量带来新的挑战。

交流电网的电能质量关键是其供电电压频率的稳定性和电压波形的正弦性或总谐波分量。本议题主要是介绍基于ARM 32位微处理器的电源质量检测方法。

首先，交流电网电压的频率虽然变化范围很小，但并

不是恒定不变的。测量供电电网的频率是交流电源电能质量检测的一个最基本的项目。而且频率的测量精度也会影响到电压谐波分量的准确测量。频率测量的最简便方法是被测的电源电压通过带低通滤波器的过零比较器和数字计数器测量每三个过零点的时间间隔来计算频率。但是这些过零点仍然有可能会受到一些电压波形畸变或负载电流突变的影响。现在基于ARM的32位微处理器往往带有高速的A/D转换器和快速的计算能力，被测的电源电压可以转换成一系列时间等间隔的数字值。然而电压为“零”的值并一定出现或者仅仅是围绕电压“零”值附件出现不只一次的电压极性变化，依靠电压的过零点来测量频率并不可靠。因此建议采用最小二乘法，将过零点附近的数值拟合成一条直线，然后求解此直线方程的解，得到真正的过零点时刻。根据每三个过零点的时间间隔，就可以计算出电源电压频率的准确值。此方法可以减少电压谐波分量对电压过零点测量的影响，同时也避免了A/D采样速率的影响。

其次，电源电压的总谐波分量THD也是电能质量的关键指标。通常是对一段固定时间内的电压信号进行傅立叶变换或快速傅立叶变换进行计算获得总谐波分量。但是由于电网频率并不一定是恒定值，这一固定采样时间段不一定会是电网电压电周期的整数倍，一般会是数个电周期加其部分周期的电压信号。因此基于固定时间段的傅立叶变换计算所得的总谐波分量会比实际分量要大一些。为了准确计算总谐波分量，建议采用整数倍电压电周期的时间段电压信号来进行傅立叶变换，从而来准确计算总谐波分量。

由于A/D的采样率与电压信号的周期并不一定会匹配，即采样频率并不一定是电周期的整数倍，或电周期并不一定是采样周期的整数倍。采样频率更不一定会是电周期的2^m倍。因此建议根据固定采样频率所获取的数据进行线性插值，在数个电周期内生存2^m的数据值，然后再进行快速傅立叶变换求得总谐波分量。或计算数个电周期电压的有效值和基波分量，最终计算总谐波分量。这时所得的总谐波分量将更为准确。

随着现代集成电子技术的快速发展，32位ARM、8通道12位精度的微处理器越来越便宜，本议题将探讨应用低成本高性能MCU开发电能质量检测仪的可能性。Infineon XMC4400 MCU将作为一个具体应用实例，希望起一个抛砖引玉的示范。

6. Chenghui Zhang

Professor Chenghui Zhang received his Bachelor and Master Degrees in automation engineering from Shandong University of Technology, Jinan, China, in 1985 and 1988, and the Ph.D. degree in control theory and operational research from Shandong University, Jinan, in 2001, respectively. In 1988, he joined Shandong University, where he is currently a Professor of School of Control Science and Engineering at Shandong University, the chief manager of Power Electronic Energy-saving Technology & Equipment Research Center of Education Ministry, a Specially Invited Cheung Kong Scholars Professor by China Ministry of Education, and a Taishan Scholar Special Adjunct Professor. He is also one of State-level candidates of “the New Century National Hundred, Thousand and Ten Thousand Talent Project”, the academic leader of Innovation Team of Ministry of Education, and the chief expert of the National “863” high technological planning. Professor Zhang’s research interests include optimal control of engineering, power electronics and motor drives, energy-saving techniques and time-delay systems.

Title: Electric Vehicle Power Battery State Estimation and Equalization Control

Abstract: The energy and environmental crisis have been concerned by the whole world. As one of the five pillars of the Third Industrial Revolution, the electric car is widely welcomed by the people due to energy saving, environmental protection, and it has become an inevitable future development trend of the automotive industry. As the "heart" of the electric vehicle (EV), the performance of battery is critical to power, economy and safety of EV, and is the key factor restricting the development of electric vehicles scale. Therefore, a good performance battery management system is significant to safety, reasonable and effective use of the battery. The core technologies of the power battery are the SOC estimation, SOH estimation, and the equalization control. This report introduces the key scientific issues of EV batteries, and focuses on the discussion of our group’s work about the battery SOC estimation, SOH estimation, equalization control and other aspects.

个人简介：

张承慧，教授，博士，博生生导师。1985年和1988年分获山东工业大学自动化专业学士学位、控制理论与控制工程专业硕士学位，2001年获山东大学运筹学与控制论专业博士学位。现为山东大学控制科学与工程学院教授、博士生导师，教育部长江学者特聘教授，山东省泰山学者特聘教授，“电力电子节能技术与装备”教育部工程研究中心主任。系“新世纪百千万人才工程”国家级人选，“复杂工业系统能量优化与先进控制”教育部创新团队带头人，国家科技部863计划项目首席专家。

张承慧教授是中国电工技术学会常务理事、中国电力电子学会副理事长、山东省自动化学会副理事长、中国自动化学会第九届控制理论专业委员会委员、中国自动化学会电气自动化专业委员会常务委员兼学术委员会副主任，教育部高等学校教学指导委员会委员。担任《电工技术学报》、《电源学报》、《电力电子技术》等多家期刊编委。

张承慧教授主要从事新能源控制、电动汽车、工程优化控制、控制理论与应用等领域的科学研究和教学工作。主持国家“863计划”项目2项，其中1项为项目首席专家，主持国家基金项目7项，其中重点项目1项、重大国际合作项目1项、面上项目4项，应急项目1项。承担山东省或教育部科技课题（含重大）12项，企业委托课题20余项。获国家级教学成果二等奖1项，获教育部科技进步一等奖1项、山教育部科技进步一等奖1项、山东省科技技术二等奖9项、教育部自然科学二等奖2项；在IEEE Trans. on Power Electronics、IEEE Trans. on Automatic Control、Automatica等国际权威期刊和会议上发表论文120余篇。出版著作3部，其中与刘锦波教授合作编写的全国统编教材《电机与拖动》被评为全国精品教材，被60余家高校选为教材，并被评为山东省高等学校优秀教材一等奖。

报告题目：电动汽车动力电池状态估计与均衡控制

摘要：全球正面临着前所未有的能源和环境危机，备受世界关注。作为第三次工业革命的五大支柱之一，电动汽车以节能、环保而广受人们的欢迎，已成为未来汽车工业发展的必然趋势。其中，车载动力电池作为电动汽车的“心脏”，其性能对整车的动力性、经济性和安全性至关重要，是制约电动汽车规模发展的关键因素。遂使得设计性能优良的电池管理系统，安全、合理、有效使用电池的意义重大，而其最核心的技术是电池的荷电状态（state of charge，SOC）估计、健康状态（state of health, SOH）估计和均衡控制。本报告首先介绍了电动汽车动力电池的关键科学问题，然后侧重讨论了本课题组在电池 SOC 估计、SOH 估计和均衡控制等方面的研究工作。

7. Xing Zhang

Prof. ZHANG Xing received his Bachelor and Master Degrees in automation engineering from Hefei University of Technology, Hefei, China, in 1984 and 1990, and the Ph.D. degree in Power Electronics and Power Drives from Hefei University of Technology, Hefei, in 2003, respectively. Now, he is Vice Dean of School of Electrical Engineering and Automation at Hefei University of Technology. He is also standing director of China Power Supply Society, vice director of New energy power conversion Technical Committee of China Power Supply Society, and standing director of Power Electronics Society of China Electrotechnical Society. He is a recipient of "Delta Electronics Scholar Award" in 2010. He has deeply developed researches on theory and applications of new energy and power electronics. Besides, He has launched a university-industry cooperation with Sungrow Power Supply Co., Ltd as a leader of research team.

Title: Study on the Improved LCL Filters for Grid-Tied Inverter

Abstract: In order to further cut down the cost of filter for grid-connected pulse width modulation (PWM) converter under the more and more stringent grid code, the shortcoming of traditional L and LCL filter are investigated in the speech and four kinds of improved LCL filter topologies and their evolution process are introduced which shows the superiority of the LCL-LC filter. Then the resonant frequency characteristics of the LCL-LC filter are analyzed and a parameter design method on the base of the characteristics is proposed. And a parameter robustness analysis method based on four-dimensional graphics is proposed to analyze parameter robustness of the LCL-LC filter under condition of parameter variations. Compared with the traditional one, the proposed analysis method can analyze the filter performance under variations of several parameters at a time without any iteration. The comparative analysis and discussion considering the LCL filter, the LLCL filter, and the LCL-LC filter, are presented and verified through the simulation and experiments.

个人简介:

张兴，教授，博士，博士生导师，1984 年、1990 年和 2003 年分获合肥工业大学自动化专业学士学位、工学硕士学位以及电力电子与电力传动专业博士学位。现为合肥工业大学电气与自动化工程学院副院长。系中国电源学会常务理事，中国电源学会新能源电能变换技术专业委员会副主任委员，中国电工学会电力电子学会常务理事，2010 年度“中达学者”。围绕新能源应用及其电力电子技术等方向开展了深入的理论和应用研究，并领导科研团队与阳光电源股份有限公司开展了长期而富有成效的产学研合作。

报告题目：并网逆变器改进 LCL 滤波器研究

摘要：为了在满足电网标准的条件下进一步减小PWM并网逆变器的成本，报告调研了传统L和LCL滤波器的缺点，并介绍了四种改进的LCL滤波器拓扑及其结构演变过程，显示出了LCL-LC滤波器的优越性。作者分析了LCL-LC的谐振频率特性并根据所得的谐振频率特性提出了一种滤波器参数设计方法。此外，为了分析LCL-LC在参数偏移条件下的鲁棒性，作者提出了一种基于四维图的参数鲁棒性分析方法。相对于传统的鲁棒性分析方法，所提方法无需反复迭代，可以一次分析多个参数偏移条件下的鲁棒性。最后通过仿真和实验结果，对LCL、LLCL和LCL-LC三种滤波器的性能进行了对比研究和验证。

8. Jialiang Wen

Dr. Jialiang Wen, male, born in 1970, senior engineer, science and technology leading talent of SGCC, serving as Vice Director of Novel Electrical Material and Microelectronics of SGCC Smart Grid Research Institute. Besides, he is a member of CIGRE and Feasibility Study Group of DC Power System. Dr. Wen has long been engaged in research on electrical engineering and power electronics technology. As the principal manager, he undertook the R & D work for more than ten projects, including 973 Program, 863 Program, the Key Project of the National Research Program of China, and the Key Project of SGCC Research Program, and has completed tasks of research on key techniques of DC converter valve, development of UHV DC switches, and research and development of high power electric devices, such as silicon IGBT and silicon carbide devices used in DC power system equipment.

Title: Power Electronic Device Applications in Smart Grid: Development and Prospect

Abstract: Advanced power electronic technology is vital foundation and method for establishment of smart grid in China, of which the core is advanced power electronic device. In this report, the requirement of high-voltage and high-power electronic devices for present and furture development of grid technology is put forward according to the practical application of smart grid. Then, the research areas and technology roadmap for high-voltage and high-power electronic devices are analysed in detail. At last, DC power system equipment taken as an example, the prospect of trend in development of high-voltage and high-power electronic devices is given.

个人简介：

温家良，男，1970 年生，博士，教授级高级工程师，国家电网公司科技领军人才，现任国网智能电网研究院电工新材料及微电子研究所副所长，国际大电网组织（CIGRE）中国会员，直流电网可行性研究工作组成员，长期从事电气工程与电力电子技术研究工作。作为主要负责人或完成人承担了 973 计划、863 计划、国家科技支撑计划以及国家电网公司重大科技项目等十余个课题的研发工作，先后完成直流换流阀(DC converter valve)关键技术研究、特高压直流转换开关（UHV DC converter switch）研制以及直流电网装备用硅 IGBT、碳化硅器件（DC power equipment with silicon IGBT, SiC devices）等大功率电力电子器件的技术研究与开发。

报告题目：智能电网用电力电子器件的发展与展望

摘要：先进电力电子技术是建设我国智能电网的重要基础与手段，其核心在于先进的电力电子器件。本报告先从智能电网的实际应用出发，提出当前以及未来电网技术发展对高压大功率电力电子器件的需求；然后详细分析了高压大功率电力电子器件的研究方向与技术路线；最后以直流电网装备为例对高压大功率电力电子器件的发展趋势进行展望。

9. Zhu Miao

Zhu Miao (S'05–M'07–SM'12) received the B.Sc. degree from Southeast University, China, in 2001 and the Ph.D. degree from Nanyang Technological University, Singapore in 2009, both in electrical engineering. During 2001–2002, he was an Assistant Engineer at Wuxi Power Supply Company, State Grid of China. From 2008 to 2009, he was with Meiden Asia Pte Ltd, Singapore, as an R&D Engineer. After that, he had been a Scientist in the Experimental Power Grid Centre (EPGC), A*STAR, Singapore. In Jul. 2012, he joined Shanghai Jiao Tong University, China, as Research Professor with the title of Distinguished Researcher. He is now the vice director of State Energy Smart Grid (Shanghai) R&D Centre, China.

Dr. Zhu is a regular reviewer for a number of academic journals, and has published 50 papers in refereed journals and conferences proceedings. He is the recipient of 2009 IEEE Power Electronics Society Prize Letter Award. In 2010, he was awarded the World Future Foundation PhD Prize in Environmental and Sustainability Research. In 2012, he was selected as one member of the 3rd National Youth 1000-talent Plan of China. His present research interests include power converters, DC power system, renewable energy generation and electrical engineering theory.

Title: New Progress of Advanced Z-Source Power Converters

Abstract: The concept of classical Z-source inverter was first proposed in 2002 for solving problems faced by the traditional voltage-source and current-source inverters. As a promising DC-AC solution scheme in renewable energy source applications, the Z-source inverter has been greatly explored from various aspects, but this topology is still constrained by its insufficient voltage boost inversion ability. In this seminar, some recent work about advanced Z-source inverters will be introduced in terms of their topology development and unique features. The new concepts of switched inductor and tapped inductor will be involved as well as their integrations in Z-source inverters. All of these new inverters are expected to find applications, where enhanced boosting of low voltage sources is needed, while yet still maintaining the basic features of classical Z-source inverter.

个人简介：

朱淼，2001 年本科毕业于东南大学，2009 年毕业于新加坡南洋理工大学获博士学位。2008 年至 2009 年，工作于日本明电舍公司新加坡研发中心；2009 年至 2012 年，工作于新加坡科技研究局/新加坡智能电网研究中心，任职研究科学家。自 2012 年以来，担任上海交通大学电气工程系研究员/博士生导师，兼任国家能源智能电网（上海）研发中心副主任。

朱淼博士现为 IEEE 高级会员、中国电源学会高级会员，长期致力于先进电力电子功率变换器与可再生能源大规模接入的应用基础研究。曾获得 2009 年度 IEEE 电力电子协会最佳论文奖、2010 年度世界未来基金会环境及可持续发展博士研究奖。2012 年入选第八批中央千人计划暨第三批中央青年千人计划。发表 SCI 和 EI 检索论文 50 余篇。目前主要研究方向为：功率变换器、直流发电技术、新能源及分布式发电技术、电气工程新理论等。

报告题目：先进阻抗型 Z 源功率变换器理论的新发展

摘要：2002 年阻抗型 Z 源功率变换器的提出，是为了解决传统电压型与电流型逆变器的固有技术问题。作为一种受到广泛关注 DC-AC 解决方案，阻抗型 Z 源变换器有可能被应用在新能源发电、电动汽车、电机驱动等领域，因为学术界正从多个角度开展对其的深入研究。然而，阻抗型 Z 源变换器也受其自身技术缺陷的制约，主要是其升压逆变能力不足。在本讲座中，部分近年来关于先进 Z 源变换器的研究工作将做一介绍，着重探讨其各类拓扑的发展及其新特性。包括开关电感、抽头电感等概念将应用于 Z 源变换器中，并取得独特的效果。此类新型 Z 源变换器有望在低电压输入、高电压转换增益比的应用环境得到应用，同时亦能保持传统 Z 源逆变器的基本特性。

10. Xu Yang

Xu Yang was born in China in 1972. He received his B.S. and Ph.D. in Electrical Engineering from Xi'an Jiaotong University, Xi'an, China, in 1994 and 1999, respectively. He has been a member of the faculty of the School of Electrical Engineering, Xi'an Jiaotong University since 1999, where he is presently a Professor. From November 2004 to November 2005, he was with the Center of Power Electronics Systems (CPES), Virginia Polytechnic Institute and State University, Blacksburg, VA, as a Visiting Scholar. He then came back to Xi'an Jiaotong University, and began teaching and doing research in the areas of power electronics and industrial automation. In 2006, he has been selected as New Century Excellent Talents program.

His current research interests include soft switching topologies, PWM control techniques, power electronic integration, and packaging technologies. He has published the book of switching power supply technology and participated in writing Power Electronics (4 & 5 versions). Besides， he has published more than 50 papers, 15 of them are published in SCI or SCI Source journal articles (including 10 IEEE Transaction articles), 7 of them are published in domestic journals , 28 of them are International Conference papers, which also are published in EI and ISIP. He has been granted 7 patents. In 2003 and 2012, he received the first prize of Shanxi Provincial Science and Technology Progress Award, ranked 2 and 3 respectively. In 2010, he was awarded the same honor as the second prize, ranked 4. And in 2011, he won the prize of Xi'an Science and Technology progress, ranked 2.

Title: Pushing forward to the applications of Wide Band gap Material devices- challenge and opportunities

Abstract: The power electronic devices made of wide band gap materials such as silicon carbide and Gallium Nitride exhibit good performances as low on-state, fast switching and high operating temperature comparing with the silicon devices, their cost are becoming more and more competitive at the same time, whereas the extents of applications are far below the expectations. The factors that impact the applications for the

wide band gap material devices are discussed from multiple aspects in the presentation, packaging and integration is proposed as a candidate way of solution. The latest efforts that have been carried out in SiC and GaN devices packaging and integration are introduced as well.

个人简介：

杨旭，1972 年 8 月生，1990 年保送入西安交通大学电气系工业电气自动化专业本科学习，1994 年获得工学学士学位。随即保送入该校同专业攻读硕士研究生。于 1996 年 3 月起直接攻读博士学位，1999 年 3 月毕业，获得工学博士学位。毕业后留校，在电气工程学院任教，2001 年 6 月晋升副教授，2004 年晋升教授。2006 年认定博士生指导教师资格。2004 年赴美国弗吉尼亚理工大学电力电子系统研究中心(CPES)学习访问，2005 年归国返校。2006 年入选教育部新世纪优秀人才计划。

一直从事直流开关电路拓扑、PWM 控制技术、逆变器、电力电子集成等方面的研究。出版专著《开关电源技术》，参加编写《电力电子技术》教材第 4、5 版。累计发表论文 50 余篇,其中 SCI 收录或 SCI 源刊文章 15 篇(含 10 篇 IEEE Transaction 文章)，国际会议 28 篇(全部为 EI 和 ISTP 收录)，国内期刊 7 篇。授权专利 7 个。分别于 2003 年和 2012 年获陕西省科技进步一等奖共 2 项(排名分别为 2 和 3)，2010 年获陕西省科技进步 2 等奖 1 项(排名第 4)，2011 年西安市科技进步 1 等奖 1 项(第 2)。

报告题目：推进宽禁带半导体材料的应用——挑战和机遇

摘要：碳化硅和氮化镓等宽禁带半导体材料制成的电力电子器件具有通态特性好、开关速度快、允许运行温度高等特点，综合性能显著超越硅材料器件，而且成本迅速降低。但几种已经商业化的器件应用推广的进度远远未达到预期的水平。本报告从多个方面探讨了影响宽禁带半导体材料器件走向应用的原因，并提出通过封装与集成化的途径解决这一问题的设想。报告中还将介绍在碳化硅和氮化镓器件封装和集成化方面已经开展的一些工作。

11. Lingdong Li

Lingdong li, professor of Anhui University, senior adviser of Power Quality Engineering Research Center，Ministry of Education, PRC, member of the Chinese power industry power quality and flexible transmission Standardization Technical Committee. He has long been engaged in teaching, scientific research and engineering application of power quality of power distribution network and industrial power saving. He is reach in theoretical basis and project experience.

Title: A Fault Modeling Method for Modern Power Distribution Network based on the Identification of Phasor Measurement

Abstract: The essence of modern power distribution network with high-density distributed generations and many power electronic devices is stochastic nonlinear system. This paper proposes a fault modeling method for modern power distribution network based on TPMI, including the theory of three wire distribution network structure and three wire distribution network node impedance measurement identification, and then presents the fault analysis and solutions of engineering applications and looks forward to the application and research prospects in the future.

个人简介：

李令冬，安徽大学教授，中国电力行业电能质量与柔性输电标准化技术委员会和安徽大学教育部电能质量工程研究中心顾问，长期从事配电系统的电能质量和工业节电领域的教学、科研和工程技术工作，有深厚的理论基础和丰富的工程经验。

报告题目：一种基于相量测量辨识的现代配电网故障建模方法

摘要：含高密度分布式电源和大量电力电子装置的现代配电网本质上是随机的时变非线性系统。本文提出一种基于两点相量测量辨识（TPMI）的现代配电网故障建模方法，包括三线配电网结构与三线配电网节点阻抗测量辨识的理论；给出应用案例的故障分析及解决方案；最后展望了 TPMI 的应用与研究前景。

12. Zhao Wei

Zhao Wei Research Professor， Vice President and the Director of PV production line in Sungrow Power Supply Co., Ltd. Ph.D. graduated from power electronics and electric drive in Hefei University of Technology. Leader of a number of national key scientific and technological projects, such as “the tenth 5-year project”, “the eleventh 5-year project”, “National 863 plan project” in China. Winner of First /Third Prize for Scientific and Technological Progress in Anhui Province
Top-notch talent of Hefei City. Current occupation is VP in Sungrow Power Supply Co., Ltd, running PV production line and R&D center.

Title: The Developments of the PV inverter and their impact on the grid

Abstract: Global warming and energy crisis have become the pressing issues all over the world that need to be solved immediately. Therefore the development of new energy sources has become the most important way to resolve these crises. In the past 10 years, the New Energy has also made progress in leaps and bounds. This PPT analyzes the development trend of photovoltaic inverters and its affected factors (such as the application of the new power electronic switching devices etc.). Then it introduces the characteristics of photovoltaic power generation 、their impact on the grid and the proposed solution. At Last, it describes the characteristics of the distributed generation and requirements for PV inverters.

个人简介：

赵为，研究员，阳光电源股份公司副总裁，光伏产品线总监。博士毕业于合肥工业大学电力电子与电力传动专业。参与主持了多项“十五”、“十一五”、“863 计划”等国家重大科技计划项目，曾荣获安徽省科技进步一等奖和三等奖、合肥市拔尖人才等多项荣誉。现任阳光电源股份有限公司副总裁，分管光伏产品线和研发中心

报告题目：光伏逆变器发展及其对电能质量的影响

摘要：全球气候变暖、能源危机的问题已成为国际社会亟待解决和改善的问题，因此新能源的发展已成为解决这些危机的必经之路。并且，近 10 年来，新能源也已势不可挡的姿态在突飞猛进。本 PPT 主要分析了光伏逆变器的发展趋势及其影响因素，光伏发电与传统发电相比其特点及对电网影响、解决方案；最后介绍了分布式发电的特点及对光伏逆变器的要求。

13. Zhuoran Zhang

Dr. Zhuoran Zhang received the B.S. degree in measurement engineering and the M.S. and Ph.D. degrees in electrical engineering from Nanjing University of Aeronautics and Astronautics (NUAA), Nanjing, China, in 2000, 2003 and 2009, respectively.

Since 2003, he has been a member of the faculty at Department of Electrical Engineering, NUAA, where he is currently a full professor and vice director of Jiangsu Provincial Key Laboratory of New Energy Generation and Power Conversion. From Feb. 2012 to Jun. 2013, he was a visiting professor in Wisconsin Electric Machines and Power Electronics Consortium(WEMPEC), University of Wisconsin-Madison, U.S. His research interests include design and control of permanent magnet machines, hybrid excitation electric machines, and doubly salient electric machines for aircraft power, electric vehicles and renewable energy generation. He has authored or coauthored over 70 technical papers and one book, and is the holder of 21 issued patents in these areas.

Dr. Zhang is with a “National Technology Innovation Second Award "for the project of Doubly Salient Electrical Machine and Its Starter/Generator System, awarded by China's State Council in 2009, and won an award of “New Century Excellent Talents in University” from Ministry of Education of China in 2013. Dr. Zhang is a senior member of IEEE, and a senior member of China Power Supply Society.

Title: Novel Technology of Doubly Salient Brushless DC Generator

It is commonly recognized that development of the pure battery-powered electric vehicle (EV) in the automobile industry reduces a widespread dependence on oil. However, it brings the classic “range anxiety” problem due to the short driving range and long charging time. The hybrid electric vehicle (HEV) offers an effective solution to this problem. An auxiliary power unit (APU) in series HEV and series/parallel HEV, which contains the onboard generator, is dedicated to the battery recharge and provides energy to the electrical propulsion system.

In this presentation, a new doubly salient brushless dc generator (DS-BLDCG) constituted by a doubly salient electro-magnetic generator

(DSEG) and the associated rectifier circuit will be introduced. The DS-BLDCG is suitable for the automobile auxiliary power unit (APU) application due to its merits of simplicity, high robustness, low cost, and flexible control. The construction and operation principle of this new brushless generator will be overviewed. The design considerations, performance analysis and control strategy of the generation system will be discussed. Moreover, the simulation, experimental results, and application case will be presented as well, which indicate that the proposed DS-BLDCG is a promising option for HEV APU application.

个人简介：

张卓然博士，南京航空航天大学自动化学院教授、博士生导师。主要研究方向为飞机电源起动发电及新能源发电与驱动电机技术。2012 年 2 月至 2013 年 6 月在美国威斯康辛大学麦迪逊分校任访问教授。

先后主持国防型号研发项目、霍英东青年教师基金、国家自然科学基金、航空科学基金等多项国家和省部级项目。发表论文 70 余篇，SCI 收录 11 篇，获国际会议最佳论文奖 1 项；出版专著 1 部。获授权发明专利 21 项。作为主要完成人获国家技术发明二等奖、国防技术发明一等奖、国防科技进步二等奖、日内瓦国际发明金奖等科技奖励。

他是 IEEE 高级会员、中国电源学会高级会员。入选教育部“新世纪优秀人才计划”、江苏省“青蓝工程”中青年学术带头人、江苏省“六大人才高峰”高层次人才等。

报告题目：新型双凸极无刷直流发电机技术

纯电动汽车因其对改善环境污染的贡献日益因其学术和工业界的重视。但行驶里程短和充电困难等问题限制了纯电动汽车的发展。混合动力汽车是解决这一问题的经济和现实途径。车载发电系统是串联混合动力、串并联混合动力以及增程式电动汽车中辅助动力装置的核心装置。

本报告将介绍并讨论一种应用于新能源汽车车载发电的新型双凸极无刷直流发电机系统，由双凸极无刷直流电机、整流器及发电机控制器构成，结构简单可靠，成本低、控制灵活。将讨论该发电机的电磁特性、设计规律和控制策略。给出仿真和实验结果和设计案例，表明该类无刷直流发电机在电动汽车车载发电系统中有重要的应用前景和价值。

14. Nian Liu

Dr. Nian Liu is an Associate Professor in School of Electrical and Electronic Engineering, North China Electric Power University, China. He has long been engaged in the research about smart grid technology. His research interests mainly include optimization of micro-grids and electric vehicles, cyber security of smart grid. He has published more than 80 papers in international journals, conferences and Chinese journals. He has also applied for 12 invention patents. In recent years, his researches are mainly supported by National Natural Science Foundation of China, National High-tech R&D Program of China (863 Program), Research Project of State Grid Corporation of China and China Southern Power Grid.

Title: Energy Management Method for Microgrids with Distributed PV and Electric Vehicles

Abstract: Electric vehicles charging/discharging facilities and renewable energy system are synergistic on working mechanism. The integration of them in the environment of microgrids can improve the clean energy utilization of electric vehicles and help solve the intermittence problem of solar energy to reduce the influence on the distribution network. This report investigates multiple energy management method for microgrids under different application background. (1) For commercial building microgrids, the energy optimization problem for microgrids with electric vehicles charging stations and distributed PV system is investigated and a heuristic real-time energy management strategy is proposed. (2) For residential microgrids, the energy management problem involving PV system and charging station are investigated and the "day-ahead scheduling and real-time adjustment" strategy is proposed. (3) For microgrid with PV system and battery switch station, a real-time energy management strategy which considers the availability of charging service is proposed. The research results provide supplement for energy management of microgrids and offer technical support for the development and operation modes of electric vehicles charging infrastructure.

个人简介：

刘念博士长期从事智能电网技术领域的研究工作，主要研究方向包括微电网与电动汽车充放电设施的规划与运行、智能电网安全评估与防御机制等。主持国家自然科学基金项目 1 项、国家 863 计划子课题 2 项，承担国家科技支撑计划项目、国家自然科学基金、国家电网公司及南方电网公司委托科技项目 10 余项。共计在国内外期刊、国际会议上发表论文 80 余篇，其中 SCI 期刊 10 篇，EI 检索论文 50 余篇；申请发明专利 12 项。刘念博士是 IEC 国际标准“微电网控制与运行技术条件”国内组成员，中关村储能产业技术联盟专家委员会委员，华北电力大学“青年骨干教师支持计划”人选，IEEE 会员，长期担任 IEEE、ELSEVIER 等出版机构 10 余种国际期刊的审稿人。

报告题目：含分布式光伏与电动汽车的微电网能量管理方法

摘要：电动汽车充放电设施与可再生能源发电系统从工作机理上具有协同增效性。在微电网环境下实现二者的有机集成，不仅可提高电动汽车的清洁能源利用率，还能协助解决可再生能源并网的间歇性问题，降低对配电网的影响。本报告以智能电网环境下电动汽车与分布式光伏的协同增效机理为切入点，研究多种应用背景下的微电网能量管理方法。（1）针对商业楼宇型微电网，研究了电动汽车充电站与分布式光伏的微电网能量优化问题，提出了一种启发式的实时能量管理策略；（2）针对居民小区型微电网，研究了小区分散充电与分布式光伏的能量优化问题，提出了“日前计划+实时调整”的能量管理策略；（3）针对含分布式光伏及电动汽车换电站的微电网系统，提出了一种考虑换电服务可用性的实时能量管理策略。研究成果为微电网能量管理技术提供有益补充，为电动汽车充电基础设施的发展及运营模式提供技术支撑。

15. Bin Xu

Bin Xu, Male, was born on May 1980, Graduated from North China Electric Power University. Senior Engineer, Deputy Director of System Engineering Office of Grid technology center, Electric Power Research Institute of Anhui Electric Power Corporation, SGCC.

Title: Research and Analysis on Power Quality of Anhui Grid

***Abstract*:**

1. The present situation of power quality problems in Anhui power grid.
   1) The present situation and power quality problems of typical disturbing load in Anhui Power Grid
   2) Anhui Power Grid's countermeasure analysis
2. Research and Analysis of problems in power quality harmonics measurement of intelligent substation.
   1) Discrepancy in harmonic measure signal of intelligent institution and the traditional analog signal.
   2) The influence on harmonic measurement caused by merging unit
   3) The advices on harmonics measurement of intelligent substation.
3. The operation and analysis of wind and solar photovoltaic generation system.

   Introduction of the present situation, operation condition, related problems and the relevant analysis in Anhui power grid
4. The outlook and demand of power quality and technology supervision in Anhui power grid

   The problems, research area and demand in the future work of power quality and technology supervision.

个人简介:

徐斌，男，1980 年 5 月出生，毕业于华北电力大学，现于国网安徽省电力公司电力科学研究院工作，电网技术中心系统技术室副主任，高级工程师。主要从事安徽电网电能质量技术监督工作。

报告题目：安徽电网电能质量问题研究与分析

摘要：

1、 安徽电网的电能质量现状。包括安徽电网中的典型电能质量的情况及造成的主要电能质量问题，安徽电力公司对于电能质量问题的对策分析。

2、 智能变电站电能质量谐波测量问题的研究与分析。智能变电站中谐波测量信号与传统模拟信号存在的差异情况，合并单元对谐波测量造成的影响以及智能变电站谐波测量的建议。

3、 安徽电网风力、光伏发电的运行和分析。介绍安徽电网新能源发电的现状、运行情况、出现的相关问题和分析。

4、 安徽电网电能质量技术监督工作的展望及需求。电能质量技术监督工作中下一步面临的一些问题、研究方向及需求。

16. Jianhua Li

Jianhua Li, male, master , graduated from Wuhan University, senior engineer, chief engineer of Shanghai Hekai Power Protection Equipment Co., Ltd.

Work Experience

He went to hydroelectricity in Henan Oilfield, and served technician , deputy director and director of power plant; vice captain and captain of Power supply group ; deputy director and director of Hydropower Plant after graduation of 1986.7.

Main award

Have gotten 7 national patents (4 invention patents and 3 utility model patents), 3 awards of national new technology and new product, 3 technology awards of CNPC, 14 technology awards of Henan Oilfield, 15 awards of energy saving achievement, 31 technology achievement awards of hydropower plants and 2 national quality management awards.

Title: Rapid recovery technology of Bus Voltage

Abstract: As an important part of microgrid, distributed generation system has been gradually used in power system. However, the operation stability and power supply continuity has been influenced and challenged greatly by large disturbance. The technology power supply continuity based on the intelligent high-speed switch and fault identification can be ensured within 30ms by undisturbed high-speed switching and rapid recovery.

个人简介：

李俭华 男 毕业于武汉大学 硕士 高级工程师 担任合凯集团技研总工

1986.7毕业进入河南油田水电厂工作，历任供电车间技术员、副主任、主任；供电大队副大队长、大队长；水电厂副厂长、厂长之职务。

获得国家专利 7 项（其中：发明专利 4 项，实用新型专利 3 项）、国家级新技术新产品奖 3 项、中石油集团科技奖 3 项、河南油田科技奖 1 4 项、节能成果奖 1 5 项、水电厂科技成果奖 3 1 项、国家级质量管理奖 2 项。

报告题目：母线电压快速恢复技术

摘要：分布式发电系统作为微电网的重要组成部分，已经在电力系统的组网中得到逐步运用，随之而来的问题是在分布式发电系统的区内和区外发生大的扰动情况下，分布式发电系统的运行稳定性和供电的连续性都受到了较大的影响和挑战。采用基于智能化高速开关技术、故障快速识别及控制技术为基础的连续性供电技术，通过实施无扰动快速切换技术和母线电压快速恢复技术，能够在30ms时间内，保证敏感负荷的连续性供电，保证分布式发电系统运行的稳定性和供电的连续性。

17. Dongliu Qi

Dongliu Qi, the Chief Engineer of Chief Engineer of Tipworld Electrical Technology Co., Ltd, is engaged in research on power electronics and power quality. He also devoted to the power quality control and power quality control device developed in recent years

Title: Solution to Power Quality of Distributed Photovoltaic Power Generation accessing to Distribution Network

Abstract: This presentation will start with an overview of the main issues of power quality of distributed photovoltaic power generation accessing to distribution network. And harmonic, reactive properties and the effects on impact load of PV systems will be analyzed. Then, several general treatments for power quality of PV systems will be discussed. With detailed description of some solution cases from the theoretical analysis and system management aspects, some treatment methods for power quality problem of PV systems, which have reference significance, will be presented.

个人简介：

齐东流，安徽天沃电气总工，从事电力电子技术、电能质量技术研究工作。近年来致力于电能质量控制、电能质量治理装置研制。

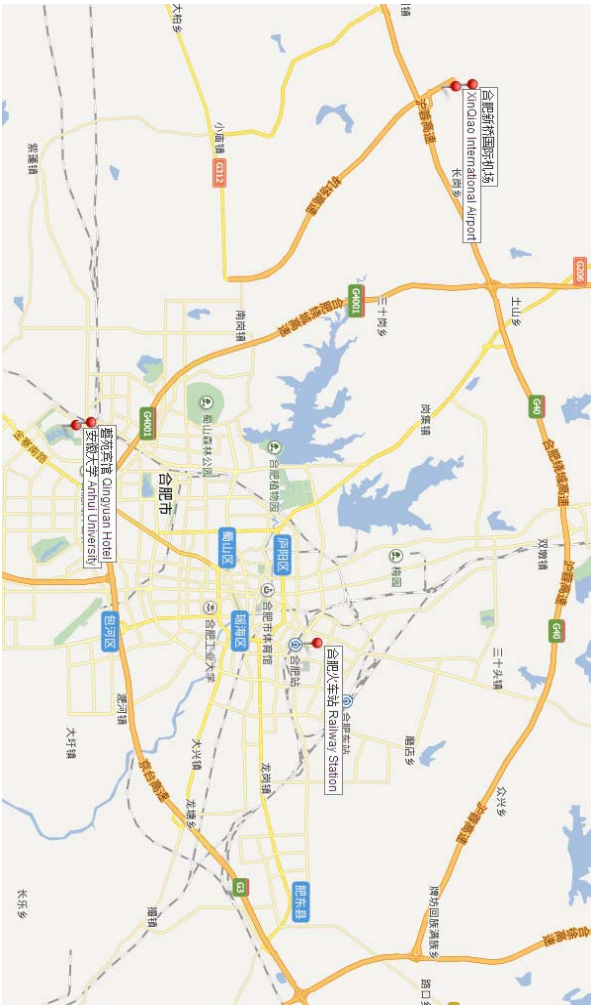
报告题目：光伏发电接入配电网电能质量解决方案

摘要：概述了含分布式光伏发电配电网的电能质量主要问题，对光伏发电系统不同运行状态的谐波和无功特性进行了分析，同时分析了电网冲击性负荷对光伏发电系统的影响；针对光伏系统的电能质量问题，介绍了几种常用的治理方法，从理论分析及系统治理两个方面详细阐述几个解决方案的案例，为光伏系统电能质量问题的治理提供了一些具有借鉴意义的方法。

地图

安徽大学磬苑宾馆(安徽大学国际学术交流中心)位置图 A

Location Map A: Qingyuan Hotel of Anhui University (Academic Exchange and Traning Center of Anhui University)



安徽大学磬苑宾馆(安徽大学国际学术交流中心)位置图 B

Location Map B: Qingyuan Hotel of Anhui University (Academic Exchange and Traning Center of Anhui University)