

EAPPC & BEAMS 2022

9th Euro-Asian Pulsed Power Conference
24th International Conference on High-Power Particle Beams

September 18-22, 2022

Seoul Olympic Parktel, Seoul, Korea



PROGRAM BOOK

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Electrical Machinery and
Energy Conversion System



Electro-physics & Application



THE KOREAN INSTITUTE OF ILLUMINATING
AND ELECTRICAL INSTALLATION ENGINEERS



The Korean
Vacuum Society



한국전기학회
KOREAN ELECTRICAL SOCIETY


PLENARY SPEAKERS



Suk Jae Yoo

Korea Institute of Fusion Energy
Korea

**"Outlook for Fusion
Energy"**

 September 19 (Mon) 11:20-12:00



Georg Müller

Karlsruhe Institute of Technology
Germany

**"Pulsed Power Research
and Applications at KIT"**

 September 20 (Tue) 11:20-12:00



Guus Pemen

Eindhoven University of Technology
The Netherlands

**"Pulsed Power Driven
Plasmas for the
Electrification of
Processes"**


 September 21 (Wed) 11:20-12:00



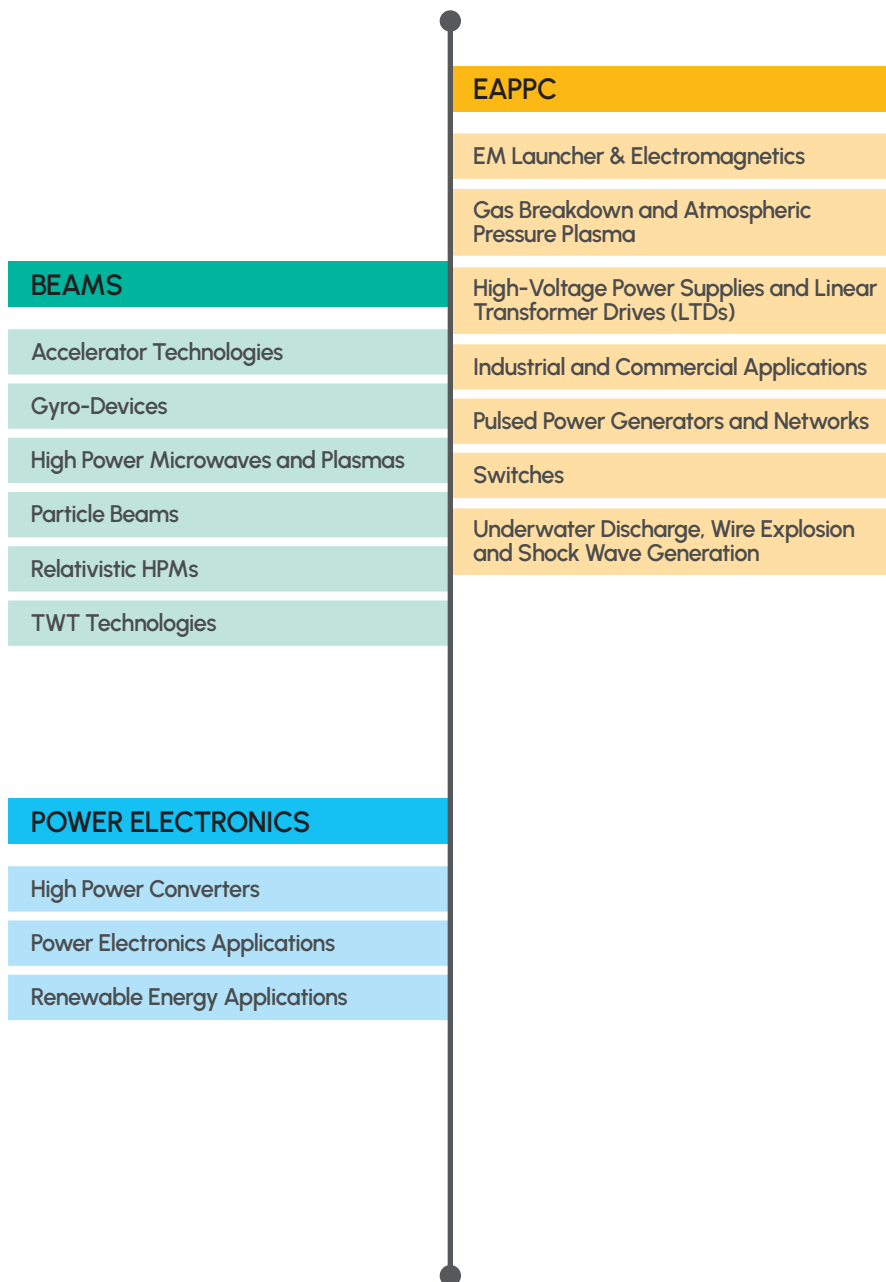
Eun Ha Choi

Kwangwoon University
Korea

**"High Power Microwave
Generation using Virtual
Cathode Oscillator and
Plasma Medicines for
COVID19"**

 September 22 (Thu) 11:20-12:00

CONFERENCE TOPICS



SESSION TIMETABLE

SEPTEMBER 18 SUNDAY		
14:00-18:00	Registration	Location Lobby (2F) Sep 18 (Sun) 14:00-18:00 Sep 19-21 (Mon-Wed) 08:00-18:00 Sep 22 (Thu) 08:00-13:00
18:00-19:30	Welcome Cocktail	Location Olympia (1F)
24 Hours	Virtual Poster Session	

SEPTEMBER 19 MONDAY						
	Session Room	Olympia (1F)	Session Room	London (2F)	Session Room	Seoul (2F)
09:00-10:40		High-Voltage Power Supplies and Linear Transformer Drives (LTDs) p. 22				
10:40-11:00				Coffee Break		Location Lobby (1F)
11:00-12:00				Opening Ceremony & Plenary Session 1 Suk Jae Yoo Korea Institute of Fusion Energy "Outlook for Fusion Energy" p. 20		Location Olympia (1F)
12:00-13:30				Lunch Break		Location Arirang (2F)
13:30-14:30				In-person Poster Session		Session Room Athens (4F)
14:30-16:10		Pulsed Power Generators and Networks 1 p. 23		Power Electronics Applications 1 p. 24		
16:10-16:30				Coffee Break		Location Lobby (1F&2F)
16:30-18:10		Pulsed Power Generators and Networks 2 p. 23		Power Electronics Applications 2 p. 25		
24 Hours				Virtual Poster Session		

SEPTEMBER 20 TUESDAY						
	Session Room	Olympia (1F)	Session Room	London (2F)	Session Room	Seoul (2F)
09:00-11:00		Underwater Discharge, Wire Explosion and Shock Wave Generation p. 26		Particle Beams p. 28		
11:00-11:20	Coffee Break					Location Lobby (1F)
11:20-12:00	Plenary Session 2 Georg Müller Karlsruhe Institute of Technology "Pulsed Power Research and Applications at KIT" p. 20					Location Olympia (1F)
12:00-13:30	Lunch Break					Location Arirang (2F)
13:30-14:30	In-person Poster Session					Session Room Athens (4F)
14:30-16:10		Gas Breakdown and Atmospheric Pressure Plasma 1 p. 27		High Power Microwaves and Plasmas p. 29		
16:10-16:30	Coffee Break					Location Lobby (1F&2F)
16:30-18:10		Pulsed Power Generators and Networks 3 p. 27		Accelerator Technologies p. 29		
18:20-22:20	Night Tour					Gather at the main gate of the conference venue by 18:20
24 Hours	Virtual Poster Session					



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SEPTEMBER 21 WEDNESDAY						
	Session Room	Olympia (1F)	Session Room	London (2F)	Session Room	Seoul (2F)
09:00-11:00	EM Launcher & Electromagnetics p. 31		Gas Breakdown and Atmospheric Pressure Plasma 2 p. 32		Relativistic HPMs p. 34	
11:00-11:20	Coffee Break Location Lobby (1F)					
11:20-12:00	Plenary Session 3 Guus Pemen Eindhoven University of Technology “Pulsed Power Driven Plasmas for the Electrification of Processes” p. 20					Location Olympia (1F)
12:00-13:30	Lunch Break Location Arirang (2F)					
13:30-14:30	In-person Poster Session Session Room Athens (4F)					
14:30-16:10	Pulsed Power Generators and Networks 4 p. 31		High Power Converters p. 33		TWT Technologies p. 35	
16:10-16:30	Coffee Break Location Lobby (2F)					
16:30-18:10			Renewable Energy Applications p. 34		Gas Breakdown and Atmospheric Pressure Plasma 3 p. 36	
18:10-20:00	Banquet Location Olympia (1F)					
24 Hours	Virtual Poster Session					

SEPTEMBER 22 THURSDAY						
	Session Room	Olympia (1F)	Session Room	London (2F)	Session Room	Seoul (2F)
09:00-11:00		Switches p. 37		Industrial and Commercial Applications p. 38		Gyro-Devices p. 38
11:00-11:20	Coffee Break					Location Lobby (1F)
11:20-12:00	Plenary Session 4 Eun Ha Choi Kwangwoon University “High Power Microwave Generation using Virtual Cathode Oscillator and Plasma Medicines for COVID19” p. 20					Location Olympia (1F)
12:00-13:30	Lunch Break					Location Arirang (2F)
24 Hours	Virtual Poster Session					

ORAL SESSION

SEPTEMBER 19, 2022 (MON)

High-Voltage Power Supplies and Linear Transformer Drives (LTDs)

September 19 (Mon)

Olympia (1F)

CHAIR Hyongsuk Kim (Korea Electrotechnology Research Institute, Korea)

1-0287 15kV and 4kW High-Precision Capacitor Charging Power Supply Based on LCC Resonant Converter for Kicker Modulator System

09:00-09:20

Chang-hyun Kwon^{1,2}, Tae-Hyun Kim^{1,2}, Seong-Ho Son^{1,2}, Sung-Roc Jang^{1,2}, Chan-Hun Yu², Jung-Soo Bae¹, Hyoung-Suk Kim^{1,2}

¹University of Science and Technology, Korea, ²Korea Electrotechnology Research Institute, Korea

1-0158 60kV High Voltage Capacitor Charging Power Supply Based on a 24V Battery

09:20-09:40

Woo-Cheol Jeong, Hong-Je Ryoo
Chung-Ang University, Korea

1-0134 Compact Pulsed-Power Modulator Based on Solid-State Switch with Peak Power of 4 MW

09:40-10:00

Hyun-Bin Jo, Hong-Je Ryoo
Chung-Ang University, Korea

1-0131 High Stability Klystron Modulator for Commercial Accelerator Application

10:00-10:20

Michael Kempkes, Christopher Chipman, Anthony Heindel, Merouane Benjnane, Henry Von Kelsch IV, Ziliang Ruan, Marcel P.J. Gaudreau, Rebecca Simpson
Diversified Technologies, Inc., USA

1-1044 A Method to Improve a High-Frequency Transformer Power Density with a B-H Curve Shifting Winding

10:20-10:40

Gang Seok Lee, Sangheok Ji, Sungwoo Bae
Hanyang University, Korea

Pulsed Power Generators and Networks 1

September 19 (Mon)

Olympia (1F)

CHAIR Georg Müller (Karlsruhe Institute of Technology, Germany)

1-0711 Solid-State Marx Generator Using Hybrid Energy Storage

14:30-14:50 [Xiaojing Ren](#)¹, Taichi Sugai¹, Akira Tokuchi^{1,2}, Weihua Jiang¹

^(P) VIRTUAL ¹Nagaoka University of Technology, Japan, ²Pulsed-Power Japan Laboratory Ltd., Japan

1-0669 Performance Study of Solid-state Pulse Modulators for DIRAMS Electron Accelerators

14:50-15:10 [Heuijin Lim](#), Dong Hyeok Jeong, Kyoung Won Jang, Sang Koo Kang, Hyun Kim, Sang Jin Lee, Kyohyun Lee, Tae Woo Kang, Seung Wook Kim, Manwoo Lee

Dongnam Institute of Radiological & Medical Sciences, Korea

1-0654 Design and Production of a Low-cost Homemade PCB-mounted Capacitive Divider for Frequencies Up to Hundred MHz

15:10-15:30 ^(P) VIRTUAL [Eric Brune](#)¹, Jean-Marie Larbaig¹, Charly Sigogne¹, Laurent Pecastaing¹, Thierry Ress¹, Antoine Silvestre De Ferron¹, Marc Rivaletto¹, Robert Ruscassie¹, Veronika Gavrilenko¹, Baptiste Cadilhon², Laurent Courtois², Bruno Cassany², Alexandre Goeury²

¹Université de Pau et des Pays de l'Adour, France, ²French Atomic Energy and Alternative Energies Commission, France

1-0823 Design of a Resonantly Charged Semiconductor-Based Marx Modulator Based on Simulations and Measurements

15:30-15:50 ^(P) VIRTUAL [Martin Sack](#), Johannes Ruf, Dennis Herzog, Georg Müller

Karlsruhe Institute of Technology, Germany

1-0665 Pulsed Power Science and Technology in the 19th Century

15:50-16:10 [Guus Pemen](#), Tom Huiskamp, Wilfred Hoeben

Eindhoven University of Technology, The Netherlands

Pulsed Power Generators and Networks 2

September 19 (Mon)

Olympia (1F)

CHAIR Yunsik Jin (Korea Electrotechnology Research Institute, Korea)

1-0201 Compact Solid State Switched Spiral Generators as Triggers for Pulsed Power Accelerators

16:30-16:50 [Simon Bland](#)¹, Susan Parker¹, Jiaqi Yan², Simon Bott-Suzuki³, Jacob Banasek³, Samuel Cordaro³, Anton Gusev⁴, Ivan Lavrinovich⁴

¹Imperial College London, UK, ²Beihang University, China, ³University of California, San Diego, USA, ⁴Pau University, France

- 1-0395** Design and Evaluation of a New 2.2 MV Pulse Generator to Drive Existent EMP Simulators While Reducing SF₆ Emission
 16:50-17:10 Léo Sousbielle^{1,2}, Francis Lassalle¹, Benjamin Lassalle¹, Thierry Chanconie¹, Laurent Pecastaing², Marc Rivaletto²
¹French Alternative Energies and Atomic Energy Commission, France, ²Université de Pau et des Pays de l'Adour, France
- 1-0148** High-Efficiency Solid-State Pulsed Power Modulator for Driving MW Range Magnetron
 17:10-17:30 Seung-Ho Song¹, Min-Kyu Choi², Hong-Je Ryoo²
¹Korea Railroad Research Institute, Korea, ²Chung-Ang University, Korea
- 1-0842** Development of High Voltage Pulsed Power Supply Using 13kV SiC- MOSFET
 17:30-17:50 Akira Tokuchi¹, Kyosuke Nakata¹, Kiyoshi Tohshi², Shinji Kobayashi²
¹Pulsed Power Japan Laboratory Ltd., Japan, ²Kyoto University, Japan
- 2-0915** Electrical and Acoustical Characteristics of an Underwater Electrical Cu Wire Explosion
 17:50-18:10 Yvan Bacqueyrisses¹, Thierry Reess², Antoine De Ferron², Bucur M. Novac^{2,3}, Remi Tujague¹, Alain Morell¹
 (v) VIRTUAL ¹ITHPP, France, ²Université de Pau et des Pays de l'Adour, France, ³Loughborough University, UK,

Power Electronics Applications 1

September 19 (Mon)

London (2F)

CHAIR Kyo-Beum Lee (Ajou University, Korea)

- 5-0978** Li-ion Battery Remaining Useful Life Prediction Algorithm Based on EMD-CNN-LSTM
 14:30-14:50 Dong Hwan Kim, Jeyeong Lim, Byoung Kuk Lee
 Sungkyunkwan University, Korea
- 5-0973** Clustering Algorithm for Recycling Retired Lithium-ion Batteries Based on DBSCAN
 14:50-15:10 Jeyeong Lim, Dong-Hwan Kim, Byoung-Kuk Lee
 Sungkyunkwan University, Korea
- 5-0759** Heatsink Integrated Symmetric Switching Module with Low Parasitic Inductance for Parallel Operation of SiC Power Semiconductor
 15:10-15:30 Sung-Soo Min, Rae-Young Kim
 Hanyang University, Korea
- 5-0756** Analysis and Design of LLC Resonant Converter Based on Time-Domain Analysis for Achieving High Efficiency
 15:30-15:50 Su-Seong Park, Min-ho Eom, Rae-Young Kim
 Hanyang University, Korea

- 5-0719** Resonant Inverter with Self-Calibration of Coil Inductance Detuning
 15:50-16:10 Dukju Ahn, Saidul Alam Chowdhury
Incheon National University, Korea

Power Electronics Applications 2

September 19 (Mon)

London (2F)

CHAIR Jeehoon Jung (Ulsan National Institute of Science and Technology, Korea)

- 5-0934** Single-phase Multi-Level Converter for Distributed Sources (PV and Battery) and Grid Interfacing Application
 16:30-16:50 Stephen Arinze Obi, Jae-Jung Jung
Kyungpook National University, Korea
- 5-1053** Development of Integrated Power Supply System with 3 kV Simmer and 30 kV Trigger for Series-connected Xenon Flash Lamps
 16:50-17:10 Jaebeom Ahn, Hong-Je Ryoo
Chung-Ang University, Korea
- 5-0828** Effective Decoupling Controller Design for Triple-Active-Bridge Converter Based on Its Frequency-Domain Analysis
 17:10-17:30 Chano Jeon, Jee-hoon Jung, Changwoo Yun, Hyunji Kim
Ulsan National Institute of Science and Technology, Korea
- 5-0266** Power Decoupled Multi-port Bidirectional DC-DC Converter for Operating Grid-Connected and Islanding Modes in DC Microgrid Systems
 17:30-17:50 Chang-Woo Yun, Jun-Young Lee, Chano Jeon, Jee-hoon Jung, Hyunji Kim
Ulsan National Institute of Science and Technology, Korea
- 5-0821** Design Methodology of High-frequency Induction Heating System Employing PCB Coils
 17:50-18:10 Hyunji Kim, Jeehoon Jung, Chano Jeon, Changwoo Yun
Ulsan National Institute of Science and Technology, Korea