

**2024 10th Euro-Asian Pulsed
Power Conference, 25th
International Conference on
High-Power Particle Beams and
20th International Symposium on
Electromagnetic Launch
Technology
(EAPPC/BEAMS/EML 2024)**

**Amsterdam, Netherlands
22-26 September 2024**



**IEEE Catalog Number: CFP24VC7-POD
ISBN: 979-8-3503-5273-3**

**Copyright © 2024, Eindhoven University of Technology
All Rights Reserved**

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP24VC7-POD
ISBN (Print-On-Demand):	979-8-3503-5273-3
ISBN (Online):	978-90-386-6135-3

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

Ultrashort Rise Time Pulses for Air Purification Using a Solid-State Impedance-Matched Marx Generator with Planar Waveguides.....	1
<i>B. Van Kuik, J. J. Van Oorschot, L. Spooren, E. Lemmen, T. Huiskamp</i>	
Energy Characteristics of Transient Spark Discharges in Air	3
<i>Robbie Alexander, Igor Timoshkin, Mark Wilson, Graeme Burt</i>	
Analysis of Damage Mechanism of F881 Glass Fiber Epoxy Composites Under Impact Load	5
<i>Yadong Zhang, Huilong Wan</i>	
Computational Models of Albers and Bragg, 2 MV, 700 kA Pulsed Power Machines with Plasma Filled Rod Pinch Diodes.....	7
<i>Aled Jones, Anthony Meadowcroft, Matthew Childs</i>	
Studies of the Interaction of the High-Power Sub-Nanosecond Pulse with Neutral Gases	9
<i>V. Maksimov, A. Haim, Y. Cao, A. Kostinskiy, J. G. Leopold, Yu. P. Bliokh, Ya. E. Krasik</i>	
Nanosecond Intense Relativistic Electron Beam Propagation in Gas and Preformed Plasma.....	11
<i>Adrien Dudès, Fabien Dorchies, Claude Fourment</i>	
A Combined Discrete-Continuous Model for Railgun Simulation.....	13
<i>Irene Ndindabahizi, Tom Vancaeyzeele, Johan Gallant, Ben Lauwens, Markus Schneider</i>	
Numerical Study of Current Density on Armature and Rail Interface with Dynamic Contact.....	15
<i>Jinghan Xu, Shengguo Xia, Lixue Chen</i>	
A Circuitry Solution for Fast Transformer-Coupled LC Inversion Generators	17
<i>Rainer Bischoff</i>	
Optimizing Control Strategies for High-Power Capacitor Chargers with a SiC-Based LC-Resonant Topology.....	19
<i>Felix Haag, Maxime Berard, Fabian Albrecht, Volker Brommer, Oliver Liebfried, Klaus F. Hoffmann</i>	
Lifetime Performance of Pulsed Capacitors Under the Combined Effect of Gamma Irradiation and High Electric Field	21
<i>Su Xiaohui, Li Hua, Wang Yycheng, Zhang Qin, Ding Chenghan, Lin Fuchang</i>	
Development of a Fast-Rising Short-Pulse High-Voltage Power Supply Using SiC-MOSFETs for the J-PARC Kicker System.....	23
<i>Tomohiro Takayanagi, Koki Horino, Tomoaki Ueno, Moe Sugita, Yasuhiro Fuwa, Shinichi Shinozaki, Ayato Ono, Akira Tokuchi, Naoya Ikoma, Hiroaki Kamezaki</i>	
Numerical Simulation of Semiconductor Opening Switches	25
<i>Ejlal Shahriari, Anton Gusev, Antoine Silvestre De Ferron, Laurent Pecastaing</i>	
Gyrator-Capacitor Circuit Modeling of Tesla Transformer with Partial Magnetic Cores.....	27
<i>Hanwu Yang, Zicheng Zhang, Jingming Gao, Tao Xun, Jiande Zhang</i>	
Revolutionizing Space Launch - The Economic and Operational Benefits of the Variable-Pitch Screw Architecture	29
<i>Philip Swan, Alastair Swan</i>	

Optimization Design of Trigger Timing for Multi-Stage Coil Launcher.....	31
<i>Yadong Zhang, Jianping Cao, Ao Zhou</i>	
Pulse Generator for Impact Ionization Triggering in Thyristors.....	33
<i>V. Senaj, A. A. Del Barrio Montañés, T. Kramer, M. Sack</i>	
Research Progress on the Characteristics of Repetition-Rate Spark Gap Closing Switches	35
<i>Falun Song, Fei Li, Beizhen Zhang, Chunxia Li, Ganping Wang, Yanqing Gan, Xiao Jin</i>	
Pulse Breakdown of Overvolted Gaps Filled with CO ₂	37
<i>I. Timoshkin, M. J. Given, M. P. Wilson, S. J. Macgregor, N. Bonifaci, R. Hanna</i>	
Study on Breakdown Voltage and Damage Mechanism of an Extrinsic V-Doped SiC Lateral Photoconductive Device	39
<i>Fuyin Liu, Tianjiao Shen, Li'Ao Yang, Linglong Zeng, Ting He, Langning Wang, Tao Xun</i>	
Research on Muzzle Arc in Ultra High Speed Air Flow.....	41
<i>Meng Wang, Qi Wang, Jue Wang, Ping Yan, Hongyan Sun</i>	
Flexible, Solid-State, Nanosecond Pulsed Power and the Influence of a Time-Varying Plasma Load.....	43
<i>J. J. Van Oorschot, T. Huiskamp, A. J. M. Pemen</i>	
Generation of Hydroxyl Radicals in Atmospheric Air Under Repetitive Nanosecond Spark Discharges	45
<i>Iliane Hifi, Mark Wilson, Igor Timoshkin, Graeme Burt</i>	
Pulsed Streamer Discharges Driven by a 500-KV, Nanosecond, Compact Marx Generator.....	47
<i>C. Ton, T. Huiskamp</i>	
Monolithic Radial Transmission Line Circuit Modelling Using a 2D Mesh.....	49
<i>Ibrahim Güngen, Gwilym Jones, Nicolas Niasse, Paul Holligan, Luis Sebastian Caballero Bendixsen, Jamie Darling, Philip Leichauer, Cristian Dobranszki, Mohamed Sasi, Adam Turnbull, Steve Baxter, Nathan Taylor</i>	
A Calculation Method of Deposition Layer Based on Armature Melting Morphology.....	51
<i>Zengji Wang, Weiqun Yuan, Weidong Xu, Ping Yan, Chen Lixue</i>	
Fundamental Longitudinal Electromagnetic (EM) Force Investigation Using DC Current	54
<i>Neal Graneau</i>	
Experimental Demonstration of Model Based Control of a Nonlinear Aircraft Arresting System.....	56
<i>Yacine Boudria, Raymond B Sepe, Steven P, Bastien, Musa Jouaneh</i>	
Pulse Transformer Investigation Based on an Inductive Toroidal Coil with Coupled Coil Sections.....	58
<i>Oliver Liebfried, Maxime Berard, Volker Brommer</i>	
Research on Rotor Strength and Critical Speed of the Air-Core Pulsed Alternator.....	61
<i>Jijian Wan, Kexun Yu, Jiasong Wang, Xianfei Xie</i>	
Investigation of Supercapacitors as Energy Source for Compact Inductive Pulsed-Power Generators	63
<i>Fabian Albrecht, Maxime Berard, Felix Haag, Volker Brommer, Oliver Liebfried, Klaus F. Hoffmann</i>	
Investigation on the Improved Topology of Air-Core Pulsed Alternator Power Supply Systems	65
<i>Jiasong Wang, Kexun Yu, Xianfei Xie</i>	

Research on the Solution Strategy of Discharge Sequence of Pulsed Power Supply Based on Reverse Fitting of Mathematical Model	67
<i>Wanyu Liu, Hongyan Sun, Xuzhe Xu</i>	
Analysis of Self-Excitation Characteristics of an Air-Core Brushless Induction Pulsed Alternator.....	69
<i>Chujie Dou, Shaopeng Wu, Bochao Du, Song Wang</i>	
Impedance of Plasma Erosion Opening Switch in Particle-In-Cell Simulation	71
<i>Shen Shou Max Chung, Shih-Chung Tuan</i>	
Optimising a Compact HVPS for Electron Beam Applications	73
<i>Ludwig Lorenz, Rainer Labitzke, Gösta Mattausch, Severin Dominok, Björn Meyer</i>	
Study on Self-Breakdown Voltage Characteristics of Gap Switches.....	75
<i>Kyosuke Nakata, Akira Tokuchi</i>	
Comparative Study of Two Types of Spark Gap Switches for Parallel Triggering.....	77
<i>Yoan Bacqueyrisses, Baptiste Guegan, Frédéric Bayol, David Arnal</i>	
Development of a Prototype Marx Generator Module for a Klystron Power-Supply in J-PARC Linear Accelerator	79
<i>Yasuhiro Fujiwara, Moe Sugita, Tomohiro Takayanagi, Shinichi Shinozaki, Koki Horino, Tomoaki Ueno, Ayato Ono, Naoya Ikoma, Akira Tokuchi</i>	
Evaluation of a MARX-Type Klystron Modulator Using Semiconductors for Practical Application.....	81
<i>Kyosuke Nakayama, Akira Tokuchi, Hiroaki Kamezaki</i>	
Study of Solid-State Modulator Topology for Magnetrons	83
<i>Naoya Ikoma, Akira Tokuchi</i>	
Pulsed Power Drilling for Deep Secure Storage.....	85
<i>E. J. M. Van Heesch, G-J. Heerens, R. Plat, M. Azimi, T. Willenbroek, T. Huiskamp, A. J. M. Pemen</i>	
Influence of Arc Armature Geometric Parameters on Current Distribution at the Armature/Guideway Interface	87
<i>Lixue Chen, Bingxuan Zhao, Penghao You</i>	
Study on the Dynamic Characteristics of Electromagnetic Rail Launcher Considering the Insulating Supports.....	89
<i>Zhizeng Wang, Weiqun Yuan, Yunlong Che, Ying Zhao, Weidong Xu, Wen Tian, Ping Yan</i>	
Research on Methods of Decoupling Current and Friction in Electromagnetic Launching	91
<i>Weidong Xu, Jiong Wang, Wenyi Ye, Zengji Wang, Rong Xu, Yiting Cao, Wenping Cheng, Ping Yan</i>	
Analysis of Electromagnetic Force of the Jumper Conductors in Augmented Special Motor.....	93
<i>Wenping Cheng, Weidong Xu, Zhizeng Wang, Ying Zhao, Zengji Wang, Ping Yan</i>	
Research on Inductance Gradient of Electromagnetic Railgun Based on Eddy Current Field Analysis	95
<i>Shengqin Xu, Lixue Chen, Shengqin Xu, Wenhao Zhang, Bingxuan Zhao, Tingyun Xiao</i>	
Optimization Design of Coated Armature in Electromagnetic Railgun Based on Multi-Objective Genetic Algorithm	97
<i>Xuan Xu, Lixue Chen, Shengqin Xu, Wenhao Zhang, Bingxuan Zhao, Tingyun Xiao</i>	

A Numerical Model of Magneto-Electro-Thermo-Mechanical Characteristics at the Armature-Rail Contact Interface	99
<i>Xuan Xu, Lixue Chen, Shengqin Xu, Wenhao Zhang, Bingxuan Zhao, Tingyun Xiao</i>	
Constant Magnetic Field Effects on EMRGs: Mechanisms and Analysis	101
<i>Yuhang Wu, Hao Geng, Pengfei Li, Xueke Gou</i>	
Study on Arcing Dynamics and Arc Igniter Design for Railguns.....	103
<i>Qun Xian Qiu, Gang Gu, Bo Gao, Ying Jie Zhao</i>	
Research on Electromagnetic Launcher Gouging Under Non-Ideal Conditions.....	105
<i>Bo Liu, Yunlong Che, Weiqun Yuan, Ruijie Guo, Ping Yan</i>	
Research on Different Structures of Additional Rails of Electromagnetic Launch with Rotational Armature.....	107
<i>Zheng Ren, Zhicheng Tan, Zengji Wang, Zhizeng Wang, Wenping Cheng, Rong Xu, Weiqun Yuan, Ping Yan, Weidong Xu</i>	
Study on Influence Characteristics of Sliding Contact of Armature Inside the Spatial Curved Rails in Electromagnetic Launch.....	109
<i>Yunlong Che, Weiqun Yuan, Zhizeng Wang, Rongyao Fu, Weidong Xu, Ping Yan</i>	
Optimization Analysis of the Bore Cross-Section in Launchers Based on Shooting Accuracy.....	111
<i>Qingxia Zhang, Hui Li, Jun Li, Kun Liu, Longwen Jin, Weidong Xu, Zengji Wang</i>	
The Study of Dynamic Inductance Gradient in EM Railgun Launchers	113
<i>Longwen Jin, Jun Li, Peizhu Liu, Ran Li, Xutong Gao, Qingxia Zhang, Weidong Xu, Zengji Wang</i>	
Analysis of Contact Pressure Between Armature and Rails of Electromagnetic Railgun	115
<i>Gao Bo, Xuan Li, Liu Yang, Li Pengfei, Li Xiang, Qiu Qunxian</i>	
Impedance Adjustments on a Fast 20kV Solid State Switch	117
<i>N. Ayala Cintas, D. Baack, B. Bromberger, N. Kularia, W. Nidens, M. Osemann, C. Piel</i>	
Research on Package-Level Failure of IGBT Under Pulse Conditions	119
<i>Zenghui Yang, Taizhuang Hu, Huibo Zhang, Zicheng Zhang</i>	
Evaluation of Folded Pulse Forming Line Characteristics	121
<i>Hiroaki Kamezaki, Akira Tokuchi, Yukiko Hirose, Hiroaki Kawakami, Weihua Jiang, Taichi Sugai</i>	
High Speed, Low Loss and Energy Recovery in Pulsed Power Circuit Using Ultra-High Voltage SiC Devices	123
<i>Reo Sasaki, Yusei Yamada, Takashi Sakugawa, Kunihiro Sakamoto, Takeharu Kuroiwa</i>	
An Improved Gate-Boosting Gate Driver for Ultrafast Switching of GaN Transistors for Nanosecond Pulse Generation.....	125
<i>Mohsen Feizi, Tom Huiskamp, Bas Vermulst</i>	
Transformer-Less Driving Circuit for Semiconductor Opening Switch Using Transient Voltage Suppressor Diodes.....	127
<i>Mahmoud S. Hassan, A. M. Elelimy Abounemra, T. Huiskamp, Ibrahim M. Safwat, Hesham N. Ahmed</i>	

First Test Results of a 30kA Pulsed Current Generator for a New Eddy Current Septum in the CERN PS Extraction	129
<i>Gregor Gräwer, Laurent Ducimetière, Stéphane Huon, Nicolas Voumard</i>	
Investigation of Effective Electrode Structure for Metal Removal from Composite Materials Using Pulsed Discharge	131
<i>Takuto Doi, Shota Oishi, Takashi Sakugawa, Kaisei Nishimura, Shinichiro Shobako, Shinichi Shimasaki, Tomohiko Yamashita</i>	
Standard PEF Equipment for Increasing the Added Value of the Technology in Olive Oil & Wine Industries	133
<i>Marcos Teotônio Pereira, Mafalda Aguiar-Macedo, Duarte Rego, Luís Manuel Redondo</i>	
The Impact of Cathode Geometry on Electron Hot Spot Formation and Ion Beam Properties in Pinched-Beam Diodes	135
<i>A. K. Tichy, J. C. Foster, S. B. Swanekamp, P. F. Ottinger</i>	
Modelling of Vacuum Breakdown in the MegaAmpere X-Ray Installation (MAXI) Output Line	137
<i>Anthony L. Meadowcroft, Aled Jones, Mark Sinclair</i>	
Data Driven Approach for High-Power Laser Ablation Phenomena.....	139
<i>Toru Sasaki, Momoka Iwasa, Innu Wang, Takatoshi Harada, Tsuneo Suzuki, Kazumasa Takahashi, Takashi Kikuchi</i>	
Research on Output Voltage Maintenance Control Strategy for Battery Cascade Charging Power Supply.....	141
<i>Kun Liu, Wanyu Liu, Hongyan Sun</i>	
Research on Pulsed Power Supply Sequence Solution Strategy Based on Charge Equivalent	143
<i>Wanyu Liu, Kun Liu, Rongyao Fuxx</i>	
Design of Multi-Channel Pulse Signal Generator with Adjustable Time Sequence.....	145
<i>Weiwei Pan, Hengyu Lv, Kun Liu, Rongyao Fu, Wanyu Liu, Yuxiang Huo, Yaohong Sun</i>	
Research on Control Strategy of Cascaded Constant Current Charging Power Supply	147
<i>Yuxiang Huo, Yinghui Gao, Kun Liu, Hengyu Lv, Chuanren Chen, Weiwei Pan, Yaohong Sun</i>	
Semi-Analytical Calculation Method for Eddy Current and Electromagnetic Force in Inductors of PPS System	149
<i>Zhizhen Liu, Xinjie Yu, Zhen Li, Bei Li</i>	
Electromagnetic Analysis of an Axial Flux Air-Core Compulsator.....	151
<i>Claudia Simonelli, Nicolò Gori, Giovanni Landi, Antonino Musolino, Luca Sani, Rocco Rizzo</i>	
Research on the Temperature Rise and Cooling Methods of Inductor in Inductive Pulsed Power Supply.....	153
<i>Bei Li, Xinjie Yu, Zhizhen Liu, Zhen Li</i>	
Development of Battery Cascade High Voltage Charging Power Supply Based on Time Sequence Encoding.....	155
<i>Jing Han, Yinghui Gao, Kun Liu, Ping Yan</i>	
Effect of Armature Mass on the Efficiency of High Current Linear Drive System.....	157
<i>Yiting Cao, Weidong Xu, Meng Wang, Wenping Cheng, Xuzhe Xu, Ping Yan</i>	
Study on the Testing Methods for Discharge Efficiency of PVDF-Based Film Capacitors	159
<i>Hao Geng, Xueke Gou, Yong Zhang, Pengfei Li</i>	

The Design of Liquid Metal Current Collector in EML.....	161
<i>Zhen Li, Xinjie Yu, Bei Li, Zhizhen Liu</i>	
Development of a Kicker Power Supply Driving Bump Magnets for the Korea-4GSR Injection System.....	163
<i>Sang Hee Kim, Jae Yu Lee, Chang Ki Min</i>	
A Comparative Study of Solid-State Pulse-Power Generators for High-Voltage Nanosecond Applications.....	165
<i>Saleh Edhah, Jamal Alsawalhi, Abdul R Beig, Noureddine Harid, Ameer Ibrahim, Musaab Salih</i>	
Development of Compact Marx Generator Based on Gas Discharge Tubes (GDTs) for Pulsed Power Experiments.....	167
<i>Yeonghwan Choi, Muhyeop Cha, Kyoung-Jae Chung, H. O. Kwon, H. J. Kwon, D. H. Son</i>	
Application of Pulsed Discharge to Separate CFRP Layer from CFRP/Steel Laminates.....	169
<i>Keita Sato, Taketoshi Koita, Manabu Inutsuka, Ryo Ogawa, Keisuke Ota, Tomoki Honda, Ryo Sasamoto, Takao Namihira, Chiharu Tokoro</i>	
The Effect of Thickness of Cathode Active Material Layer on Separation of Cathode Materials in Lithium-Ion Batteries Using Electrical Pulsed Discharge	171
<i>Moe Nakahara, Taketoshi Koita, Shinichi Higuchi, Asako Narita, Yusei Onithuka, Ryosuke Honda, Takao Namihira, Chiharu Tokoro</i>	
Analysis of High Voltage Pulse Characteristics for Electric Weed Control Application	173
<i>Roman Grinberg, Tobias Kämpfer, Martin Bauer</i>	
Influences of Explosive Field Emission Threshold to the Performance of Magnetron with Diffraction Output	175
<i>Shen Shou Max Chung, Shih-Chung Tuan</i>	
Approach Formulation for Frequency Tunability in Gyromagnetic Lines	177
<i>J. O. Rossi, F. Yamasaki, J. Barroso, L. P. Silva Neto, E. Schamiloglu</i>	
Effect of Surface Morphology on Armature Melt Wear	179
<i>Bingxuan Zhao, Lixue Chen, Shengqin Xu, Xuan Xu, Wenhao Zhang, Tingyun Xiao</i>	
General Description of Solid Armatures in Electromagnetic Railguns	181
<i>Lixue Chen, Wenhao Zhang, Lidong Li, Shengqin Xu</i>	
Modeling and Simulation Analysis of Linear Motor Finite Length Transfer Based on Abnormal Armature.....	183
<i>Li Pengfei, Gao Bo, Niu Zhipeng, Qiu Qunxian, Pang Guohua, Gu Gang, Li Xiang</i>	
Parameters Optimization Design of High-Speed Reluctance Coil Launchers.....	185
<i>Yadong Zhang, Ao Zhou, Zhiqiang Sun</i>	
Design and Analysis of Anti-Recoil Device for Launcher with Large Recoil Mass.....	187
<i>Xinke Ma, Gang Gu, Xiang Li, Zhipeng Niu, Qunxian Qiu, Bo Gao</i>	
Launch Efficiency of Capacitive Energy-Storage Electromagnetic Railgun System	189
<i>Tingyun Xiao, Lixue Chen, Xuan Xu, Shengqin Xu, Wenhao Zhang, Bingxuan Zhao</i>	
Design and Experimental Research of Ultra-High-Speed Electromagnetic Rail Launch Device	191
<i>Zhenchao Li, Wanyu Zhao, Yan Wang, Dejiang Yu, Yanbo Ma, Wenjie Zhao, Zhen Li, Xinjie Yu</i>	

Author Index