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June 19-23, 2011

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### **2P-86: DESIGN OF ELECTROMAGNETIC AND ELECTROTHERMAL LAUNCH TEST STANDS** **950**

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### **2P-88: Control of Thermal Limitations in Railguns** **959**

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### **2P-92: Design of a Single Stage Supersonic Reluctance Coilgun** **964**

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### **2P-94: Mathematical Modeling of a Solid State Pulse Power Modulator** **970**

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Alexandre CHUVATIN, Victor Kantsyrev, Alexey Astanovitsky, Radu Presura, Alla Safronova, Bruno LeGalloudec, V. Nalajala, Kenneth Williamson, I. Shrestha, G. Osborne, M. Weller, V. Shlyaptseva, Leonid Rudakov and Michael Cuneo

**4A-2: Status of the Z Pulsed Power Driver** **983**

Mark E. Savage, Keith R. LeChien, Mike R. Lopez, Brian S. Stoltzfus, William A. Stygar, David S. Artery, John A. Lott and Patrick A. Corcoran

**4A-6: Simulations of Dynamic Laser / Plasma X-Ray Production\*** **991**

Dale R Welch, Craig L Miller, David V Rose, Robert B Campbell, Bryan V Oliver, Timothy J Webb and Dawn G Flicker

**4A-7: Research of Non-Cylindrical Wire Arrays on ANGARA-5-1 Facility** **998**

Eugene V Grabovski, Valentine P Smirnov, Vladimir Aleksandrov, Mike Fedulov, Igor Frolov, Alexander Gribov, Arcady Gritsouk, Yan Laukhin, Stanislav Medovshikov, Konstantine Mitrofanov, Georgy Oleinik, Alexander Samokhin, Georgy Volkov, Vladimir Zaitsev, Pavel Sasorov, Vladimir Gasilov, Sergey D'yachenko, Olga Olkhovskaya, Alexander Shevel'ko and Oleg Yakushev

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**4B-1: New Self-Magnetically Insulated Connection of Multi-Level Accelerators to a Common Load for Fusion** **1003**

J Pace VanDevender, William L Langston, Michael F Pasik, Rebecca S Coats, Timothy D Pointon, David B Seidel, Christopher A Jennings, G Randall McKee and Larry X Schneider

**4B-2: Inverse Diode for Combination of Multiple Modules and Fusion Driver-Target Standoff** **1009**

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**4C-2: The Triggered Behaviour of a Controlled Corona Stabilised Cascade Switch** **1015**

Martin J Given, Mark P Wilson, Igor V Timoshkin, Scott J MacGregor, Tao Wang and Jane M Lehr

**4C-3: Triggered Vacuum Switch and Air Spark Gap for Pulsed Power Applications** **1021**

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**4C-5: High Pressure Sealed Hydrogen Spark Switches** **1026**

Spencer D Rendall, Zac Shotts, Frank Rose and Zach Roberts

**4C-7: Study on the Saturation Phenomena of Discharge Channel Number of a Gas Spark Switch Gap under Nanosecond Trigger Pulses** **1032**

Qiaogen Zhang, Hu Wang, Jiasen Chang and Aici Qiu

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**5A-1: Extension of the Operating Point of the Mercury IVA from 6 to 8 MV\*** **1036**

Raymond J Allen, Robert J Comisso, Gerald Cooperstein, Paul F Ottinger and Joseph W Schumer



<b>5A-2: Status of the AWE Hydrus Fabrication</b>	<b>1042</b>
Kenneth J Thomas, Paul F Beech, Stephen Brown, Jonathan Buck, James Burscough, Stephen G Clough, Ian Crotch, John Duffy, Chris Goes, Ian Huckle, Aled Jones, Alex King, Brian Stringer, James Threadgold, Stephen Trenaman, Roger Whealdon, Mathew Woodroffe, Victor Carboni, Tim DaSilva, Bob Galver, Ward Glazebrook, Kelly Hanzel, Jorge Pearce, John Pham, Stephen Pomeroy, Walter Saunders, David Spelts, Tom Warren, Brandon Whitney, J Wilson and S Schmit	
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<b>5A-6: Generation Supershort Avalanche Electron Beam and X-Ray During Subnanosecond Breakdown in Different Gases at Pressures from 1 Torr up to 15 Atm</b>	<b>1052</b>
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<b>5A-7: 3D Simulations of the Self-Magnetic-Pinch Diode</b>	<b>1057</b>
Mark D Johnston, Dale R Welch, Bryan V Oliver and Nichelle L Bruner	
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William Sullivan III, Cameron Hettler and James Dickens

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- 3P-11: Diode Particle Simulation Result Comparison with 2-D and 3-D Simulations by Using LSP and MCNP Codes.** **1138**  
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### **3P-24: Stimulation of HeLa Cells by Intense Pulsed Ultraviolet Radiation from Z-Pinch Discharge** **1171**

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Takashi Toyooka and Yasushi Minamitani

### **3P-30: The Investigation of the Proceeding Route of the Pulse Streamer Discharge in the Water Treatment by Pulsed Discharge in Air with Droplets of Water.** **1190**

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### **3P-38: Study of Underwater Shock Wave Induced Embryonic Modification In-vivo** **1208**

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### Pulsed Power Systems posters II: Repetitive and Single Shot Systems

- 3P-68: Status of Genesis a 5 MA Programmable Pulsed Power Driver** **1309**  
Steven F Glover, Forest E White, Peter J Foster, Diego J Lucero, Larry X Schneider, Kim W Reed, Gary E Pena, Jean-Paul Davis, Clint A Hall, Randy J Hickman, Keith C Hodge, Raymond W Lemke, Jane M Lehr, Dillon H McDaniel, James G Puissant, Joseph M Rudys, M.E. Sceiford, Steven J Tullar and Dave M Van De Valde
- 3P-70: High Voltage Surge Arrestor Testing with Enhanced Transformer Drive** **1315**  
Richard J Adler, David T Price, James Evans and David Wastell
- 3P-71: A Robust Modular IGBT Power Supply for Configurable Series/parallel Operation at High Power and Frequency.** **1321**  
Timothy Ziemba, Kenneth Miller, Jim Prager and John Carscadden
- 3P-72: Solid-State Marx Type Modulator for Plasma Based Ion Implantation Applications** **1326**  
Luis M S Redondo, Fabio H. M Cavalcante, Hiren Canacsinh, Marcos T Pereira, Maria R Gomes and Manuel R Silva
- 3P-74: A Disk EMG System for Driving Impacting Liners to ~ 20 Km/s** **1330**  
Anatoly M Buyko, Sergey F Garanin, Alexey M Glybin, Yury N Gorbachev, Pavel V Dudai, Vladimir I Dudin, Vadim V Zmushko, Galina G Ivanova, Andrey V Ivanovsky, Andrey I Kraev, Ivan V Morozov, Irina V Morozova, Alexandr N Skobelev, Valery B Yakubov, Walter L Atchison, Robert E Reinovsky and David B Holtkamp
- 3P-75: Development of a Boost Converter Topology for a High Repetition Pulsed Power Generator** **1336**  
Alireza Nami, Tatsuou Sakamoto, Masahiro Akiyama and Hidenori Akiyama
- 3P-76: A Repetitive Solid State Marx-Type Pulsed Power Generator Using** **1342**

## **Multi-Stage Switch-Capacitor Cells**

Masahiro Akiyama, Alireza Nami, Hidenori Akiyama and Tatsuro Sakamoto

### **3P-77: Design and Evaluation of a Water Blumlein Pulse Generator 1347**

Hoon Heo, Oh Ryong Choi and Sang Hoon Nam

### **3P-78: Behavior of Spark Gaps in Self Breakdown Mode 1350**

H Rahaman, JW Nam, B-J Lee and SH Nam

## **Wednesday, June 22 13:30-15:30**

### **Power Electronics posters**

#### **3P-82: Design and Control of an Inductive Adder for CLIC Damping Rings 1353**

Janne Holma, Mike M. J. Barnes and Seppo S. J. Ovaska

#### **3P-84: Gate-Drive for Solid-State Modulators with Improved Short Circuit Detection and Short Circuit Current Turn-off Capability 1359**

Dominic Gerber, Thomas Guillod and Juergen Biela

#### **3P-85: Improved Hybrid MOSFET/driver Switching Module for Pulsed Power Applications 1365**

Tao Tang and Craig Burkhart

#### **3P-86: Development of Inexpensive Electrical Probe for Wideband Voltage Measurement up to 300 kV 1369**

Hasibur Rahaman, Hoon Heo, Yoon Kyoo Son, Oh Ryong Choi, Sang H Nam, Joon Ho So and Chan Ho Kuk

#### **3P-88: A Compact 700-kV Erected Pulse Forming Network for HPM Applications 1372**

Clay Nunnally, Matthew B Lara, Jon R. Mayes, William C Nunnally and David W Kohlenberg

#### **3P-89: Power Supply with Bipolar Pulsed Output Voltage and High Repetition Rate Based on a Solid-State Marx Topology 1377**

David Tastekin, Frederic Blank, Achim Lunk and Joerg Roth-Stielow

#### **3P-91: Reconfigurable Compact Pulsed Power Modules 1382**

Jon R Mayes and WJ Carey

#### **3P-92: Recent Upgrade of the Klystron Modulator at SLAC 1386**

Minh N Nguyen, Craig P Burkhart, Briant K Lam and Ben Morris

#### **3P-93: Bouncer Circuit for a 120 MW/370 KV Solid State Modulator 1392**

Dominic Gerber and Juergen Biela

#### **3P-97: Compact Capacitor Charger Using Resonant MOSFET Inverter 1398**

Takashi Sakugawa, Yuto Matsumoto, Yuta Itoh, Hidenori Akiyama, Kenichi Suematsu, Atsushi Kouda, Masashi Watanabe and Shigeto Baba

#### **3P-99: Recharge of Electrochemical Energy Storage Devices at Pulsed Elevated Rates 1402**

Peter M Novak, David A Wetz, Biju Shrestha, Gopal C Sarkar, Jay P Kelley and James A Reed

#### **3P-100: Suppressing Thermal Energy Drift in the LLNL Flash X-Ray Accelerator Using Linear Disk Resistor Stacks 1408**

Timothy L Houck, Otto C Luchterhand and Blake R Kreitzer

**3P-101: Klystron Modulator Technology Challenges for the Compact Linear Collider (CLIC) 1413**

Davide Aguglia, Carlos de Almeida Martins, Miguel C. Bastos, David Nisbet, Daniel Siemaszko, Eleni Sklavounou and Philippe Viarouge

**3P-102: Modeling Solid-State Marx Generator Parasitic Capacitances for Optimization Studies 1422**

José F Silva, Hiren Canacsinh and Luis M Redondo

## **Wednesday, June 22 15:30-17:30**

### **Radiation Sources II: High Power Diodes**

**6A-2: High-Power, Pulsed Bremsstrahlung Source for Inducing Photo-Fission 1428**

David D Hinshelwood, Raymond J Allen, John P Apruzese, Robert J Commisso, Gerald Cooperstein, Stuart L Jackson, David Mosher, Donald P Murphy, Paul F Ottinger, Joseph W Schumer, Stephen B Swaneekamp, Bruce V Weber, Frank C Young, JC Zier, AW Hunt, ZM Larsen, ES Cardenas and AN Caruso

**6A-3: A Computation-Based Analysis of Photon-Induced Fission\* 1436**

John P Apruzese, Stephen B Swaneekamp, Donald P Murphy, Stuart L Jackson, Robert J Commisso, Joseph W Schumer, David Mosher and David D Hinshelwood

**6A-4: 6-7 MeV Characteristic Gamma Source Using a Plasma Opening Switch and a Marx Bank\* 1442**

Bruce V Weber, Stuart L Jackson, David G Phipps and Stavros J Stephanakis

**6A-5: Advanced Particle-in-Cell Techniques for Pulsed Power Device and HEDP Simulation\* 1448**

Dale R Welch, Robert E Clark, Carsten Thoma, Nichelle L Bruner, Thomas C Genoni, Christopher Mostrom, David V Rose, Bryan V Oliver, Mark D Johnson and William A Stygar

**6A-6: The Quantitative Effect of Anode Plasma on a Pinched Electron Beam from Particle in Cell Modelling of a Self Magnetic Pinch Diode 1453**

Jim R Threadgold, Dale R Welch and Philip N Martin

**6A-7: High-Current Reflex Triode Research\* 1459**

Donald P Murphy, Bruce V Weber, Stephen B Swaneekamp, Robert J Commisso, Raymond J Allen, John R Goyer, John C Riordan and Jerrold S Levine

## **Wednesday, June 22 15:30-17:30**

### **Power Electronics I: Power Electronics and Prime Power**

**6B-1: Discharge of Electrochemical Energy Storage Devices at Elevated Rates for Driving Pulsed Power Applications 1465**

Biju Shrestha, David A Wetz, Peter M Novak, Gopal C Sarkar, Jay P Kelley and James A Reed

**6B-2: Green Pulsed Power Achieved by Efficient Solid State Pulsed Power Technology 1471**

Walter Crewson, Mikael Lindholm and Klas Elmquist

- 6B-4: Unique High Energy Test Bed for Experimental Thyristors Devices** **1474**  
Shelby Lacouture, Stephen B Bayne, Michael Giesselmann, Kevin J Lawson, Heather O'Brien and Charles J Scozzie
- 6B-5: Enhanced MOSFET Gate Driver for IVA Based Pulsed Power Module** **1477**  
Pravin Iyengar, John E Fletcher, David J Bittlestone, Stephen J Finney and M.A. Sinclair
- 6B-6: Modeling and Characterization of VSCF Aircraft Electric Power Systems with Nonlinear Loading** **1482**  
Hassan El-Kishky, Hadi Ibrahimi, M Abu Dakka, A Eid and M Abdel-Akher
- 6B-7: Transient Performance of Battery/Fuel Cell-Based APU on Aircraft Electric Power Systems with Nonlinear Loading** **1486**  
Hassan El-Kishky, Hadi Ibrahimi, M Abu Dakka, A Eid and M Abdel-Akher

## Wednesday, June 22 15:30-17:30

### Pulsed Power Systems II: Electromagnetic Launch and Lasers

- 6C-3: Design and Implementation of an Advanced X-Ray Trigger Generator for EML Test Facilities** **1490**  
Brett M Huhman, Jesse M Neri and Thomas R Lockner
- 6C-4: A 40-Stage DES Plasma Arc Railgun** **1495**  
Ryan W Karhi, Ian K El-Dana, John J Mankowski, Michael Giesselmann and David A Wetz
- 6C-5: Simulation and Measurement on Velocity of Flat-Plate Projectiles in a Three-Stage Reconnection Electromagnetic Launcher** **1503**  
Xiongying Duan, Minfu Liao, Jiyan Zou, Chun Zhao, Zhengyang Zhou and Lin Xiaopeng

## Thursday, June 23 09:30-12:00

### Pulsed Power Systems III: Repetitive and Single Shot Systems

- 7A-1: Impact of Time Varying Loads on the Programmable Pulsed Power Driver Called Genesis** **1508**  
Steven F Glover, Jean-Paul Davis, Larry X Schneider, Kim W Reed, Gary E Pena, Clint A Hall, Heath L Hanshaw, Randy J Hickman, Keith C Hodge, Raymond W Lemke, Jane M Lehr, Diego J Lucero, Dillon H McDaniel, James G Puissant, Joseph M Rudys, Matthew E Sceiford, Steven J Tullar, Dave M Van De Valde, Forest E White, L K Warne, R S Coats, R E Jorgenson and W A Johnson
- 7A-2: Isentropic Compression Studies at the Los Alamos National High Magnetic Field Laboratory** **1516**  
Douglas G Tasker, Charles H Mielke, George Rodriguez and Dwight G Rickel
- 7A-4: Transformer-Based, Repetitive Pulsed Power Driver for a Dense Plasma Focus\*** **1522**  
Colt James, Brian Bures, Robert E Madden and Mahadevan Krishnan
- 7A-5: Development of A Modulator Pulse Stability Measurement Device and Test Results at SLAC** **1526**  
Chaofeng Huang, Craig Burkhart, Mark Kemp, Ben Morris, Tony Beukers, Minh Nguyen and Rosa Ciprian



- 7A-6: SiC Super GTO Technology Development: Present Status and Future Perspective** **1530**  
Jon Q. Zhang, John Palmour, Vic Temple, Aderinto Ogunniyi, Heather O'Brien, Charles Scozzie, Lin Cheng, Al Burk, Michael O'Loughlin, Craig Capell and Anant Agarwal
- 7A-7: Capacitor Bank for ITER Fast Discharge Unit** **1536**  
Boris E. Fridman, Rustam Sh. Enikeev, Nikolay A. Kovrizhnykh, A Pekhotnyi, Alexander G. Roshal, Roman A. Serebrov and Karina S. Kharcheva
- 7A-8: Semiconductor Switches in a Counter-Pulse Capacitor Bank** **1542**  
Roman A. Serebrov, Rustam Sh. Enikeev and Boris E. Fridman

## Thursday, June 23 09:30-12:00

### Applications III: Medical, Biological and Environmental Applications

- 7B-1: Single Nanosecond Pulsed Power Induced Structural Modifications of Medaka Fish Embryo** **1549**  
D.K Kang, S.H.R Hosseini, E Shiraishi, M Yamanaka and H Akiyama
- 7B-2: CONTROL OF CURRENT INTENSITY: EXPERIMENTAL PROOFS OF THE RELEVANCE OF CURRENT DENSITY IN BIOLOGICAL CELLS PERMEABILISATION CAUSED BY NANOSECOND ELECTRIC PULSES** **1553**  
Aude Silve, I Leray, René Vezinet and Lluís M Mir
- 7B-4: Response of HeLa Cells to Transient Thermal Shock** **1559**  
Kazunori Mitsutake, Shinya Moriyama, Keisuke Abe, Sunao Katsuki, Hidenori Akiyama, Tuyoshi Shuto, Hirofumi Kai and Sunao Katsuki
- 7B-5: Modification of Dielectric Characteristics of Cells by Intense Pulsed Electric Field** **1564**  
Jie Zhuang, Karl H Schoenbach and Juergen F Kolb
- 7B-7: Influence of Gas Flow Rate and Pressure in Reactor on Ozone Production Using a Compact Pulsed Power Generator** **1570**  
Fumiaki Tanaka, Takumi Iwaishi, Takashi Sakugawa and Hidenori Akiyama
- 7B-10: A comparison of the efficacy of pulsed UV light and pulsed plasma gas-discharge systems for the novel inactivation of Cryptosporidium spp. and other clinically relevant microorganisms in drinking water** **1574**  
Jennifer C Hayes, Andrew M Fogarty, Eoghan Clifford and Neil J Rowan

## Thursday, June 23 09:30-12:00

### Power Electronics II: Modulators and Power Supplies

- 7C-3: Final Design of the SLAC P2 Marx Klystron Modulator** **1582**  
Mark A Kemp, Andrew Benwell, Craig Burkhart, Ray Larsen, David MacNair, Minh Nguyen and Jeff Olsen
- 7C-4: Rep-Rated Operation of a Modular Compact HV-Capacitor Charger** **1590**  
Travis T Vollmer and Michael G Giesselmann
- 7C-6: Pulse to Pulse Stability at Parts per Million (ppm) Level** **1593**

Carl Hartman, Magnus Graas, Klas Elmquist, Mikael Lindholm and Walter Crewson

**7C-7: High Power Pulse Quality Using Solid State Technology**

**1598**

Klas Elmquist, Mikael Lindholm and Walter Crewson