

# **2019 IEEE Electrical Insulation Conference (EIC 2019)**

**Calgary, Alberta, Canada  
16-19 June 2019**



**IEEE Catalog Number: CFP19EEI-POD  
ISBN: 978-1-5386-7625-7**

**Copyright © 2019 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. 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:	CFP19EEI-POD
ISBN (Print-On-Demand):	978-1-5386-7625-7
ISBN (Online):	978-1-5386-7624-0
ISSN:	2334-0975

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# TABLE OF CONTENTS

<b>ANALYSIS OF THE DEGRADATION KINETICS OF KAPTON FILM IN AN AEROSPACE ENVIRONMENT</b> .....	1
<i>Hasti Haghighi ; Ian Cotton</i>	
<b>IMPROVING DIELECTRIC PROPERTIES AND SUPPRESSION OF PARTIAL DISCHARGES IN FIBER/THERMOSET-MATRIX COMPOSITES BY POLYMERIC NANOFIBERS</b> .....	5
<i>Radek Polansky ; Pavel Prosr ; Josef Pihera ; Jiri Chvoika ; Tomáš Kyselák</i>	
<b>A NOVEL NONLINEARLY EQUIVALENT CIRCUIT MODEL FOR CALCULATING ELECTRIC FIELDS ALONG THE STATOR END-WINDING OF HV ROTATING MACHINE</b> .....	9
<i>Ping Liu ; Xuezhong Liu ; Yue Zhang ; Zhiming Liang ; Bo Hu</i>	
<b>CHARACTERISTIC RESEARCH ON THE SENSOR FOR INTER-TURN PARTIAL DISCHARGE MEASUREMENT OF INVERTER-FED MOTOR WINDING</b> .....	13
<i>Pengfei Yuan ; Xuezhong Liu ; Tianlong Zhang ; Ping Liu</i>	
<b>TEMPERATURE DEPENDENCE OF RPDIV OF MOTORETTE SAMPLE WITH VARNISH TREATMENT</b> .....	18
<i>Yasutaka Nishigaki ; Takakazu Matsuzoe ; Tomohiro Kubo ; Yusuke Nakano ; Masahiro Kozako ; Masayuki Hikita ; Takahiro Nakamura ; Jintong Sun ; Aoto Izumi ; Takavuki Sakurai ; Kazunari Karasawa ; Kenichi Nojima</i>	
<b>A NEW APPROACH TO MAKE THE ELECTRIC FIELD UNIFORM ALONG THE STRESS GRADING SYSTEM OF A FORM-WOUND COIL UNDER SQUARE WAVES</b> .....	22
<i>Alireza Naeini ; Edward A. Cherney ; Shesha H. Jayaram</i>	
<b>THE EFFECTS OF STEEP VOLTAGE SLOPES ON INSULATION SYSTEMS OF COIL WINDINGS CAUSED BY NEXT GENERATION POWER SEMICONDUCTOR DEVICES</b> .....	26
<i>Vivien Grau ; Rik W. De Doncker</i>	
<b>INVESTIGATION OF PARTIAL DISCHARGE IN AIRCRAFT CONFORMALLY-COATED PRINTED CIRCUIT BOARDS</b> .....	30
<i>Ehsan Zeynali ; Ryan Bridges ; Behzad Kordi</i>	
<b>FINITE ELEMENT MODELING OF PARTIAL DISCHARGE ACTIVITY WITHIN A SPHERICAL CAVITY IN A SOLID DIELECTRIC MATERIAL UNDER FAST, REPETITIVE VOLTAGE PULSES</b> .....	34
<i>Moein Borgheti ; Mona Ghassemi</i>	
<b>INFLUENCE OF METAL PARTICLES ON DISCHARGE CHARACTERISTICS OF INSULATING OIL UNDER LIGHTNING IMPULSE</b> .....	38
<i>Chao Wei ; Xiaoping Yang ; Jiansheng Li ; Yuncai Lu ; Lei Sun ; Tonglei Wang ; Bonan Li ; Houying Li ; Youyuan Wang</i>	
<b>THE IMPLICATIONS ON THE PD CHARACTERISTICS OF UNIPOLAR VERSUS BIPOLAR PWM WAVEFORMS</b> .....	42
<i>Thomas Hammarström</i>	
<b>COMPUTATION OF THE CORONA ONSET VOLTAGE FOR DC AT TWO DIFFERENT ALTITUDES</b> .....	46
<i>R. Vázquez Cortés ; F. P. Espino Cortés ; R. Linares Y Miranda ; A. Ozdemir ; S. Ilhan</i>	
<b>EFFECT OF VIBRATION ON SURFACE DISCHARGE OF EPOXY RESIN</b> .....	50
<i>Siyun Wang ; Ming Ren ; Changjie Xia ; Tianxin Zhuang ; Shujing Yang ; Xiaojing Dou</i>	
<b>IOT-BASED ON-LINE MONITORING SYSTEM FOR PARTIAL DISCHARGE DIAGNOSIS OF CABLE</b> .....	54
<i>Gao Xu-Ze ; Zhuang Tianxin ; Ren Ming ; Song Bo ; Huang Wenguang ; Dong Ming</i>	
<b>ENHANCING THE ACCURACY OF PARTIAL DISCHARGE LOCALIZATION IN POWER TRANSFORMERS USING THE UHF MEASUREMENT TECHNIQUE</b> .....	58
<i>Mohammad Akbari Azirani ; Mohamadreza Ariannik ; Peter Werle ; Asghar Akbari</i>	
<b>NONLINEAR FIELD DEPENDENT CONDUCTIVITY MATERIALS FOR ELECTRIC FIELD CONTROL WITHIN NEXT-GENERATION WIDE BANDGAP POWER ELECTRONICS MODULES</b> .....	63
<i>Maryam Mesgarpour Tousi ; Mona Ghassemi</i>	
<b>SEARCHING FOR OPTIMAL CONNECTION SCHEMES FOR PARTIAL DISCHARGE TESTING OF INVERTER-FED ROTATING MACHINES</b> .....	67
<i>Andrea Cavallini ; Luca Lusuardi ; Alberto Rumi ; Ken Kimura ; Alfredo Contin ; Tao Han</i>	
<b>ESTIMATION OF THE PARTIAL DISCHARGE INCEPTION VOLTAGE OF LOW VOLTAGE CABLES</b> .....	71
<i>Richard Cselko ; Istvan Kiss</i>	

<b>PARTIAL DISCHARGE DETECTION STRATEGIES UNDER FAST RISE TIME VOLTAGES GENERATED BY WIDE-BANDGAP SEMICONDUCTOR DEVICES .....</b>	<b>75</b>
<i>Zhuo Wei ; Haoyang You ; Risha Na ; Jin Wang</i>	
<b>CAN LOW VOLTAGE INVERTER-FED INDUCTION MOTORS BE DESIGNED ALLOWING PARTIAL DISCHARGE ACTIVITY?.....</b>	<b>79</b>
<i>Luca Lusuardi ; Alberto Rumi ; Andrea Cavallini ; Peng Wang ; Tao Han</i>	
<b>DIELECTRIC AND INSULATION PROPERTIES OF POLYIMIDE-BASED BOEHMITE NANOCOMPOSITE MATERIAL.....</b>	<b>83</b>
<i>Takakazu Matsuzoe ; Naoki Kita ; Yasutaka Nishigaki ; Tsuyoshi Abe ; Tomohiro Kubo ; Yusuke Nakano ; Masahiro Kozako ; Masayuki Hikita ; Nobutaka Fujimoto ; Noriyuki Hayashizaka ; Shohei Fujimoto ; Toshihiko Kato</i>	
<b>ACOUSTIC NOISE EMITTED FROM OVERHEAD LINE CONDUCTORS WITH SUPERHYDROPHOBIC COATING.....</b>	<b>87</b>
<i>Xu Zhang ; Chengxing Lian ; Christopher Emersic ; Ian Cotton</i>	
<b>DESIGN OF THE POLYMER INSULATOR BETWEEN HVDC CONVERTER VALVE MODULES.....</b>	<b>91</b>
<i>Jae-Hong Koo ; Ho-Young Lee ; Ryul Hwang ; Jong-Min Joo ; Jae-Won Park ; Bang-Wook Lee</i>	
<b>DEVELOPMENT OF HIGH THERMAL CONDUCTIVITY EPOXY COMPOSITE FOR LARGE CURRENT SWITCHGEAR.....</b>	<b>96</b>
<i>Gen Komiya ; Takahiro Imai ; Yasuhisa Miyauchi</i>	
<b>EXAMINATION OF CLEARANCES DURING HIGH VOLTAGE LIVE-LINE WORKING.....</b>	<b>104</b>
<i>Dávid Szabó ; Gábor Göcsei ; Bálint Németh ; Cselkó Richárd ; Levente Rác</i>	
<b>DETECTION OF FORCED COOLING FAULTS IN POWER TRANSFORMERS BASED ON WINDING TEMPERATURE INDICATOR AND LOAD DATA.....</b>	<b>111</b>
<i>Atip Doolgindachbaporn ; Nik Hakimi Nik Ali ; George Callender ; James Pilgrim ; Paul Lewin ; Gordon Wilson</i>	
<b>EVALUATION OF NATURAL ESTER RETROFILLED TRANSFORMERS AFTER ONE YEAR OF CONTINUOUS OVERLOAD .....</b>	<b>115</b>
<i>Robert C. Breazeal ; Alan Sbravati ; Diego M. Robalino</i>	
<b>LABORATORY MODEL FOR EVALUATION OF INCIPIENT TRANSFORMER THERMAL FAULT INVOLVING INSULATING .....</b>	<b>120</b>
<i>Helena M. Wilhelm ; Paulo O. Fernandes ; Thatiane K. Pereira ; Geovana C. Santos ; Daniel Aroucha Filho ; Arley Mar ; Marcelo Ribeiro</i>	
<b>CORONA IN HIGH VOLTAGE ROTATING MACHINES STATOR. CAUSES, REPAIR AND PROGNOSIS.....</b>	<b>124</b>
<i>Anna Gegenava ; Aleksandr Khazanov ; Fred Dawson</i>	
<b>CALCULATION OF THE ELECTRIC FIELD INSIDE CAVITIES FOUND THROUGH STATOR BAR DISSECTION .....</b>	<b>129</b>
<i>E. Cloutier-Rioux ; H. Provencher ; A. Turgeon ; C. Hudon</i>	
<b>OBSERVATIONS FROM THE DISSECTION OF SEVERAL AGED STATOR COILS FROM DIFFERENT HYDROGENERATORS.....</b>	<b>133</b>
<i>Greg Stone ; Howard Sedding ; Ron Wheeler ; Alastair Wilson</i>	
<b>ESTIMATING THE THERMAL STABILITY OF CELLULOSE INSULATION USING MSD AND T<sub>G</sub> PARAMETERS BY MOLECULAR DYNAMICS SIMULATION.....</b>	<b>152</b>
<i>Wei Hou ; Lijun Yang ; Yang Mo ; Tiantian Zou ; Youyu Huang ; Xiaoling Zheng</i>	
<b>MODELLING TRANSFORMER CORE WITH APPROPRIATE BOUNDARY CONDITIONS FOR PARTIAL DISCHARGE STUDIES .....</b>	<b>156</b>
<i>Santosh Janaki Raman ; Pritam Mukherjee ; Sanjib Kumar Panda</i>	
<b>TRANSFORMER INSULATION DEGREE OF POLYMERIZATION ESTIMATION THROUGH ADAPTIVE NEURO FUZZY INFERENCE SYSTEM APPROACH .....</b>	<b>160</b>
<i>Edwell. T. Mharakurwa ; George. N. Nyakoe ; A. O. Akumu</i>	
<b>UNIDIRECTIONAL ACCELERATED LIFETIME INVESTIGATIONS OF MECHANICALLY DOMINATED AGED ELECTRICAL INSULATION SYSTEM USED IN GENERATOR WINDING BARS .....</b>	<b>164</b>
<i>Alessandro Cimino ; Frank Jenau ; Andrey Mashkin ; Daniel Behnisch ; Ralf Merte ; Hendrik Steins ; Friedhelm Pohlmann</i>	
<b>PARTIAL DISCHARGE CHARACTERISATION OF STATOR WINDINGS TAKEN FROM A 50-YEAR-OLD NORWEGIAN HYDROGENERATOR .....</b>	<b>168</b>
<i>Gunnar Berg ; Espen Eberg ; Sverre Hvidsten</i>	
<b>INVESTIGATION OF PARTIAL DISCHARGE ACTIVITY AND INSULATION LIFE OF A LARGE HYDRO GENERATOR.....</b>	<b>172</b>
<i>Reza Soltani ; Pascalina Gaillardetz ; Igor Chichkin ; Bruce Ledger</i>	

<b>PARTIAL DISCHARGE INCEPTION VOLTAGE IN DC INSULATION SYSTEMS: A COMPARISON WITH AC VOLTAGE SUPPLY</b> .....	176
<i>Paolo Seri ; Leonardo Cirioni ; Hadi Naderiallaf ; Gian Carlo Montanari ; Robert Hebner ; Angelo Gattozzi ; Xianyong Feng</i>	
<b>THE RPDIV AND THE LIMITS OF ITS DEFINITION ACCORDING TO IEC 60034-18-41: THE EFFECT OF VOLTAGE CONDITIONING</b> .....	180
<i>Andrea Caprara ; Giacomo Ciotti ; Andrea Cavallini ; Alberto Rumi</i>	
<b>OPTO ELECTRONIC TECHNIQUE FOR DETECTION OF CORONA DISCHARGES IN AIR AND OIL</b> .....	184
<i>Nageshwar Rao Burjupati ; Dillip Kumar Puhan ; Rajat Sharma</i>	
<b>A NEW REPRESENTATION OF PASCHEN'S LAW SUITABLE FOR VARIABLE TEMPERATURE POWER APPLICATIONS</b> .....	188
<i>Aws Al-Taie ; Chanyeop Park ; Peter Cheatham ; Chul Han Kim ; Lukas Graber ; Sastry V. Pamidi</i>	
<b>POLYMER-IMPREGNATED CONCRETE INSULATORS/INSULATING STRUCTURES</b> .....	193
<i>Muthian Gunasekaran</i>	
<b>INVESTIGATION OF PERSEA AMERICANA OIL AS AN ALTERNATIVE TRANSFORMER INSULATION OIL</b> .....	197
<i>Benard M. Makaa ; George K. Irungu ; David K. Murage</i>	
<b>INFLUENCE OF AMBIENT HUMIDITY ON PDIV AND ENDURANCE OF INVERTER-FED MOTOR INSULATION</b> .....	201
<i>Peng Wang ; Yanghao Gu ; Qi Wu ; Andrea Cavallini ; Qin Zhang ; Jiawei Zhang</i>	
<b>MATERIAL TEMPERATURE DEPENDENCE ON BEHAVIOR OF PARTIAL DISCHARGE IN EPOXY RESIN</b> .....	205
<i>Tatsuya Sakoda ; Mitsuki Kawakone ; Noriyuki Hayshi ; Makoto Setoguchi</i>	
<b>TEMPERATURE AND ELECTRIC FIELD UNDER PULSE VOLTAGE ALONG THE STRESS GRADING SYSTEM OF A FORM-WOUND COIL</b> .....	209
<i>Alireza Naeini ; Edward A. Cherney ; Shesha H. Jayaram</i>	
<b>INFLUENCE OF CAVITY GEOMETRY ON PARTIAL DISCHARGE MEASUREMENT AT VERY LOW FREQUENCY</b> .....	213
<i>S. Morsalin ; B. T. Phung ; M. G. Danikas</i>	
<b>WATER TREE DETECTION IN MEDIUM VOLTAGE XLPE CABLES</b> .....	217
<i>W. McDermid ; M. Partyka ; T. Black</i>	
<b>PARTIAL DISCHARGES IN XLPE INSULATED CABLE UNDER SUPERIMPOSED TRANSIENT VOLTAGES</b> .....	221
<i>Jiayang Wu ; Paul V. M. Van Nes ; Armando Rodrigo Mor ; Johan J. Smit</i>	
<b>THE EFFECT OF AC RIPPLE VOLTAGE ON SPACE CHARGE ACCUMULATION IN DOUBLE LAYER POLYMER SAMPLES</b> .....	226
<i>A. A. Mulla ; S. J. Dodd ; N. Chalashkanov ; L. A. Dissado</i>	
<b>EVALUATION OF NANO-COMPOSITE XLPE COMPOUND ON ACCELERATED AGING CABLE PERFORMANCE</b> .....	230
<i>Suh Joon Han ; Scott Wasserman</i>	
<b>EFFECTS OF ACETOPHENONE ON CHARGE DYNAMICS IN LOW DENSITY POLYETHYLENE</b> .....	234
<i>Meng Chen ; Yi Yin ; Hongliang Zhang ; Zhen Gao ; Zhuang Ma ; Jiandong Wu</i>	
<b>LONG-TERM DURABILITY OF STEARIC ACID SILICON DIOXIDE NANOPARTICLE SUPERHYDROPHOBIC COATING ON ALUMINIUM ALLOY OVERHEAD LINE CONDUCTORS</b> .....	238
<i>Chengxing Lian ; Xu Zhang ; Christopher Emersic ; Robert Lowndes ; Ian Cotton</i>	
<b>INVESTIGATION OF THE THICKNESS EFFECT ON DC BREAKDOWN STRENGTH FOR HVDC FLEXIBLE CABLE INSULATION ASSOCIATED WITH SPACE CHARGE</b> .....	242
<i>Pengfei Su ; Yi Yin ; Xinlong Zheng ; Yaowei Xuan ; Jiandong Wu</i>	
<b>MEASUREMENT OF SPACE CHARGE DISTRIBUTION CHARACTERISTICS IN THE ACTUAL HVDC CABLE</b> .....	246
<i>Yifan Zhou ; Wei Wang ; Tailong Guo ; Jiale Qi</i>	
<b>ANALYSIS OF AC 500KV XLPE SUBMARINE CABLE INSULATION LABORATORY AGING CONDITION BASED ON FREQUENCY DOMAIN DIELECTRIC SPECTROSCOPY</b> .....	250
<i>Zhiqian Liu ; Zhen Gao ; Jian Hao ; Cong Liu ; Hanping Li ; Xize Dai</i>	
<b>CAPACITIVE TRANSFER CABLE AND ITS PERFORMANCE IN COMPARISON WITH CONVENTIONAL SOLID INSULATED CABLE</b> .....	254
<i>Yang Yang ; Mohamed Darwish ; Mansour Moghadam ; Dominic Quennell ; Ashkan Hajiloo</i>	

<b>SIMULATION OF NANOFUID AS A TWO-PHASE FLOW IN A DISTRIBUTION TRANSFORMER .....</b>	<b>258</b>
<i>Leyla Raeisian ; Peter Werle ; Hamid Niazmand</i>	
<b>INFLUENCE OF PRESSBOARD ORIENTATION IN THE ELECTRIC FIELD ON LIGHTNING IMPULSE DISCHARGE CHARACTERISTICS OF OIL-PRESSBOARD INSULATION .....</b>	<b>275</b>
<i>Jiansheng Li ; Chao Wei ; Yiming Wu ; Shengquan Wang ; Yuandi Lin ; Leifeng Huang ; Houying Li ; Youyuan Wang</i>	
<b>RESEARCH ON TRANSFORMER CONDITION-BASED MAINTENANCE OPTIMIZATION BASED ON LIVE DETECTION.....</b>	<b>283</b>
<i>Jieqing Deng ; Chao Wei ; Jiansheng Li ; Houying Li ; Guangyao Wang ; Youyuan Wang</i>	
<b>STUDY ON THE AGEING CHARACTERISTICS OF PERSEA AMERICANA OIL AS AN ALTERNATIVE TRANSFORMER INSULATION OIL.....</b>	<b>287</b>
<i>Benard M. Makaa ; George K. Irungu ; David K. Murage</i>	
<b>CLASSIFICATION OF INSULATING LIQUIDS THERMAL TREATMENT USING INFRARED SPECTROSCOPY AND MULTIVARIATE STATISTICAL METHOD .....</b>	<b>291</b>
<i>Pavel Prosr ; Radek Polanský ; Josef Pihera ; Pavel Hahn</i>	
<b>GEOMETRICALLY OPTIMIZED PHASE CONFIGURATIONS AND SUB-CONDUCTORS IN THE BUNDLE FOR POWER TRANSMISSION EFFICIENCY.....</b>	<b>295</b>
<i>Moein Borgheti ; Mona Ghassemi</i>	
<b>INSULATING LIQUIDS, AN ALTERNATIVE TO SILICONE GEL FOR POWER ELECTRONIC DEVICES .....</b>	<b>299</b>
<i>Ouassim Agri ; Jean Louis Auge ; Eric Vagnon ; François Buret</i>	
<b>A STUDY OF RELATIONSHIP BETWEEN V-T AND TAN<math>\delta</math> CHARACTERISTIC ON EPOXY RESIN .....</b>	<b>304</b>
<i>Jaehun Yoon ; Jinhun Kwon ; Jaeseop Ryu ; Cheayoon Bae ; Jongung Choi ; Younggeun Kim</i>	
<b>EFFECT OF GAS-PHASE FLUORINATION ON TRAP LEVEL OF NANO-ALUMINA / EPOXY RESIN NANOCOMPOSITES.....</b>	<b>308</b>
<i>Feipeng Wang ; Muhammad Zeeshan Khan ; Li He ; Zhengyong Huang ; Mo Yang</i>	
<b>SPACE CHARGE ANALYSIS OF EPOXY-BORON NANO-COMPOSITES AND THE IMPORTANCE OF DISPERSION TECHNIQUES.....</b>	<b>312</b>
<i>Debarshi Saha ; Roman Kochetov ; Peter H. F. Morshuis</i>	
<b>DIAGNOSTIC TECHNIQUE FOR ELECTRICAL TREE BY CURRENT INTEGRATION METHOD.....</b>	<b>317</b>
<i>Shinya Iwata ; Ryota Kitani ; Tatsuo Takada</i>	
<b>STUDY ON LOCATION ACCURACY OF PARTIAL DISCHARGE LOCATOR .....</b>	<b>321</b>
<i>Katsuya Yamashita ; Takuma Miyake ; Tatsuya Sakoda ; Wataru Kawano</i>	
<b>TRANSFORMER REMNANT LIFE ESTIMATION AND ASSET MANAGEMENT MODEL BASED ON INSULATION STRESS ASSESSMENT .....</b>	<b>325</b>
<i>Edwell T. Mharakurwa ; George. N. Nyakoe ; A. O. Akumu</i>	
<b>IMPROVING THE ASSESSMENT OF REMAINING LIFE OF SERVICE AGED POWER TRANSFORMERS.....</b>	<b>330</b>
<i>Ali Naderian ; Pranav Pattabi ; Laurent Lamarre</i>	
<b>TECHNICAL AND ECONOMIC ANALYSIS OF COPPER UTILIZATION ON NEW WINDINGS OF REPAIRED DISTRIBUTION TRANSFORMERS ORIGINALLY DESIGNED FOR ALUMINUM.....</b>	<b>335</b>
<i>Jansen Villibor ; Estácio Wanderley Neto ; Gustavo Lopes ; Gabriel Faria ; Matheus Pereira ; Tiago Nogueira ; Paulo Tavares</i>	
<b>PLASMA DYNAMIC SIMULATIONS OF PARTIAL DISCHARGES WITHIN ELECTRICAL TREE STRUCTURES.....</b>	<b>340</b>
<i>George Callender ; Paul L. Lewin</i>	
<b>MULTIVARIATE TIME SERIES MODELING FOR LONG TERM PARTIAL DISCHARGE MEASUREMENTS IN MEDIUM VOLTAGE XLPE CABLES.....</b>	<b>344</b>
<i>Zeeshan Ahmed ; Mojtaba Rostaghi Chalki ; Kamran Yousfpour ; Joni Klüss</i>	
<b>RESEARCH ON STAGES OF AC CORONA DISCHARGE BASED ON VISIBLE DIGITAL IMAGES GRAY-LEVEL CO-OCCURRENCE MATRIX.....</b>	<b>348</b>
<i>Ziqing Guo ; Qizheng Ye ; Yuwei Wang</i>	
<b>RESEARCH ON ARC NON-THERMAL EQUILIBRIUM CHARACTERISTICS USING CHROMATICITY INFORMATION FROM A VISIBLE DIGITAL IMAGE .....</b>	<b>352</b>
<i>Yuwei Wang ; Qizheng Ye ; Ziqing Guo</i>	
<b>A NOVEL BREAKDOWN PROTECTION CIRCUIT FOR ENDURANCE TESTS UNDER REPETITIVE IMPULSIVE VOLTAGES .....</b>	<b>356</b>
<i>Peng Wang ; Yanghao Gu ; Qi Wu ; Andrea Cavallini ; Qin Zhang ; Jiawei Zhang</i>	

<b>FAULT DIAGNOSIS IN ROTOR WINDINGS IN DFIG USING MAGNETIC FLUX MEASUREMENT COIL ANTENNA</b> .....	360
<i>Attiq Ur Rehman ; Yong Zhao ; Guorui Huang ; Yihan Zhao ; Yu Chen ; Yonghong Cheng ; Toshikatsu Tanaka ; Peng Wang</i>	
<b>EVALUATION OF OFFLINE PARTIAL DISCHARGE IN VACUUM ENVIRONMENTS</b> .....	364
<i>Howard W Penrose ; Matthew B Dreisilker</i>	
<b>DETECTION OF PARTIAL DISCHARGES OCCURRING IN PROPULSION COILS OF SUPERCONDUCTING MAGLEV SYSTEMS USING A RADIO INTERFEROMETER SYSTEM WITH A VECTOR-ANTENNA MOUNTED ON A TEST BOGIE</b> .....	368
<i>Masatake Kawada ; Ryohei Ikeda ; Masayuki Aiba ; Ken Watanabe ; Masao Suzuki</i>	
<b>EFFECT OF NANOFIBRILLATED CELLULOSE DOPING ON PROPERTIES OF OIL IMMERSED INSULATING PAPER DURING THERMAL AGING</b> .....	372
<i>Yang Mo ; Rnjin Liao ; Lijun Yang ; Yuan Yuan</i>	
<b>RAPID ANALYTICAL METHOD FOR ELEMENTAL SULPHUR DETECTION IN POWER TRANSFORMER INSULATION</b> .....	376
<i>Sérgio Garcia ; Richard C. D. Brown ; G. John Langley ; Peter Birkin ; James Pilgrim ; Paul Lewin ; Gordon Wilson</i>	
<b>INFLUENCE OF OIL DUCT VARIATION ON THERMAL CHARACTERISTICS OF CONVERTER TRANSFORMER WINDING</b> .....	380
<i>Cong Liu ; Jian Hao ; Runhao Zou ; Zhiwei Li</i>	
<b>ESTIMATION OF INTERPHASE PERMITTIVITY AND INTERPHASE THICKNESS IN EPOXY BASED NANOCOMPOSITES USING ELECTROSTATIC FORCE MICROSCOPY</b> .....	384
<i>Asha Sharma ; Sumit Basu ; Nandini Gupta</i>	
<b>INFLUENCE OF METAL OXIDE AND METALLOID NANO PARTICLES ON THE DIELECTRIC RESPONSE OF HVDC CABLE NANO DIELECTRIC</b> .....	388
<i>Nageshwar Rao Burjupati ; R Kandiban ; C Ashwin Parthasarathy</i>	
<b>IMPULSE VOLTAGE-BASED TEST METHOD FOR IDENTIFYING THE STATOR INSULATION COMPONENT WITH PD ACTIVITY FOR LOW VOLTAGE AC MOTORS</b> .....	392
<i>Sang Bin Lee ; Alireza Naeini ; Shesha Jayaram ; Greg C. Stone ; Mladen Šašić</i>	
<b>DIELECTRIC RESPONSE ANALYSIS AS TOOL TO ASSESS THE MECHANICAL DETERIORATION OF VPI INSULATION</b> .....	396
<i>Christian Staubach ; Soeren Meissner ; Alessandro Cimino</i>	
<b>COMPATIBILITY OF MICA BINDER RESINS WITH MEDIUM AND HIGH VOLTAGE IMPREGNATION RESINS</b> .....	400
<i>Tan Nguyen</i>	
<b>SYNTHESIS OF EXPERIENCES USING RESISTIVE TEMPERATURE DETECTORS (RTD) AS PD SENSORS FOR DETECTING AND LOCATING ELECTRICAL DEFECTS INSIDE GENERATOR STATOR WINDINGS</b> .....	405
<i>Raja Kuppuswamy ; Sandy Rainey</i>	
<b>ADDITIVE EFFECT ON DIELECTRIC SPECTRA OF CROSSLINKED POLYETHYLENE (XLPE) USED IN NUCLEAR POWER PLANTS</b> .....	410
<i>Simone Vincenzo Suraci ; Davide Fabiani ; Chuanyang Li</i>	
<b>HIGH RESOLUTION CHEMICAL ANALYSIS OF ELECTRICAL TREES THROUGH AFM-IR SPECTROSCOPY</b> .....	414
<i>Harry McDonald ; Simon Rowland ; Suzanne Morsch</i>	
<b>OFF-LINE AND LABORATORY ON-LINE PD TESTS ON THERMALLY AGED MV CABLE JOINTS</b> .....	418
<i>Johnny Borghetto ; Giovanni Pirovano ; Carlo Tornelli ; Alfredo Contin</i>	
<b>A MODIFIED MEASUREMENT TECHNIQUE BASED ON THE DEPOLARIZATION CURRENT USED FOR POWER CABLE</b> .....	423
<i>Xi Zhu ; Jiandong Wu ; Xinlong Zhen ; Qiwei Bao ; Chuansheng Zhang ; Yi Yin</i>	
<b>STATISTICAL SIGNIFICANCE OF WAVELET EXTRACTED FEATURES IN THE CONDITION MONITORING OF CERAMIC OUTDOOR INSULATORS</b> .....	432
<i>Ahmed S. Haiba ; Ahmed Gad ; Soliman M. Eldebeiky ; Mamdouh Halawa</i>	
<b>ELECTRICAL PERFORMANCE OF HTV SILICONE RUBBER UNDER DIFFERENT FILLERS AND FILLER LOADINGS</b> .....	436
<i>Suat İlhan ; Didem Tuzun ; Aydogan Ozdemir</i>	
<b>CFD SIMULATION OF A HIGH VOLTAGE CIRCUIT BREAKER COUPLED WITH A MECHANICAL OPERATING MECHANISM</b> .....	440
<i>Mahesh T. Dhotre ; Francesco Agostini ; Sami Kotilainen</i>	

<b>IMPROVEMENTS IN THE IDENTIFICATION OF DEFECTS ON THE SEMICONDUCTING SLOT COATING OF STATOR BARS USING PARTIAL DISCHARGES .....</b>	<b>444</b>
<i>Fernando Pereira ; Hedio Tatizawa ; Milton Zanotti</i>	
<b>THERMAL IMAGING FOR RAPID NONINVASIVE ON-SITE INSULATION DIAGNOSTICS .....</b>	<b>449</b>
<i>Shane Morrison ; Joni Kluss ; John Ball ; Lucas Cagle ; Sam Bryan</i>	
<b>UHF MEASUREMENT OF PARTIAL DISCHARGE ON STATOR BARS USING PATCH ANTENNAS .....</b>	<b>453</b>
<i>Mike Partyka ; Greg E. Bridges ; Bill McDermid ; Tyler Black ; Behzad Kordi</i>	
<b>SCANNING INDIVIDUAL STATOR BARS AND COILS WITH AN ANTENNA TO DETECT LOCALIZED PARTIAL DISCHARGES .....</b>	<b>457</b>
<i>Claude Hudon ; Mélanie Lévesque ; Simon Bernier ; H��l��ne Provencher ; ��milie Cloutier-Rioux ; Yoon Duk Seol</i>	
<b>A HIGH VOLTAGE CAPACITOR ELEMENT MODEL .....</b>	<b>465</b>
<i>Calum J. Mackinnon ; Brian G. Stewart</i>	
<b>CHARACTERISTICS OF THE PARTIAL DISCHARGE-INDUCED CURRENT ALONG EPOXY RESIN FILM UNDER SUPERIMPOSED AC- DC VOLTAGE .....</b>	<b>469</b>
<i>Tianxin Zhuang ; Xuze Gao ; Ming Ren ; Siyun Wang ; Junkai Huang</i>	
<b>AUTOMATED IDENTIFICATION OF INSULATION FAULTS USING ELECTRO MAGNETIC INTERFERENCE METHODS .....</b>	<b>473</b>
<i>J. Slater ; I. Mitiche ; A. Nesbitt ; G. Morison ; P. Boreham</i>	
<b>ADDING NANOFILLERS IN POLYMERIC INSULATING MATERIALS: SO FAR SO GOOD? THE CASE OF POLYPROPYLENE FOR DC CABLES.....</b>	<b>477</b>
<i>Gian Carlo Montanari ; Paolo Seri ; Hadi Naderiallaf ; Anke Blume ; Amirhossein Mahtabani ; Xiaozhen He ; Gabriele Perego ; Christelle Mazel ; Mika Paajanen ; Mikko Karttunen</i>	
<b>TOWARDS A HYBRID POWER CABLE HEALTH INDEX FOR MEDIUM VOLTAGE POWER CABLE CONDITION MONITORING .....</b>	<b>481</b>
<i>Jose Ignacio Aizpurua ; Brian G. Stewart ; Stephen D. J. McArthur ; Nitin Jaiware ; Martin Kearns</i>	
<b>GAS-INSULATED HIGH TEMPERATURE SUPERCONDUCTING COAXIAL DIPOLE FOR MVDC POWER SYSTEMS .....</b>	<b>485</b>
<i>Peter Cheetham ; Chanyeop Park ; Sharath Satyanarayana ; Chul Han Kim ; Lukas Graber ; Sastry Pamidi</i>	
<b>PARTIAL DISCHARGE BEHAVIORS IN POWER MODULE UNDER VERY HIGH DV/DT REPETITIVE SQUARE VOLTAGES .....</b>	<b>489</b>
<i>Haoyang You ; Zhuo Wei ; Mohammed Aldawsari ; Boxue Hu ; Risha Na ; Jin Wang</i>	
<b>PARTIAL DISCHARGE BEHAVIOR ON TWISTED PAIR UNDER ULTRA-SHORT RISE TIME SQUARE-WAVE EXCITATIONS .....</b>	<b>493</b>
<i>Zhuo Wei ; Haoyang You ; Boxue Hu ; Risha Na ; Jin Wang</i>	
<b>STUDY OF PARTIAL DISCHARGE DETECTION IN MOTORS FED BY SIC MOSFET AND SI IGBT INVERTERS .....</b>	<b>497</b>
<i>Robin Acheen ; C��dric Abadie ; Thibaut Billard ; Thierry Lebey ; St��phane Duchesne</i>	
<b>NOISE REJECTION AND PARTIAL DISCHARGE IDENTIFICATION IN PDIV TESTS OF INSULATED WIRES UNDER REPETITIVE IMPULSE SUPPLY VOLTAGE .....</b>	<b>505</b>
<i>Gian Carlo Montanari ; Robert Hebner ; Paolo Seri ; Riddhi Ghosh</i>	
<b>DIAGNOSTIC TESTING OF POWER CABLE INSULATION FOR RELIABLE SMART GRID OPERATION .....</b>	<b>509</b>
<i>S. Morsalin ; A. Sahoo ; B. T. Phung</i>	
<b>ABOUT THE RELEVANCE OF USING PASCHEN'S CRITERION FOR PARTIAL DISCHARGES INCEPTION VOLTAGE (PDIV) ESTIMATION WHEN DESIGNING THE ELECTRICAL INSULATION SYSTEM OF INVERTER FED MOTORS .....</b>	<b>513</b>
<i>Philippe Collin ; David Malec ; Yvan Lefevre</i>	
<b>THE OHIO STATE UNIVERSITY PARTIAL DISCHARGE DETECTION PLATFORM FOR ELECTRIC MACHINE WINDINGS DRIVEN BY PWM VOLTAGE EXCITATION .....</b>	<b>517</b>
<i>Han Xiong ; Rui Liu ; Boxue Hu ; Haoyang You ; Zhuo Wei ; Julia Zhang ; Jin Wang</i>	
<b>Author Index</b>	