

PEMD 2022

The 11th International Conference on Power Electronics, Machines and Drives
21 - 23 June 2022 | The Frederick Douglass Centre, Newcastle University, UK

Tuesday 21 June 2022

40mins	08:30	Registration, breakfast and networking			
5mins	09:10	Chair's Welcome Dr Nick Baker, Newcastle University			
30mins	09:15	Keynote Speaker: Designing In Resiliency To A Net Zero Electricity Systems As National Grid, we are at the heart of the energy transition. We are decarbonising energy networks at pace and preparing for climate change. We need to ensure the energy transition is resilient, deliverable and affordable. We also need to adjust our asset engineering for a changing climate. <ul style="list-style-type: none"> We are tackling 4 key categories of resilience risk: <ul style="list-style-type: none"> Resilient Transition: We face deliverability challenges as we grow our networks to connect new clean energy and meet an increased demand for electricity driven largely by hydrogen electrolysis, EVs and heat pumps. Supply chain, internal resources and operational management will all need to be resilience to the transition Network Evolution: The Electricity Network will undergo significant transformation on the road to net zero. Challenges around topology, quality of supply, and design standards will need to be addressed System Interconnectedness: Our networks will become more interconnected with other critical sectors such as transport. Climate Adaption: Our assets will be more vulnerable in the future. The ESO is on track to operate the electricity system with 100% renewables from 2025, a key enabler for zero carbon operation by 2035. This provides several technical challenges to be resolved. 			
15mins	09:45	Driving the Electric Revolution: Ensuring the UK has a resilient, cross sectoral supply chain for Power Electronics, Machines and Drives underpinning net zero. Will Drury, Challenge Director, Driving the Electric Revolution			
45mins	10:00	The PEMD Executive Summary: Simon Hart, CTIO (Controllers and Power Electronics), YASA , Nigel Jakeman, Engineering & Business Development Director, Turbo Power Systems and James Yu, Head of Innovation, Scottish Power <i>An overview on the commercial trends for drive systems, energy systems and electric machines</i>			
30mins	10:45	Exhibition and Refreshments Poster session 1			
60mins	11:15	Stream 1	Stream 2	Stream 3	Stream 4
		Power Electronics - Special and Extreme applications I Session Chair: Dr Antonio Grippo, University of Sheffield	Electric Machines - Special and Extreme Applications Session Chair: Prof. Nigel Schofield, University of Huddersfield	Energy Systems - Renewable Energy Sources	Drives and Controls - Special and Extreme Applications Session Chair: Dr Helen Pollock, Technelec
		1.1.a P.73 Investigation On Threshold Voltage Instability Under Sweeping And DC Gate Bias Stressing Of SiC Symmetrical And Asymmetrical Double-Trench MOSFET Juefei Yang, Saeed Jahdi, Bernard Stark, Phil Mellor, University of Bristol Jose Ortiz-Gonzalez, Ruizhu Wu, Olayiwola Alatise, University of Warwick	2.1.a P67 Design, Build And Testing Of An Integrated Compressor-Generator Ramin Korbekandi, Nick Baker, Newcastle University	3.1.a P81 Equalizing The Radial Attraction Forces In Direct-Drive PM Generators Yanhao Zhang, Alasdair McDonald, University of Edinburgh	4.1.a P77 Analysis Of Extended EMF Based Sensorless Control With DC-Link Voltage Fluctuation Jun Yan, Ximeng Wu, Zi-qiang Zhu, University of Sheffield
		1.1.b P53 Device Power Loss Calculation For A Multi-Level DC-AC Converter Design Optimisation Tool Ian Laird, Jun Wang, Xibo Yuan, University of Bristol	2.1.b P34 Experimental Spherical Permanent-Magnet Generator Cellan Brady, Christopher Crabtree, Durham University	3.1.b P58 Control Strategy Assessment For Wind Turbine Converter Reliability Sermed Alsaadi, Peter Matthews, Christopher Crabtree, Durham University	4.1.b P151 Post-Fault Control Strategy Of Rotor Field-Oriented Induction Motor Drive Fed From Cascaded H-Bridge Multi-Level Converter Martin Joy Cheerangal, Amit K Jain, Anandarup Das, Indian Institute of Technology, Delhi
		1.1.c P50 IGBT Finite Element Model For Fibre Bragg Grating Sensor Installation Analysis Damian Vilchis-Rodriguez, Shiyong Chen, Sinisa Djurovic, Mike Barnes, The University of Manchester	2.1.c P103 Winding Design In High Frequency Electrical Machines Considering AC Copper Losses Dave Winterborne, Glynn Atkinson, Newcastle University	3.1.c P92 6-Rpm 5MW Axial Flux Multi-Stage Air Cored Permanent Magnet Generator Design For Vertical Axis Offshore Wind Turbines Halil Cimen, Markus Mueller, University of Edinburgh	4.1.c P181 Real Time Estimation Of Power Transistor Junction Temperature For Motor Drive Application Mohamed Abdelkader, Philip Mawby, Mahdi Tousizadeh,

		Paul McKeever, Chunjiang Jia, Offshore Renewable Energy Catapult	Lars Sjöberg, Alvier Mechatronics		Arkadeep Deb, Layi Alatise, Li Ran, University of Warwick
		1.1.d P86 Computationally Efficient Virtual Prototyping And 3D Loss Calculations For Magnetic Components Andrew Hopkins, Nick Simpson, University of Bristol Valon Blakaj, Paul Evans, University of Nottingham		3.1.d P165 A Combination Of Hybrid Generator And Battery System For Frequency Support Renqi Guo, Nan Zhao, University College Dublin Nigel Schofield, University of Huddersfield	4.1.d P152 Bidirectional Medium-Frequency DAB Converter with Dual-Phase-Shift Modulation and Super-Twisting Sliding Mode Control Ibrahim Alhurayyis, Fazal Akbar, Ahmad Elkhateb, Queen's University
5mins	12:15	Movement Break			
65mins	12:20	Lost and Found: Power Semiconductor supply chain growth - Building resilience <i>A fireside chat exploring the well documented challenges but also the unexpected and less explored positives of a global component shortage</i> Alistair McGibbon, Head of Business Development, Compound Semiconductor Applications (CSA) Catapult and Paul Jarvie, Lead (SW & Wales), DER-IC	The Hydrogen Opportunity for UK Rail <i>The presentation will outline the whole-system considerations of introducing fleets of hydrogen-powered trains into passenger service on the UK rail network and their roles within a decarbonised railway. It will also describe the key features of the new Aventra hydrogen multiple units being developed by Alstom and Eversholt Rail and the opportunities that this will provide to a wide range of stakeholders.</i> Tim Burleigh, Head of External Relations and Relationship Development Manager, Eversholt Rail and James O'Sullivan, Product Manager, Alstom	Energy Systems - Distributed Generation, Energy Systems Resilience and Cyber Security Session Chair TBC 3.2.a P8 Study Of An Electrical LNG Plant With Active Front End Drive Systems For Equipment Failure Toshiyuki Fujii, Mitsubishi Electric Corporation Hiroyuki Masuda, Yoshihiro Ogashi, Toshiaki Oka, Toshiba Mitsubishi-Electric Industrial Systems Corporation	eVehicles - Automotive and Aerospace Systems I Session Chair: Prof. Volker Pickert, Newcastle University 4.2.a P88 High Power 4-Phase Interleaved DC-DC Converter Using Interphase Transformers Michael Mawby, Pete James, Michael Bland, Stephen Hodgson, Lyra Electronics Andrew Forsyth, The University of Manchester
				3.2.b P182 Evolution Operator-Based Automata Control Approach For EMS In Active Buildings Trinadh Pamulapati, Adib Allahham, Sara L Walker, Damian Giaouris, Newcastle University	4.2.b P68 Sensitivity Studies Towards A Better Coupling Of Electromagnetic And NVH Simulation For A Traction Motor Bilquis Mohamodhosen, Christopher Riley, Dan Ilea, Dassault systemes UK Ltd Bartosz Lukasik, Annabel Shahaj, Hexagon
				3.2.c P157 A New Single-Phase Six-Switch Dual-Output Buck-Boost Inverter Fazal Akbar1, 2, Ahmad Elkhateb, Queen's University , Mohamed Elgenedy, Glasgow Caledonian University	4.2.c P122 Investigation Of Winding Schemes By Slot-Based High-Frequency Modelling Of A Hairpin Winding Stator Silvan Scheuermann, Martin Doppelbauer, Felix Hoffmann, ETI Björn Hagemann, Antoine Jarosz, Delta Electronics B.V.
				3..2.d P129 A Voltage Type Single-Stage Multi-Input Distributed Generation System Runchang Wei, Daolian Chen, Qingdao University	4.2.d P22 Estimating The Future Numbers Of EV & HV Battery Cells Available For Second Life Repurposing Matthew Beatty, Dani Strickland, Pedro Ferreira, Loughborough University
60mins	13:25	Exhibition, Posters and Networking Lunch			
30mins	14:25	Keynote Speaker: Current Status and Future Plans for Electric Motors and Drives Dr Rodger Dyson, Hybrid Gas Electric Propulsion Technical Lead, NASA Glenn Research Center			
5mins	14:55	Movement Break			
65mins	15:00	Roadblocks - Electric Vehicle Infrastructure Shamala Evans-Gadgil	Design Techniques for Lightweight Aircraft Motor Drives	Energy Systems - Smart Grids, Microgrids and Power Electronic Converters for Energy Systems	Drives and Control - Sensors, Condition Monitoring and Prognostics

		<p>Senior Programme Manager, Coventry City Council, Lorna McAtear, Fleet Operator, National Grid, Claire Miller, Director of Technology and Innovation, Octopus EV and Jacob Roberts, Transport Policy Manager, Renewable Energy Association</p> <p><i>A panel discussion exploring the current policy and technical challenges facing the successful rollout of EV infrastructure.</i></p>	<p>Dr Matthew Granger, Control and Power Systems Engineer, NASA Glenn Research Center</p> <p>30 min session. This stream will close at 15:30</p> <p>No live Q&A – questions submitted directly to speaker afterwards</p>	<p>Session Chair TBC</p>	<p>Session Chair: Dr Antonio Griffo, University of Sheffield</p>
				<p>3.3.a P74 Comparison Of Cascaded Modular Converter And Central Multi-Port Converter For Modularization Of Battery Packs</p> <p>Bortecene Yildirim, Mahfuz Kamal, Mohammed Elgendy, Andrew Smith, Volker Pickert, Newcastle University</p>	<p>4.3.a P69 Detection Of Partial Discharge Activity In Thermally Aged Sic Inverter Fed Stator Winding Samples And Impact Of Partial Discharges On Their Lifetime</p> <p>Shubhum Sundeeep, David A. Hewitt, Antonio Griffo, Jiabin Wang, University of Sheffield Fernando Alvarez-Gonzalez, Tecnalia Research & Innovation Mohamed S. Diab, Xibo Yuan, The University of Bristol</p>
				<p>3.3.b P60 Grid Forming Control For Solid-State Transformer Operating In Islanding And Grid Connected Conditions</p> <p>Taibo Zhang, Lie Xu, University of Strathclyde</p>	<p>4.3.b P183 Minimisation Of Interference Between Magnetised Multipole Tracks Of Magnet Disc-Based Rotation Sensors</p> <p>Ari Al-Jaf, Harvey Smith, ZF Automotive UK Limited</p>
				<p>3.3.c P93 An Improved SRF-PLL For Grid-Connected Inverters In Renewable Energy Systems</p> <p>Jianguo Wang, Alex Ridge, Richard McMahon, University of Warwick</p>	<p>4.3.c P171 Package-Related Degradation Condition Monitoring Of Sic Power MOSFETs Using Current Distribution Anomaly Detection</p> <p>Javad Naghibi, Kamyar Mehran, Queen Mary University of London Sadegh Mohsenzade, K. N. Toosi University of Technology Martin Foster, University of Sheffield</p>
				<p>3.3.d P155 Control Of Microgrids Using An Enhanced Model Predictive Controller</p> <p>Muhammed Cavus, Adib Allahham, Kabita Adhikari, Mansoureh Zangiabadi, Damian Giaouris, Newcastle University</p>	
30mins	16:05	Exhibition and Refreshments Poster session 1			
90mins	16:35	<p>Roadmaps and Industry Challenges – Collaboration session in association with DER-IC:</p> <p><i>An exploration of the Advanced Propulsion Centre industry challenges, their importance and outputs. This interactive session will outline the process, propose priorities for audience consideration, discuss views and ideas for solutions, and gather on-going challenges from the audience for discussion. We'll be asking for volunteers to help determine some concrete next steps to make this a continuous process.</i></p> <p>Facilitated by: Prof Jon King, Warwick Manufacturing Group and DER-IC Midlands and Paul Jarvie, CSA Catapult and DER-IC Southwest & Wales</p>			
60mins	18:05	Networking Drinks Reception, Exhibition, Posters and Finger Food			
	19:05	Close of Day 1			

30mins	08:30	Registration, Guided Walk and Morning Refreshments			
30mins	09:00	Keynote Speaker: Electrification Development in a Changing World David Fulton, Director of Electric Machine Innovation, BorgWarner PowerDrive Systems <i>Battery electric and hybrid automotive volumes are growing quickly and are expected to exceed pure internal combustion engine propulsion by 2026, in annual production. However, changing material prices and legislation create uncertain conditions for electrification developers. As investors in development, the challenge is to select a project portfolio and development teams that produce a good return for our investment, in view of this volatility. This presentation will discuss portfolio options, technology opportunities, and considerations for improved collaboration to attain them.</i> <ul style="list-style-type: none"> The inevitability of sustainability Rare earth risk mitigation required Good bets for disruption Effective collaboration 			
5mins	09:30	Movement Break			
65mins	09:35	Power Electronics - Special and Extreme Applications II Session Chair: Prof Derrick Holliday, Newcastle University	Electric Machines - Permanent Magnet Machines I Session Chair: Jeff Carter, BorgWarner	Energy Systems - Power Electronic Converters for Energy Systems Session Chair: Prof. Nigel Schofield, University of Huddersfield	Green Design <i>A panel discussion focussing on technologies, methods, processes and policies for ensuring sustainable and environmentally friendly product development.</i> Steve Lambert, Head of Electrification, McLaren Applied , James Widmer, CEO, Advanced Electrical Machines and David Moule, Technical Specialist - Electric Drives, ZF Automotive
		1.2.a P163 Impact Of Turn Off Transients On MOSFET Failure During Short Circuit Events Lydia Robinson, Ransheng Xu, Matthew Littlefair, Andrew Gallant, Alton Horsfall, Durham University	2.2.a P51 Magnet Loss Reduction: A New Technique Beyond Segmentation And Shielding Adrián Artacho López, Barrie Mecrow, Newcastle University , Daniel Smith, Dyson Ltd	3.4.a P49 Design Methodology For S-S Compensated Sub-Resonant Controlled Inductive Wireless Power Transfer Link With Range Of CV Loads Under Frequency Constraints Andrey Vulfovich, Alon Kuperman, Ben-Gurion University of the Negev	
		1.2.b P148 Comparison Of Phase-Leg Circuits For Cryogenic Operation In The All-Electric Aircraft Abdelrahman Elwakeel, Zhengyang Feng, Neville McNeill, Rafael Peña Alzola, Min Zhang, Weijia Yuan, University of Strathclyde	2.2.b P154 Effects Of The Randomness Of Winding Distribution In Slot On The Bearing Voltage And The Electric Discharge Machining Bearing Current Wenjun Zhu, Xiao Chen, Geraint Jewell, University of Sheffield	3.4.b P145 Leakage-Ground Current Reduction In The Double-Dual Buck Inverter Julio Rosas-Caro, Universidad Panamericana , Jonathan Mayo-Maldonado, University of Sheffield , Samuel Iturriaga, Panfilo Martinez-Rodriguez, Universida Autonoma de San Luis Potosi , Jesus Valdez-Resendiz, Gerardo Escobar, Carlos Soriano-Rangel, Daniel Guillen, Tecnologico de Monterrey	
		1.2.c P156 Simple Temperature Model For Half-Bridge Modules In DC-DC Converters Noass Kunstbergs, Hartmut Hinz, Dennis Roll, Robert Michalik, Frankfurt University of Applied Sciences , Nigel Schofield, University of Huddersfield , Mathias Diego Marquina Sandoval, Universidad de Cádiz	2.2.c P175 Performance Analysis Of A Hybrid Ferrite IPM/SynR Traction Machine With Axially Combined Rotor Structure Khoa Dang Hoang, University of Huddersfield , Anshan Yu, Kais Atallah, University of Sheffield , Giorgio Valente, Annabel Shahaj, Hexagon	3.4.c P131 A Kind Of ZVS Quasi Impedance Source Inverter With High Voltage Transmission Ratio Pengshuai Xing, Jian Li, Daolian Chen, Qingdao University	
		1.2.d P14 Performance Of PZT-Based Piezoelectric Transformers For Use In High Temperature Converters Jack Forrester, Linhao Li, Zijiang Yang, Jonathan	2.2.d P40 Design And Analysis Of A Cooling System For Permanent Magnet Synchronous Machines	3.4.d P128 A Kind Of Full-Bridge Buck Type Multi-Input Inverter With High-Frequency Link Jiangong Wang, Daolian Chen, Qingdao University	

		Davidson, Martin Foster, David Stone, Ian Reaney, Derek Sinclair, University of Sheffield	Qing Li, Barrie Mecrow, Xu Deng, Muhammad Ikhlaiq, Newcastle University , Xiang Shen, Northumbria University		
30mins	10:40	Exhibition and Refreshments Poster session 2			
30mins	11:10		Better Ways to get Published! <i>A short talk offering tips and tricks for drafting academic research papers.</i> Prof. Volker Pickert, Newcastle University and Editor-in-Chief, IET Power Electronics Journal	Effect of Phase Errors in Power Management <i>The effect of phase errors in high power and high frequency applications and how to tackle it</i> Jaysheel Dave, HIOKI	Drives and Controls - Thermal Management Session Chair: Dr Antonio Griffio, University of Sheffield 4.4.a P97 Thermal Analysis Of Direct Air-Cooled PM Machine For UAV Propulsion Rafal Wrobel, Archie Graham-Watson, Callum Mason, Nilanjan Chakraborty, Newcastle University , Roger Zouein, Formtech Composites Ltd. 4.4.b P96 Experimental Analysis of Additively Manufactured Air-Cooled Splayed End-Windings Francis Tocher, Nick Simpson, Phil Mellor, University of Bristol
5mins	11:40	Movement Break			
75mins	11:45	Power Electronics - New Power Semiconductor Devices and their Practical Application Session Chair: Jeff Carter, BorgWarner 1.3.a P125 Using Device Figure Of Merit To Optimize Transistor Selection Based On Switching And Conduction Loss Over A Wide Temperature Range Glenn Galea, Volker Pickert, Matthew Armstrong, Newcastle University , Richard Gibson, Nidec Control Techniques	Electric Machines - Manufacturing Processes, Design and Simulation Session Chair: Prof Derrick Holliday, Newcastle University 2.3.a P5 Stator Design For Flexible Manufacturing In Hairpin Technology Achim Kampker, Benjamin Dorn, Brans Brans, Christian Stäck, RWTH Aachen University , Bernhard Burkhart, Kajan Uththama, ENGIRO GmbH	AEM Session – speakers tbc	Tours of the Electrical Power Research Group Labs
		1.3.b P139 Experimental Efficiency Comparison Of A Superjunction MOSFET, IGBT And SiC MOSFET For Switched Reluctance Machine Drives Euan Macrae, Neville McNeill, Khaled Ahmed, Barry Williams, University of Strathclyde , Richard Pollock, Technelec Ltd. , Derrick Holliday, University of Newcastle	2.3.b P85 Virtual Prototyping Strip Wound Inductors For 3D AC Loss Distributions Dominic North, Nick Simpson, Phil Mellor, University of Bristol		
		1.3.c P19 Modular Design Of A Three-Level SiC MOSFET Power	2.3.c P72 Influence Of Rotor Eccentricity On Cogging Torque Of 12-Slot/10-Pole		

		Module For More-Electric Aircraft Applications Zixiao Li, Antonio Griffo, Shangjian Dai, Jiabin Wang, The University of Sheffield , Yangang Wang, Anne Harris, Muhammad Morshed, Dynex Semiconductor Ltd.	PM Machines With Tooth Bulge Dong Xiang, Zi-Qiang Zhu, Tianran He, Fangrui Wei, University of Sheffield		
		1.3.d P150 Analysis Of Si IGBT And SiC MOSFET Three Phase Inverter Technologies In HEV, P-HEV And EV Applications Kyrlo Melnyk, Oleh Kiselychnyk, Jose Ortiz Gonzalez, University of Warwick , Ciprian Antaloae, Hyundai Motor Europe Technical Center , Marina Antoniou, University of Warwick	2.3.d P63 Practical Loss Prediction In Soft Magnetic Composite Components Nick Baker, Mehmet Kulan, Newcastle University , Oliver Davis, Kostas Liogas, SGtec		
		1.3.e P140 Realising SiC MOSFET Switching Speed Control Based On A Novel Series Variable-Resistance Gate Driver Shuren Wang, Neville McNeill, Khaled Ahmed, Barry Williams, University of Strathclyde , Richard Pollock, Technelec Ltd. , Derrick Holliday, University of Newcastle	2.3.e P160 Impact Of Compressive Mechanical Stress From Shrink Fitting Of A Casing On The Core Loss In A Cobalt Iron Stator Core Of A Permanent Magnet Synchronous Machine Xiao Chen, Geraint W. Jewell, Jason D. Ede, Han Wu, University of Sheffield		
60mins	13:00	Exhibition, Posters and Networking Lunch			
30mins	14:15	Keynote Speaker: Digitisation, Creating the World's Most Advanced Railway Mark Wild, CEO, Crossrail (No live Q&A – questions submitted directly to speaker afterwards)			
5mins	14:45	Movement Break			
65mins	14:50	Power Electronics - Thermal Management and Reliability Session Chair: Michael Mawby, Lyra Electronics	Electric Machines - Synchronous and Reluctance Machines I Dr Nick Simpson, University of Bristol	Digitalisation in Power Electronics - Leverages and Setbacks - AI and Cyber Security <i>Digitalisation is a double-edge sword in any field. As we try to facilitate the operation, design and maintenance of key driving factors of non-conventional energy systems, i.e., power electronics, the unexplored dynamics and governing equations are often determined using historic data. However, it has never been a key aspect in the commercialisation process. In this presentation, Prof. Sahoo will be speaking more about the assessment of quality data and how to use them for different applications. Apart from quantifying data-driven performance, he will also be introducing how even a minor manipulation in this data might go unnoticed due to emerging cybersecurity concerns and ultimately its impact on energy</i>	eVehicles - Automotive and Aerospace Systems II Session Chair: Prof. Volker Pickert, Newcastle University
		1.4.a P26 Investigation Of The Impact Of Temperature And Humidity On The Capacitance Of Dielectric Gel Used For Power Electronics Mark Sherriff, Antonio Griffo, University of Sheffield , Chunjiang Jia, Chong Ng, Offshore Renewable Energy Catapult	2.4.a P11 Rotating Stabilisers To Provide Inertia And Reactive Power To Gb National Grid Jason Hill, Statkraft UK Ltd , Kevin Hui, GE		4.5.a P41 Improving The Air Supply Control Of A Fuel Cell Electric Vehicle Maximilian Eisner, Ralph Kennel, Technical University of Munich , Zheng Zhou, Volker Formanski, BMW Group
		1.4.b P104 Investigation Of TSEPs Based On The Feature Extraction From The Gate Current Jiawei Liu, Hongfei Chen, Jinghan Lin, Zekun Li, Bing Ji, University of Leicester , Haimeng Wu, Northumbria University	2.4.b P70 Rain-Flow Counting Method For Hysteresis Loss Computation In A Switched Reluctance Drive Giulia Urgera, Barrie Mecrow, Xu Deng, Newcastle University , Melanie Michon, Mircea Popescu, Motor Design Limited		4.5.b P12 A Multiphysics Approach For Minimising Motor Losses On The WLTP Driving Cycle Iago Martinez, Diego J. Palomar, Maite Garate, Jon Garcia, Alberto Peña, GKN Automotive , David Pardo, Angel J. Omella, University

		<p>1.4.c P78 A Comparison Of The Short Circuit Performance Of 650 V SiC Planar MOSFETs, Trench MOSFETs And Cascode JFETs</p> <p>Olayiwola Alatise, erfan Bashar, Ruizhu Wu, Nereus Agbo, Simon Mendy, Jose Ortiz-Gonzalez, Philip Mawby, University of Warwick, Saeed Jahdi, University of Bristol</p>		<p>systems and green transition ambitions.</p> <p>Prof. Subham Sahoo, Aalborg University</p>	<p>of Basque Country UPV/EHU</p> <p>4.5.c P89 3D Thermal Equivalent Circuit Model Of A Lightweight Composite Stator</p> <p>Suzanne Collins, Philip Mellor, Nick Simpson, University of Bristol</p>
		<p>1.4.d P64 Thermal Design Of The Armature Region Of A Partially Superconducting Generator</p> <p>Sabrina Ayat, Rémi Dorget, Rémy Biaujaud, Safran Tech, Jean Lévêque, Université de Lorraine - GREEN</p>			<p>4.5.d P35 Investigating An Influence Of Temperature And Relative Humidity On The Electrical Performance Of Lithium Polymer Ion Battery Using Constant-Current And Constant Voltage Protocol At Small Scale For Electric Vehicles</p> <p>Peter Makeen, Hani Ghali, The British University in Egypt, Saim Memon, London South Bank University</p>
30mins	15:55	Exhibition and Refreshments Poster session 2			
60mins	16:25	<p>Opportunities for Commercialisation - Collaboration session in association with DER-IC: <i>The UK must accelerate the industrialisation of PEMD technologies to capitalise on the opportunities afforded by the electric revolution through enhanced collaboration and linking between academia and industry. This interactive session will offer a series of quick-fire presentations exploring projects that are looking for next step actions to move along the readiness level timeline and those seeking industry partners.</i> Facilitated by: Prof Jon King, Warwick Manufacturing Group and DER-IC Midlands and Paul Jarvie, CSA Catapult and DER-IC Southwest & Wales</p>			
60mins	17:25	Networking Drinks Reception Featuring Locally Brewed/ Distilled Beverages and Sourced Food			
	18:25	Close of Day 2			

Thursday 23 June 2022					
30mins	09:00	Registration, Guided Walk and Morning Refreshments			
30mins	09:30	<p>Keynote Speaker: <i>The view from China - an international perspective - Exploring the challenge CRRC, China and the whole world face to achieve carbon neutrality this keynote presentation will outline the study and approach the CRRC Zhuzhou Institute has followed. Liangjie will cover case study examples sharing insight of decarbonized engineering applications delivered by CRRC Zhuzhou Institute in China.</i> Liangjie Liu, Director of Zhuzhou, CRRC Times Electric UK Innovation Center</p>			
5mins	10:00	Movement Break			
65mins	10:05	<p>Power Electronics - High-Frequency Converters and Power Supplies Session Chair: Dr Helen Pollock, Technelec</p>	<p>Electric Machines - Monitoring, Diagnostics and Prognostics Session Chair: Prof. Nigel Schofield, University of Huddersfield</p>	<p>Energy Systems - Energy Storage and Fuel Cells Session Chair TBC Room:</p>	<p>Tours of the Electrical Power Research Group Labs</p>
		<p>1.5.a P44 Development Of Mhz Power Converters For Wireless Power Transfer Applications</p> <p>Jianguo Wang, Ku N E Ku Ahamad, Richard McMahon, University of Warwick, Asim Mumtaz, University of Liverpool</p>	<p>2.5.a P91 Using Principal Component Analysis And Binary Classification To Detect Static Eccentricity Faults In Induction Motors</p> <p>Nicolas Krause, Jake Malone, Meg McPherson, Frederik van Wingerden, Martin Yong, Ilamparithi Thirumarai-</p>	<p>3.5.a P111 Lithium-Ion Battery State Of Health Estimation With Recurrent Convolution Neural Networks</p> <p>Bowen Jiang, Yujing Liu, Junfei Tang, Chalmers University of Technology</p>	

			Chelvan, University of Victoria		
		1.5.b P16 Fully-Integrated Transformer With Asymmetric Leakage Inductances For A Bidirectional Resonant Converter Sajad A Ansari, Jonathan N Davidson, Martin P Foster, University of Sheffield	2.5.b P98 Machine Learning-Based Adjustments Of Thermal Networks Kristian Rönnberg, Panagiotis Kakosimos, Erik Nordlund, ABB AB , Zlatko Kolondjovski, ABB Oy	3.5.b P133 Investigating The Effectiveness Of Offline Techniques To Sort And Grade Second Life Batteries Matthew Beatty, Achim Buerkle, Dani Strickland, Pedro Ferreira, Loughborough University	
		1.5.c P143 Double Dual Converter Topologies For Renewable Energy Power Conditioning Systems Enrique Garza-Arias, Jesus Valdez-Resendiz, Carlos Soriano-Rangel, Gerardo Escobar, Tecnologico de Monterrey , Julio Rosas-Caro, Pedro Rodrigo, Univdad Panamericana , Jonathan Mayo-Maldonado, University of Sheffield , Alma Rodriguez, Universidad de Guadajara	2.5.c P45 Induction Machine Analysis With Extensive Stator Interturn Fault Conditions Giovanni Zanuso, Hareesh Babu, Konstantina Bitsi, Luca Peretti, KTH Royal Institute of Technology	3.5.c P87 Energy Management Techniques For Rapid Discharge Of Li-Ion Batteries Prior To Recycling Mahfuz Kamal, Bortecene Yildirim, Mohamed Ahmeid, Volker Pickert, Simon Lambert, Newcastle University	
		1.5.d P153 A Comparison Of P5, Cuk And Class E2 Converters For WPT In EV Battery Charging Iman Okasili, Ahmad Elkhateb, Timothy Littler, Queen's University	2.5.d P94 Active Fault Detection Using Time And Frequency Diagnostic Features For Electrical Machine Ma'D El-Dalahmeh, Maher Al-greer, Aykut Demirel, Ozan Keysan, Middle East Technical University	3.5.d P174 An Overview Of Hybrid Systems Consisting Of Synchronous Condensers And Battery Energy Storage System To Support Power Grid Xinzheng Chen, Renqi Guo, Nan Zhao, University College Dublin , Nigel Schofield, University of Huddersfield	
30mins	11:10	Exhibition and Refreshments Poster session 3			
65mins	11:40	Power Electronics - Novel converter topologies and applications Session Chair: Prof. Volker Pickert, Newcastle University Room:	Electric Machines - Permanent Magnet Machines II Session Chair: Jeff Carter, BorgWarner	Edgy Magnetics 1 – A Session In Collaboration With The UK Magnetics Society 11:40 - Welcome & Introduction to UK Magnetics Society – Matthew Swallow, Bunting Magnetics 11:45 - Talk 1: Post Assembly of Halbach PM Rotor <i>Including Static and Rotating systems, focusing on the benefits of Halbach design within these systems. The presentation will take a detailed look at the regions that do not saturate fully and how we are able to generate bespoke magnet data for these regions and utilise this to generate a real-world model of the system. In addition to design considerations for engineers to facilitate post assembly magnetising we will look at</i>	Collaboration in Electrification at the MTC <ul style="list-style-type: none"> MTC's electrification journey Insight into a variety of key collaborative projects. An overview of the MTC's capabilities Dr Marc Henry, Electrification / PEMD – Strategy Lead, The Manufacturing Technology Centre
		1.6.a P112 Different Operation Of The MSC Converter To Reduce The Input Current Ripple Cesar Ibarra-Nuño, CINVESTAV del IPN, Julio C. Rosas-Caro, Universidad Panamericana, Juan M. Ramirez, CINVESTAV del IPN, Jonathan C. Mayo-Maldonado, University of Sheffield, Jesus E. Valdez-Resendiz, Tecnologico de Monterrey	2.6.a P9 Developing A Direct Drive Power Take Off For The Mocean Wave Energy Converter Nick Baker, Lewis Chambers, Newcastle University , Chris Retzler, Mocean Energy , Mike Galbraith, Ed Spooner, Fountain Design Limited		
		1.6.b P168 Multi-Active Bridge Based Dc-Link Balancing Of Three-Level NPC Inverters Ferdinand Grimm, Pouya Kolahian, Richard Bucknall, Mehdi Baghdadi, UCL	2.6.b P29 A Mechanical Flux Weakening Method Via Split Rotor In Permanent Magnet Aerospace Alternators		

			Mehmet Kulan, Nick Baker, Newcastle University , Simon Turvey, Rolls-Royce plc.	<i>the downstream advantages of this process including the obvious reduction in Health and Safety risk as well as the time saved in assembly, the ease of operations like machining, grinding and balancing and the utilisation of any banding materials to their fullest potential without a limit on magnet killing temperature effects.</i> Dr Chris Riley, Bunting Magnetics Europe Ltd	
		1.6.c P113 A DC-DC Multilevel Boost Converter With Reduced Inductor-Current Avelina Alejo-Reyes, Julio C. Rosas-Caro, Universidad Panamericana , Jesus E. Valdez-Resendiz, Tecnologico de Monterrey , Alma Rodriguez, Universidad de Guadalajara , Jonathan C. Mayo-Maldonado, University of Sheffield	2.6.c P54 Design And Analysis Of A Blade-Embedded Limited-Angle Torque Motor For Vertical-Axis Water Turbines Zhao Zhao, Stefan Hoerner, Roberto Leidhold, Otto-von-Guericke University of Magdeburg		Sustainable Servo Motors: Considerations and Design Challenges David Moule, Technical Specialist - Electric Drives, ZF Automotive
		1.6.d P114 A Family of Double Dual DC-DC Converters Jesus E. Valdez-Resendiz, Tecnologico de Monterrey , Jonathan C. Mayo-Maldonado, University of Sheffield , Avelina Alejo-Reyes, Julio C. Rosas-Caro, Universidad Panamericana , Francisco Beltran-Carbajal, Universidad Autónoma Metropolitana , Unidad Azcapotzalco		12:15 - Talk 2: Performance and NVH Characteristics of a Novel Ferrite Magnet Motor <i>A collaboration between Hexagon, University of Sheffield, Jaguar Land Rover, National Physical Laboratory, Dassault Systemes UK and GRM Consulting has seen the successful design, build and test of a novel ferrite magnet motor for an automotive application. This presentation will introduce the flux focusing concept that enables air gap flux density equal to that expected of a traditional IPM, and give test and simulation results showing capability for use in an automotive application. Finally, the NVH characteristics of the test rig, which included integrated gearbox, from a simulation and test point of view will be explained. Dr Giorgio Valente and Dr Khoa Dang Hoang - Performance and NVH Characteristics of a Novel Ferrite Magnet Motor</i> Dr Giorgio Valente, Hexagon and Dr Khoa Dang Hoang, University of Huddersfield	
60mins	12:45	Exhibition, Posters and Networking Lunch			
60mins	13:45	Power Electronics - High-Frequency Converters, Power Supplies and Passive Components Session Chair TBC	Electric Machines - Synchronous and Reluctance machines II Session Chair: Dr Helen Pollock, Technelec	Edgy Magnetics 2 – A Session In Collaboration With The UK Magnetics Society	Tours of the Electrical Power Research Group Labs
		1.7.a P179 Parameterisation Methods For Piezoelectric Transformer Equivalent Circuit Models Henry O'Keeffe, Martin Foster, Jonathan Davidson, University of Sheffield	2.7.a P52 A Comparative Study Between Inner And Outer Rotor Variable Flux Reluctance Machine Topologies For Heavy-Duty Electric Vehicles Doğa Ceylan, Konstantin Boynov, Elena Lomonova, Eindhoven University of Technology	13:45 - Talk 3: The Development of HTS Magnets for Spherical Tokamaks <i>Tokamak Energy (TE) is developing Spherical Tokamak (ST) technology toward commercial electrical power generation. A tokamak is a device which generates strong magnetic fields in order to confine a high-temperature plasma with sufficient density for nuclei fusion to occur. ST's are a particular type of tokamak in which the plasma is elongated and contained</i>	
		1.7.b P141 Cyclic-Mode Modelling Of Class EF2 Inverters Featuring A Piezoelectric Resonator As The Auxiliary Network	2.7.b P173 Analysis Of Stator End-Winding In A Dual Wound Machine Using Biot-Savart Law		

		<p>Yuqing Wang, Jonathan Davidson, Martin Foster, University Of Sheffield</p> <p>1.7.c P48 AC Resistance In Medium Frequency Transformers With Foil Windings: A Computational Study</p> <p>Siamak Pourkeivannour, Mitrofan Curti, Andrea Cremasco, Elena A. Lomonova, TU/e, Uwe Drogenik, ABB Corporate Research Center</p> <p>1.7.d P15 Featured Properties Of PV Array – Dual Active Bridge System For Efficient MPPT Implementation</p> <p>Olutayo Omotoso, Oleh Kiselychnyk, Richard McMahon, Jihong Wang, University of Warwick, Srinivas B. Karanki, Indian Institute of Technology</p>	<p>Boyuan Yin, Xiaoze Pei, Frederick Eastham, Xianwu Zeng, University of Bath</p> <p>2.7.c P99 Design Of An Optimized PCB Motor With A GaN Switched Integrated Motor Drive</p> <p>Furkan Tokgöz, Özgür Gülsuna, Furkan Karakaya, Gökhan Çakal, Ozan Keysan, Middle East Technical University</p> <p>2.8.d P55 Analysing The Performance Of Three Phase SiC Inverters And Interior Permanent Magnet Machines Using Different Modulation Techniques</p> <p>Hamidreza Gashtil, Chris Pearce, Nick Turton, Jacob Varughese, Sean Freedman, Jonathan Hyde, turntide technology Company</p>	<p><i>closer in to the central column of the machine. ST's have less space for the central column so the magnets need to operate in higher background magnetic fields and at higher current densities than would be required in conventional tokamaks. This requires the development of magnets utilising High Temperature Superconductors (HTS). At TE we are undertaking a multi-staged program of projects to develop this HTS magnet technology to fusion reactor scale magnet sets. This presentation will summarise the challenges and the progress of that program to date.</i></p> <p>Dr Rod Bateman, Tokamak Energy Ltd</p> <p>14:15 - Talk 4: High Performance Micro-Magnets</p> <p><i>In this talk I will begin by outlining the interest for micro-magnets and the potential they hold for the development of magnetic micro-systems. I will then describe the fabrication and characterisation of NdFeB films and show how these films can be patterned to produce arrays of micromagnets of thickness up to 50 µm. Finally I will show some examples of the use of our micro-magnets to date and will finish by discussing prospects for their future use in micro-scaled devices (motors, generators, actuators, sensors...), with applications in fields as diverse as telecommunications, energy management and bio-technology.</i></p> <p>Dr Nora Dempsey, Institut NEEL, Grenoble, CNRS</p>	
5mins	14:45	Movement Break			
30mins	14:50	Conference Roundup and Closing remarks <i>A Panel Discussion Exploring the Conference Highlights, Lessons Learned and Takeaways from IET PEMD 2022</i> Conference Co-Chairs: Dr Nick Baker, Newcastle University, Dr Helen Pollock, Technelec			
5mins	15:25	Close of conference			

Poster Session Day 1 – Tuesday 21 June 2022		
P37 ONLINE ONLY	Household Building Nanogrid Power Management Based on Fuzzy Logic Controller	Walid Issa, Sheffield Hallam University , Rashid Albadwawi, University of Exeter , Tedjani Mesbahi, INSA Strasbourg , Yihua Hu, University of York , Mohammad Abusara, University of Exeter
P7 ONLINE ONLY	PMSM Drive System Based On Current Source Inverter	Jing Wang, Qiang Gao, Harbin institute of technology
P110 ONLINE ONLY	A Low-Loss Passive Filter For Overvoltage Mitigation Of Inverter-Drive Motors With Ultra-Long Cables	Hamed Izadi, Ebrahim Asadi, Mobarakeh Steel Company
P43 ONLINE ONLY	Modular Power Electronics Topology To Leverage The Modularity Of C-GEN Electrical Generator	Nan Zhang, Michael Merlin, Markus Mueller, University of Edinburgh
P19	Modular Design Of A Three-Level SiC MOSFET Power Module For More-Electric Aircraft Applications	Zixiao Li, Antonio Griffo, Shangjian Dai, Jiabin Wang, The University of Sheffield , Yangang Wang, Anne Harris, Muhammad Morshed, Dynex Semiconductor Ltd.
P20	Lead-Acid Battolyser Concept	Matthew Brenton, John Barton, Dani Strickland, Jonathan Wilson, Upul, Wijayantha-Kahagala, Loughborough University
P107	An Augmented Short Circuit Detection Method For SiC MOSFETs	Zekun Li, Jixuan Wei, Hongfei Chen, University of Leicester
P142	Topology Optimization Of A PMSM Based On A Local Method To Gain Lightweight Structure And Better Operation	Shabnam Ruzbehi, Ingo Hahn, Institute of Electrical Drives and Machines, University of Erlangen-Nuremberg
P27	Ring Loss Analysis And Its Influence On Boost Converter Efficiency	Xiang Wang, Magnus, Sandell, Gavin Watkins, Bristol Research and Innovation Lab , Shusuke Kawai, Takeshi Ueno, Kohei Onizuka, Corporate Research & Development Centre
P28	Feasibility Study Of Distributed Hardware In The Loop Simulation For Electric Machine Drive System	Siamand Mostafavi, Matthew Armstrong, Newcastle University
P33	Implementation Of An AC Chopper In Domestic Appliances For Dynamic Frequency Response	Tinashe Chinyemba, Dani Strickland, Loughborough University
P36	Impact Of Flux Barrier Shape And Design Strategy In Synchronous Reluctance Machine Optimisation	Christophe De Gréef, Virginie Kluykens, Bruno Dehez, Institute of Mechanics, Materials and Civil Engineering (IMMC), UCLouvain
P56	A Preliminary Study On Superconducting Linear Motors In High-Dynamic Applications	Arvind Desikan, Dave Krop, Bart de Bruyn, Elena Lomonova, Eindhoven University of Technology
P47	Wind-Plus-Battery System Optimisation For Stacking Of Frequency Response And Black Start Services In The UK	Fulin Fan, David Campos-Gaona, University of Strathclyde , John Nwobu, Offshore Renewable Energy Catapult
P57	Effect Of The 3D End Fields On Torque Production Capability In Segmental Rotor Switched Reluctance Motors	Majid Alssadi, Glynn Atkinson, School of Electrical and Electronic Engineering, Newcastle University
P61	Proportional-Integral-Resonant Control For The Periodic Disturbance Minimization Of The PMSM	Muhammad Saad Rifaq, Will Midgley, Thomas Steffen, Loughborough University
P62	Evaluation Of The Uncertainty For Traceable Efficiency Determination Method On Electrical Machines For Wind Turbines In Small-Scale Test Bench	Nijan Yogal, Christian Lehrmann, Physikalisch-Technische Bundesanstalt (PTB) , Hongkun Zhang, Fraunhofer Institute for Wind Energy Systems

Poster Session Day 2 – Wednesday 22 June 2022		
P106 ONLINE ONLY	Online MTPA Tracking For Optimal Performance Of IPMSM Based Compressor Drives	Visweshwar Chandrasekaran, University of Minnesota , Bernard Jose, Trane Technologies , Ned Mohan, University of Minnesota , Kaushik Basu, Indian Institute of Sciences
P38 ONLINE ONLY	Series SiC MOSFET-Based Low Gain Buck Converter For Enabling Access To MVDC Network	Walid Issa, Sheffield Hallam University , Jose Ortiz-Gonzalez, University of Warwick , Yihua Hu, University of York
P127 ONLINE ONLY	A Full Bridge Buck DC Chopper Type Multi-Input Inverter	Shuran Qin, Daolian Chen, College of Electrical Engineering, Qingdao University
P130 ONLINE ONLY	A Kind Of Full Bridge Current Type Multi-Input Distributed Generation System	Fuying Shen, Daolian Chen, College of Electrical Engineering, Qingdao University , Yanhui Qiu, College of automation, Qingdao University
P21	Energy Scavenging On Distribution Network Cables	Cliff Walton, Innovate Create Solutions , Jingxi Yang, James Delaney, Dani Strickland, Loughborough University
P58	Control Strategy Assessment For Wind Turbine Converter Reliability	Sermed Alsaadi, Peter Matthews, Christopher Crabtree, Durham University
P71	Influence Of Winding Configurations On Inductances In 2-Pole High-Speed Permanent Magnet Machines	Tianran He, Zi-Qiang Zhu, Fan Xu, University of Sheffield , Hong Bin, Liming Gong, Midea Group Corporate Research Center
P75	Analysis Of On-State Static And Dynamic Transients Of High Voltage 4H-SiC Merged-Pin-Schottky Diode	Chengjun Shen, Saeed Jahdi, Phil Mellor, Juefei Yang, University of Bristol , Erfan Bashar, Olayiwola Alatise, Jose Ortiz-Gonzalez, University of Warwick
P146	Statcom Data-Driven Ccontrol For Griddinamyc Performance Improvement	David Rivera, Daniel Guillen, Jesus Valdez-Resendiz, Carlos Soriano-Rangel, Tecnologico de Monterrey , Jonathan Mayo-Maldonado, The University of Sheffield , Julio Rosas-Caro, Universidad Panamericana
P80	An Investigation Into The Influence Of Stator Tooth And Conductor Geometry On AC Winding Losses In A 365kW Permanent Magnet Machine Equipped With Rectangular Bar Conductors	Yangyu Sun, Geraint Jewell, The University of Sheffield
P83	Feedforward Effect On The Transient Response During Low Voltage Ride Through	Raul De La Fuente, Phillip Thies, Mohammad Abusara, University of Exeter
P84	Resonant Current Estimation And Voltage Regulation For Piezoelectric Transformer-Based Power Supply	Zijiang Yang, Jack Forrester, Jonathan Davidson, Martin Foster, University of sheffield
P100	Design, Analysis And Comparison Of IPM Machines With Concentrated And Distributed Winding For A High-Performance Traction Application	Nabeel Ahmed, Barrie Mecrow, Glynn Atkinson, Newcastle University
P102	A Bidirectional Three-Level Interleaved DC-DC Converter For An Electric Vehicle Charging Station Operating In A Wide Range Of Battery Currents And Voltages	Perdana Putera, Christian Klumpner, Pat Wheeler, University of Nottingham
P105	SiC MOSFET Junction Temperature Estimation Based On The Principal Components Regressed Model	Jinghan Lin, Hongfei Chen, Jiawei Liu, Jixuan Wei, Bing Ji, University of Leicester
P115	Quadratic Improved Super-Boost (ISB) Converter With Low Stored Energy In Components	Jonathan C.Mayo-Maldonado, University of Sheffield , Jesus E.Valdez-Resendiz, Tecnologico de Monterrey , Avelina Alejo-Reyes, Julio C.Rosas-Caro, Antonio Valderrabano-Gonzalez, Universidad Panamericana
P137	New Power Converter Topology For High-Voltage Microwave Power Modules (MPMs)	Joel Holland, Volker Pickert, Mohammed Elgendy, Newcastle University , Gary Henderson, CPI TMD Technologies

Poster Session Day 3 – Thursday 23 June 2022		
P132 ONLINE ONLY	Precise Timing Boost PFC Converter Adaptive Digital Control Using AZURE RTOS	Siavash Heydarzadeh, Arno Grabher-Meyer, V-research
P135 ONLINE ONLY	An X-shaped Busbar For Cancellation Of Capacitor Parasitic Inductances In Automotive Inverters	Jia Li, Hitachi, Ltd , Masami Nohara, Hirofumi Shimizu, Hitachi Astemo, Ltd
P138 ONLINE ONLY	Comparative Study Of Swing Equation-Based And Full Emulation-Based Virtual Synchronous Generators	Chen Jiang, Ajinkya Sinkar, Aniruddha Gole, University of Manitoba
P158 ONLINE ONLY	A Novel Package Structure For SiC Power Module With Kelvin Source	Yifeng Wang, Danfeng Zhao, Xiaoyong Ma, chen Chen, Long Tao, Tianjin University
P159 ONLINE ONLY	Accurate Model And Switching Characteristics Of SiC MOSFET Power Modules With Kelvin Source Package	Yifeng Wang, Danfeng Zhao, Xiaoyong Ma, Bo Chen, Chen Chen, Tianjin University
P150	Analysis Of Si IGBT And SiC MOSFET Three Phase Inverter Technologies In HEV, P-HEV And EV Applications	Kyrylo Melnyk, Oleh Kiselychynk, Jose Ortiz Gonzalez, University of Warwick , Ciprian Antaloae, Hyundai Motor Europe Technical Center , Marina Antoniou, University of Warwick
P152	Bidirectional Medium-Frequency DAB Converter With Dual-Phase-Shift Modulation And Super-Twisting Sliding Mode Control	Ibrahim Alhurayyis, Fazal Akbar, Ahmad Elkhateb, Queen's University
P153	A Comparison Of P5, Cuk And Class E2 Converters For WPT In EV Battery Charging	Iman Okasili, Ahmad Elkhateb, Timothy Littler, Queen's University
P157	A New Single-Phase Six-Switch Dual-Output Buck-Boost Inverter	Fazal Akbar, Ahmad Elkhateb, Queen's University , Mohamed Elgenedy, Glasgow Caledonian University
P161	High Gain DC-DC Voltage Lift Switched-Inductor Multilevel Boost Converter For Supporting Grid Connection Of Wave Energy Conversion	Abdulrahman Alsafrani, Mahmoud Shahbazi, Alton Horsfall, Durham University
P166	Remote Laser Cutting Of High Cobalt Content Electrical Steel: Preliminary Results And Microscopy	Alexei Winter, Lloyd Tinkler, University of Sheffield, AMRC Geraint Jewell, University of Sheffield
P167	A Hybrid 13-Level Switched-Capacitor Multilevel Inverter	Ze Shan, Matthew Armstrong, Mohamed Dahidah, Newcastle University
P170	N-Stage Quadratic Boost Converter Based On Voltage Lift Technique And Voltage Multiplier	Abdulaziz Alkhalidi, Fazal Akbar, Ahmad Elkhateb, David Lavery, Queen's University
P176	A DC Bus Signaling Control Strategy For DC Microgrids With Consideration Of Battery State Of Charge Balancing	Haoge Xu, Fulong Li, Zhengyu Lin, Ruichi Wang, Loughborough University Fei Wang, Shanghai University
P177	Optimal Device Selection Tool For Discrete SiC MOSFETs Considering Switching Loss Challenges Of Paralleled Devices	Hugo Calder, Mahmoud Shahbazi, Alton Horsfall, Durham University
P178	Calorimetric Loss Measurement For Air And Liquid-Cooled Power Electronics And Electrical Machines	Xiaoyan Wang, Danilo Llano, Ruizhu Wu, Xiaoyun Rong, Richard McMahon, University of Warwick
P23	Ragone Plots For Battery Discharge Optimisation	Dani Strickland, Mina Abedi Varnosfaderani, Loughborough University
P76	The Impact Of Electrothermal Stress On Threshold Voltage Drift Of GaN And SiC Cascode Devices	Yasin Gunaydin, Saeed Jahdi, Xibo Yuan, Juefei Yang, Bernard Stark, University of Bristol , Jose-Ortiz Gonzalez, Ruizhu Wu, Olayiwola Alatise, University of Warwick