

Inhaltsverzeichnis

Keynotes

K1-1	Holistic view on the sustainable application of permanent magnets	11
	Martin Kregel (WILO SE, Germany); Kai Schmersahl (Magnequench GmbH, Germany); Oliver Drubel (Wilo SE, Germany)	
K1-2	Möglichkeiten zur Charakterisierung und Parameterbestimmung elektrischer Traktionsmaschinen im frühen Entwicklungsprozess.....	18
	Marcus Gohl, Mark Schmadel and Michael Friedmann (APL Automobil-Prüftechnik Landau GmbH, Germany)	
K1-3	De-Karbonisierung von Bahnantrieben mit Hilfe von Lithium Batterien	19
	Thomas Huggenberger (ABB, Germany)	
K2-1	Vom Verbrauch zum Kreislauf - Ressourcen für einen nachhaltigen Transportsektor	20
	Sebastian Wolff (Technical University of Munich, Germany)	
K2-2	Hairpin-Wicklungen für Industrieanwendungen	21
	Jakob Jung (Additive Drives GmbH, Germany)	
K3-1	Integrated multi-phase electric motor drives: aspects, technologies, opportunities, and challenges.....	24
	Roberto Petrella and Johann Krenn (Silicon Austria Labs GmbH, Austria)	
K3-2	Effizienzverbesserungen durch Silicon Carbide im 3-Phasen Umrichter	25
	Bernd Stiller (Infineon, Germany)	
K3-3	Effizienzgewinne für den Asynchronmotor mit High Performance Rotoren	27
	Peter Szilágyi (Wieland eTraction Systems GmbH, Germany); Gerhard Thumm (Wieland-Werke AG, Germany)	
K4-1	Holistic Drive System Optimization for Robotics	29
	Tobias Wellerdieck and Johannes Kreher (Maxon, Switzerland)	
K4-2	Motor-Integrated Power Factor Corrected Single-to-Three-Phase AC/AC Converter Concepts	30
	Michael Haider (ETH Zurich, Switzerland)	

Trendthema Ressourceneffizienz

S1(1)-1	Sustainability optimization of the NdFeB magnet system of PMSMs by linking electromagnetic calculation and life cycle assessment	31
	Christian Könen (Porsche AG, Germany); Hans-Christian Reuss (University of Stuttgart, Germany)	

Trendthema Optimierung der Energieeffizienz im Gesamtsystem

S1(2)-1 Indirect Efficiency Measurement at PM Machines of Different Power Classes.....	38
Daniel Dietz (Ebm-Papst Mulfingen GmbH & Co. KG, Germany)	
S1(2)-2 Finite Element Analysis and Experimental Validation of Loss Reduction Strategies in Synchronous Reluctance Motors with Combined Star-Delta Winding	56
Tobias Knapp (TU Dresden, Germany); Wilfried Hofmann (TU Dresden, Germany, Germany)	
S1(2)-3 Investigation of the Torque Ripple in 6-pole Synchronous Reluctance Motors with Asymmetrical Rotor Structures	63
Patrick Fehn, Leonie Kilian and Matthias Weigold (TU Darmstadt, Germany)	
S2(2)-1 Analysis of the losses in the electric drive train depending on switching frequency and modulation strategy of the converter.....	71
Florian Muellner (TSA - Traktionssysteme Austria GmbH, Austria)	
S2(2)-2 Cross-Topology Modeling and Optimization of Electrical Machines Using Machine Learning.....	78
Michael Heroth (ZF Friedrichshafen AG, Germany); Helmut C. Schmid (ZF Friedrichshafen AG, Germany); Rainer Herrler (Technische Hochschule Würzburg-Schweinfurt, Germany); Wilfried Hofmann (TU-Dresden & Elektrotechnisches Institut, Germany)	
S2(2)-3 „True-MTPL“ - A New Optimization Method for Minimum Loss Operation of PMSM Drives.....	88
Stephan Goehner (Karlsruhe Institute of Technology, Germany); Matthias Brodatzki (Karlsruhe Institute of Technology KIT, Germany); Johannes Kolb (SHARE at KIT, Germany); Andreas Liske (Karlsruhe Institute of Technology, Germany); Marc Hiller (Karlsruhe Institute of Technology, Germany)	

Parasitäre Effekte bei wechselrichtergesteuerten Antriebssystemen

S2(1)-1 Cogging torque reduction and system simulation of a PMSM Drive for ventilation applications.....	95
Michael Gustav Peters (ZIEHL-ABEGG SE, Germany)	
S2(1)-2 Influence Analysis on the Bearings‘ Impedance Behavior of Inverter-Fed Motor Drives	99
Silvan Scheuermann (Karlsruhe Institute of Technology KIT, Germany); Martin Doppelbauer (Karlsruhe Institute of Technology, Germany); Björn Hagemann (Delta Electronics Netherlands, Germany); Matthias Brodatzki (Karlsruhe Institute of Technology KIT, Germany)	
S3(1)-1 Measures against bearing currents in permanent magnet excited synchronous machines ...	106
Carsten Fräger (Hochschule Hannover & IKME, Germany)	
S3(1)-2 PDIV Measurements on Aviation Electric Motor Insulation Systems - Influence of Operating Temperature and Low Air Pressure	112
Johannes Hoffmann (Technische Universität Dresden); Thomas Linde (Technische Universität Dresden, Germany); Florian Schulz and Diego Machetti (Rolls Royce Deutschland Ltd. & Co KG); Stephan Schlegel (Technische Universität Dresden, Germany)	
S3(1)-3 Thickness of aluminum oxide layer in insulated bearings to reduce circular bearing currents in a 110 kW induction machine	118
Omid Safdarzadeh and Andreas Binder (Technical University of Darmstadt, Germany)	

S4(1)-1	Reduced order model based NVH workflow of a variable-speed motor-pump system	125
	Sascha Neusüs (KSB SE & Co. KGaA, Germany); Boris Janjic (KSB SE und Co. KGaA, Germany)	
S4(1)-2	Eddy Current Losses in Permanent Magnets of Inverter-Driven Synchronous Machines ...	131
	Max Hullmann (Leibniz University Hannover, Germany); Jens Krotsch (Aalen University, Germany); Bernd Ponick (Leibniz Universität Hannover, Germany)	
S4(1)-3	Methodology for determination of additional losses of permanent-magnet synchronous machines due to inverter feeding	139
	Björn Deusinger and Andreas Binder (Technical University of Darmstadt, Germany)	
S4(1)-4	Pulsation losses in un-skewed rotors of synchronous reluctance motors without and with ferrite magnet assistance and their measurement	146
	Sascha Neusüs (KSB SE & Co. KGaA, Germany); Andreas Binder (Technical University of Darmstadt, Germany)	
S5(1)-1	Investigation of Eddy Current Losses in the Rotor of Permanent Magnet Vernier Synchronous Motors.....	152
	David Orth and Raimund Gottkehasch (University of Applied Sciences Düsseldorf, Germany)	

Postersession

P-1	Steigerung der Energieeffizienz von Holzbearbeitungsmaschinen durch adaptive Steuerung von Prozesseinstellgrößen	157
	Stefan Engelmann (TU Dresden, Germany); Julius Hausmann (Technische Universität Dresden, Germany); Wilfried Hofmann (TU-Dresden & Elektrotechnisches Institut, Germany); Christian Gottloeber (TU Dresden, Germany); Volkmar Müller (TU Dresden, Germany)	
P-2	Optimization of the Current Operating State of Induction Machines Based on Electrical Quantities, Rated Data and Temperatures.....	164
	Jason Moos (University of Applied Sciences and Arts Hannover & Institute of Engineering Design, Mechatronics and Electromobility, Germany); Carsten Fräger (Hochschule Hannover & IKME, F2-M-Mechatronik, Germany)	
P-3	Design & Operating Point dependent Surrogate Models for PSM	170
	Christian Digel (Karlsruher Institute of Technology, Germany); Patrick Breining (Institute of Electrical Engineering (ETI), Germany); Johannes Jakubik and Benedict Jux (Karlsruher Institute of Technology, Germany); Martin Doppelbauer (Karlsruher Institute of Technology, Germany)	
P-4	End Ring Resistance Calculation for Line-Start Synchronous Reluctance Machines with Non-Standard Rotor Cage Geometries	177
	Jannik Rituper and Raimund Gottkehasch (University of Applied Sciences Düsseldorf, Germany)	
P-5	Design of three- and five-phase induction and permanent magnet synchronous prototype machines for systematic comparison	183
	Alexander Möller and Andreas Binder (Technical University of Darmstadt, Germany); Maximilian Clauer (TU Darmstadt, Germany)	

P-6	Electromechanical optimization of high reluctance torque variable flux machines under structural mechanical constraints.....	189
	Julius Kesten (Karlsruhe Institute of Technology, Germany); David Armbruster (University of Stuttgart, Germany); Felix Frölich and Luise Kärger (Karlsruhe Institute of Technology, Germany); Christian Bonten (University of Stuttgart, Germany); Martin Doppelbauer (Karlsruhe Institute of Technology, Germany)	
P-7	Peak power reduction of drive systems in an industrial DC grid	195
	Frederic Blank (KEBA Industrial Automation Germany GmbH, Germany)	
P-8	Aspects of Fault-Tolerant Electrical Aircraft Propulsion	200
	Andreas Reeh, Johannes Mühlthaler and Bastian Lehner (Rolls-Royce Electrical, Germany)	

Elektromechanik für Erneuerbare Energien / für die Energiewende

S3(2)-1	Validierung eines Verfahrens zur Wirkungsgradbestimmung von Windenergieanlagen auf Prüfständen unter den Aspekten der Messunsicherheit sowie Vorstellung von Ansätzen zu deren Minimierung.....	208
	Christian Lehrmann (Physikalisch-Technische Bundesanstalt, Germany); Nijan Yogal (Physikalisch-Technischen Bundesanstalt (PTB), Germany)	
S3(2)-2	Erneuerbare Energie aus Gezeitenströmungsturbinen - eine echte Alternative für die Energiewende?	215
	Andreas Jöckel (Flender GmbH, Germany)	

Elektrifizierung von Antriebsstrang und Hilfsantrieben bei Fahrzeugen

S4(2)-1	Hocheffizientes Antriebssystem auf begrenztem Raum für die Londoner Deep-Tube-Metro	227
	Olaf Koerner (Siemens Mobility GmbH, Germany); Rainer Weinmann and Axel Fechner (Siemens Mobility Austria GmbH, Austria); Kai Pöhnisch and Volker Wehrmeister (Siemens Mobility GmbH, Germany)	
S4(2)-2	Superior Continuous Torque Motor - Dauerleistungsbereitstellung für den elektrifizierten mittleren und schweren Nutzfahrzeugverkehr	237
	Christoph Schmülling and Leonard Lorenz (MAHLE International GmbH, Germany)	
S6(2)-1	Determination of Speed-Dependent Thermal Resistance of Ball Bearings	243
	Felix Hoffmann and Martin Doppelbauer (Karlsruhe Institute of Technology, Germany)	
S6(2)-2	Neuartiges Mehrbereichs-Hybridgetriebe für Lastenräder.....	250
	Kevin Zyska, Richard Frizler and Peter Tenberge (Ruhr-Universität Bochum, Germany)	
S6(2)-3	Simulation and Measurements concerning the Thermal and Efficiency Behavior of the „HeAD“ Automotive Drive.....	268
	Manfred Schroedl (Vienna University of Technology, Austria); Matthias Hofer and Raphael Beyerle (Vienna University Technology, Austria)	

Antriebsapplikationen aus Industrie

- S5(2)-1 Standardization of Tractor / Implement Interfaces: Challenge and Opportunity 274**
 Roger Keil (Germany)

Innovative E-Motorentechnik und Materialien

- S6(1)-1 Investigation of Additive Manufactured and Bonded Hard-Magnetic Rotors for Surface-Mounted Permanent Magnet Synchronous Machines..... 281**
 Tong Wu (Technische Universität Berlin, Germany)

- S6(1)-2 Cost effective PM rotor design for servo motor applications 288**
 Gurakuq Dajaku (FEAAM GmbH, Germany); Christian Roth (FEAAM GmbH & Bundeswehr University Munich, Germany)

- S6(1)-3 Resource-efficient integration of slot cooling channels in a hairpin electric motor 294**
 Leonard John (Fraunhofer ICT, Germany); Stefan Hähnlein (Karlsruhe Institut of Technologie, Germany); Steffen Reuter (Fraunhofer ICT, Germany); Martin Doppelbauer (Karlsruhe Institute of Technology, Germany); Lars Berg (Fraunhofer ICT, Germany)

- S7(1)-1 Influence of additive manufacturing processes on the electromagnetic properties and the microstructure of duplex steel 299**
 Bernd Löhlein (Hochschule Flensburg, Germany); Axel Bosslet (APL Landau GmbH, Germany); Constanze Backes and Marek Smaga (RPTU Kaiserslautern, Germany)

- S7(1)-2 Application of additive manufacturing processes to reduce the axial end-winding length of low-pole high-voltage machines 306**
 Markus Jäger (TU Berlin, Germany); Karsten Brach (Siemens AG, Germany); Hartmut Rauch (TU Berlin, Germany) and Uwe Schäfer (Siemens AG, Germany)

- S7(1)-3 Defect types and mechanisms of hairpin coils in manufacturing of electric traction motors..... 312**
 Felix Wirth, Felix Fraider, Ludwig Hausmann, Johannes Gerner and Jürgen Fleischer (Karlsruhe Institute of Technology, Germany)

- S7(1)-4 Asymmetric Operation of Segmented Dual Three-Phase Electric Machines for Improved Cycle Efficiency..... 319**
 Lorenz Schoch (Karlsruhe Institute of Technology, Germany); Miriam Axtmann and Johannes Kolb (SHARE at KIT, Germany); Martin Doppelbauer (Karlsruhe Institute of Technology, Germany)

Umrichtertechnik und Antriebssystemtechnik

- S7(2)-1 Comparative Studies of Anti-Windup Schemes in the Current Control Loop of PMSM Drives at Higher Stator Frequencies 325**
 Uwe Nuß (Offenburg University of Applied Sciences, Germany)

- S7(2)-2 Increasing the Motion Accuracy of a Servo-Controlled Mechanism at Variable Machine Speeds..... 333**
 Olaf Holowenko (Theegarten-Pactec GmbH & Co. KG, Germany); Clemens Troll (& Theegarten-Pactec GmbH & Co. KG, Germany)

S7(2)-3 Regelung eines Schwungradspeichers mit doppeltgespeister Drehstromasynchronmaschine und Multilevel Matrixumrichters zur Sicherung der Momentanreserve in trägheitsarmen Netzen..... 340
Gino Sturm (TU Dresden, Germany); Wilfried Hofmann (TU-Dresden & Elektrotechnisches Institut, Germany); Jonas Kienast (TU Dresden, Germany); Steffen Bernet (Dresden University of Technology, Germany)

Condition Monitoring

S8(2)-1 Drive-based Condition Monitoring: A System for Condition Monitoring Based on Data Processing in Servo Drives..... 347
Stephan Beineke and Alexander Bähr (KEBA Industrial Automation Germany GmbH, Germany)