

**XXII-nd International Symposium on  
Electrical Apparatus and Technologies**

***SIELA 2022***



**PROGRAMME**

**1 - 4 June 2022**

**Hotel Bulgaria  
Bourgas, Bulgaria**

**SIELA 2022** is organized by:



**Union of Electronics, Electrical Engineering and Telecommunications (CEEC)**



**IEEE Bulgaria Section**

**SIELA 2022** is supported by:

- **Technical University of Sofia (within Days of Science of the Technical University of Sofia)**
- **Technical Universities of Varna and Gabrovo**
- **Federation of Scientific and Technical Unions**
- **House of Science and Technology – Plovdiv**
- **Faculty of Technical Sciences, “Prof. Assen Zlatarov” University – Bourgas**
- **Ruse University “Angel Kantchev”**
- **Regional Organization of STU – Bourgas**
- **Centre of Informatics and Technical Sciences at BFU**

Partners of **SIELA 2022** are:



<b><i>Honorary Chairs:</i></b>	Mintcho MINTCHEV, TU-Sofia Iliia CHALAKOV, CEEC
<b><i>Symposium Chair:</i></b>	Ivan YATCHEV, TU-Sofia
<b><i>Symposium Co-Chair:</i></b>	Iliana MARINOVA, TU-Sofia
<b><i>Scientific Secretary:</i></b>	Valentin MATEEV, TU-Sofia

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Elena KOLEVA, Bulgaria	Marek ZIOLKOWSKI, Germany
	Sergey ZIRKA, Ukraine

### **Notes**

- Oral presentations – up to 15 min including discussions (laptop and multimedia projector available)
- Invited paper presentations – up to 30 min including discussions
- Poster size: 0.8×1.2 m
- Invited Papers 2 and Oral Session O4 will be presented online. All other sessions will be in person.

### **Venue**

The symposium will be held in the Conference Center of Hotel Bulgaria.

### **Information and registration desk**

The Information and Registration desk will be open at Hotel Bulgaria as follows:

- Wednesday, 1 June - from 17:00 to 19:00
- Thursday, 2 June - from 8:30 to 16:00
- Friday, 3 June - from 8:30 to 13:00

Phones: (+359) 896 803 915; (+359) 895 588668

### **Symposium dinner**

The Symposium Dinner will be in restaurant “Bulgaria” on Thursday, 2 June 2022.

### **Cultural programme**

Excursion – Saturday, 04 June, 9:30 – 13:30.

Boat trip to the fishermen village *Chengene Skele*, visit to the tourist complex and brief exercise of emergency body signalling and fishing nets knitting.

## SIELA 2022 General Schedule

Day	Hour	Event
Wednesday 1 June	17:00 - 19:00	Registration
	19:00 - 20:00	Welcome Cocktail
Thursday 2 June	9:30 - 10:30	Opening Session
	10:30 - 11:00	Invited papers 1
	11:00 - 11:30	Coffee Break
	11:00 - 13:00	Oral Session <b>O1</b>
	13:00 - 14:00	Lunch
	14:00 - 15:30	Oral Session <b>O2</b>
	15:30 - 16:00	Coffee Break
	16:00 - 17:30	Poster Session <b>P1</b>
	17:30 - 18:30	Oral Session <b>O3</b>
	19:30	Symposium Dinner
Friday 3 June	9:00 - 10:00	Invited Papers <b>2 (online)</b>
	10:00 - 11:00	Oral Session <b>O4 (online)</b>
	11:00 - 11:30	Coffee Break
	11:30 - 13:00	Poster Session <b>P2</b>
	13:00 - 14:00	Lunch
	14:00 - 15:30	Poster Session <b>P3</b>
	15:30 - 16:00	Coffee Break
	16:00 - 17:30	Poster Session <b>P4</b>
	17:30 - 18:00	Closing Session
Saturday 4 June	9:30 - 13:30	Excursion

## INVITED PAPERS 1

**Thursday, 2 June, 10:30 - 11:00**

Nick PAPANIKOLAOU

Greece

***More Electric Transportations: the key for sustainable growth***

## ORAL SESSION O1

**Thursday, 2 June, 11:30 - 13:00**

Ioannis PERPINIAS, Nick RIGOGIANNIS, Ioannis ROIDOS, Nick VAGIANNIS,  
Ioannis BOGATSIS, Athanasios ZOURNATZIS, Anastasios NTEREKAS,  
Anastasios KYRITSIS, Nick PAPANIKOLAOU

Greece

***Energy harvesting techniques for thermal city-buses***

Konstantina DIMITRIADOU, Alexandros BOUBARIS, Nick RIGOGIANNIS,  
Nick PAPANIKOLAOU

Greece

***Digital implementation of P-Q control in grid-tied inverters for educational purposes***

Nick RIGOGIANNIS, Faidra KOTARELA, Alexandros BOUBARIS,  
Anastasios KYRITSIS, Christos CHRISTODOULOU, Nick PAPANIKOLAOU,  
Eftichios KOUTROULIS

Greece

***Incorporation of smart PV technology in zero energy building concept***

Adrienn DINEVA,, Ádám ZSUGA, Szabolcs KOC SIS SZÜRKE

Hungary

***Application of machine learning to automatic gear shift schedule design of alternative drive systems***

Denitsa DARZHANOVA, Iosko BALABOZOV, Petar DARJANOV

Bulgaria

***A special software to predict the first order dynamic circuit steady state DC response within a limited set of experimental data***

Ahmed KULA, Anna GEORGIEVA, Georgi RUZHEKOV

Bulgaria

***Modeling and control of rectification column***

## ORAL SESSION O2

**Thursday, 2 June, 14:00 - 15:30**

Martina PETKOVIC, Ivan GARVANOV, Slavoljub ALEKSIC

Serbia, Bulgaria

***The importance of disaster risk assessment for the transport of dangerous goods in Serbia***

Nebojsa RAICEVIC, Mirjana PERIC, Ana VUCKOVIC, Slavoljub ALEKSIC,  
Svetlana RAICEVIC

Serbia

***Influence of nonlinearity of magnetic material on skin effect in tubes***

Ilona IATCHEVA <b>Some specifics in field modeling, taking into account the coupling of the thermal, mechanical and physicochemical features</b>	Bulgaria
Ilona IATCHEVA, Nikolina PETKOVA, Elisaveta GADJEVA <b>Application of parametric simulations in learning process – opportunities and benefits</b>	Bulgaria
Andon LAZAROV, Dimitar MINCHEV <b>SAR complex images subpixel co-registration</b>	Bulgaria
Andon LAZAROV, Petia PETROVA <b>Crypto genetic approach in information security</b>	Bulgaria

## POSTER SESSION P1

**Thursday, 2 June, 16:00 - 17:30**

Yury PEREVALOV, Victor DEMIDOVICH <b>Intelligent design and control system of automated installations for induction heating of products</b>	Russia
György ISTENES, Zoltán HORVÁTH <b>Multi-objective optimization of electric motors with a kriging surrogate model</b>	Hungary
Krisztián HORVÁTH, Diána HENÉZI <b>Impact of iron loss on performance of speed sensorless MRAS estimator for induction machines</b>	Hungary
Szabolcs KOCSIS SZÜRKE, Adrienn DINEVA <b>Testing and modeling procedure of the 18650 lithium battery at different temperatures</b>	Hungary
E.V. KUZMIN, V.S. LEONTIEV, Yu.V. KILIBA, R.V. PETROV, D.A. USIK, Slavcho BOZHKOVA, Ivan MILENOV, Penko BOZHKOVA <b>Magnetolectric energy harvesting device</b>	Russia, Bulgaria
A.O. NIKITIN, V.A. KISELEV, V.A. MISILIN, Yu.V. KILIBA, R.V. PETROV, Slavcho BOZHKOVA, Ivan MILENOV, Penko BOZHKOVA <b>Antenna model based on a magnetolectric gradient structure with electronic switching of radiation direction</b>	Russia, Bulgaria
D.Y. BURTSOVA, E.A. MENDELEEV, Yu.V. KILIBA, R.V. PETROV, Slavcho BOZHKOVA, Ivan MILENOV, Penko BOZHKOVA <b>Virtual design of physical processes</b>	Russia, Bulgaria
Gancho BOJLOV, Emil RACHEV, Vladislav PETROV <b>Electronic starter with timing control for start capacitor single phase induction motor</b>	Bulgaria
Valentin MATEEV <b>Modeling and testing of thermally activated Fe<sub>2</sub>O<sub>3</sub> / Li<sub>2</sub>CO<sub>3</sub> electrochemical cell</b>	Bulgaria
Valentin MATEEV, Martin RALCHEV, Iliana MARINOVA <b>3D printed CO<sub>2</sub> absorption air contactor</b>	Bulgaria

Grigore CIVIDJIAN <b>Capacitance of narrow strip in tall rectangular cross section envelope</b>	Romania
Mihaela POPESCU, Alexandru BITOLEANU, Constantin Vlad SURU <b>Performance of traction system with induction motor and rotor field-orientation by voltage control</b>	Romania
Alexandru BITOLEANU, Mihaela POPESCU, Constantin Vlad SURU <b>Experimental performances of the battery charging system of an autonomous locomotive</b>	Romania
Constantin Vlad SURU, Mihaela POPESCU, Mihaita LINCA <b>Implementation of rotor field orientation by voltage control on dSpace system</b>	Romania
Mihaita-Daniel CONSTANTINESCU, Mihaita LINCA, Gheorghe-Eugen SUBTIRELU <b>On the influence of the DC-voltage on the performance of the active power filter</b>	Romania
Gheorghe-Eugen SUBTIRELU, Mihaita LINCA, Mihaita CONSTANTINESCU <b>Advanced system for power quality monitor</b>	Romania
Lavinus Sorin GORECI, Mihaela POPESCU, Mihai RADULESCU <b>Active load for testing the control algorithms of traction systems with induction motors of autonomous locomotives</b>	Romania

## ORAL SESSION O3

**Thursday, 2 June, 17:30 - 18:30**

Darin PEEV, Nikolai KOLEV, Yordan SIVKOV <b>Stratified layer composite material for radar anti-reflective coating</b>	Bulgaria
Valentin TOTEV, Vultchan GUEORGIEV <b>A study on regenerative braking of the system battery–power converter–electric motor of electric vehicles</b>	Bulgaria
Dzhengiz IBRAM, Vultchan GUEORGIEV <b>Comparative analysis of two simulation models for reactive power compensation in grid tied single-phase photovoltaic systems</b>	Bulgaria
Alexander VOLOSHIN, Dmitry BLAGORAZUMOV, Andrey LEBEDEV, Evgeniy VOLOSHIN <b>Application of the measurement synchronization method by emergency parameters for the implementation of a process bus according to IEC 61850</b>	Russia

## INVITED PAPERS 2 (online)

**Friday, 3 June, 9:00 - 10:00**

Subhas MUKHOPADHYAY <b>IoT Enabled Sensors for Smart City and Environmental Monitoring</b>	Australia
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Maurizio REPETTO Italy  
**Magneto-Mechanical Behaviour in Magnetic Gear Transmission:  
Design and Experiment**

## ORAL SESSION O4 (online)

**Friday, 3 June, 10:00 - 11:00**

Turan Alp Sarıkaya, Caner Korel and Lale T. Ergene Turkey  
**Artificial neural network modeling of synchronous reluctance motor**

Sebastiaan KONING, Diego ZUIDERVLJET, Peter van DUIJSEN Netherlands  
**Educational laboratory demonstrator for teaching dual active bridge control principles**

Alexander MITOV, Jordan KRALEV, Tsonyo SLAVOV, Ilcho ANGELOV Bulgaria  
**Design of embedded control system for open circuit axial piston pump**

Atanas TERZIYSKI, Stoyan TENEV, Vedrin JELIAZKOV, Nikola PETROV Bulgaria  
**UV radiation monitoring probe**

Atanas TERZIYSKI, Stoyan TENEV, Vedrin JELIAZKOV, Ludmil TSANKOV Bulgaria  
**Beta and gamma rays evaluation gauge**

## POSTER SESSION P2

**Friday, 3 June, 11:30 - 13:00**

Ivelina HINOVA Bulgaria  
**Overview of the possibilities for realization of the interaction between RES and natural gas**

Ivelina HINOVA Bulgaria  
**Analysis of the possibilities for realization of the PTG technology in RES**

Isak KEROLLI Kosovo  
**Requirements for balancing service providers to deliver frequency containment reserve in Europe**

Emil PANOV, Emil BARUDOV, Milena IVANOVA Bulgaria  
**Research into the Z-parameters and the characteristic parameters of a ship's alternating voltage regulator**

Kalin NIKOLOV, Maik STREBLAU Bulgaria  
**Hydrogen production technologies - a comparative overview and future developments**

Veselin VASILEV, Bohos APRAHAMIAN Bulgaria  
**Implemented PLC control system for domestic hot water supply in a recreational facility**

Veselin VASILEV, Bohos APRAHAMIAN Bulgaria  
**Implemented PLC control system using temperature hysteresis for energy savings in buildings**

Tatyana DIMOVA <b>Modeling the magnetic field inside a hand separator with permanent magnets</b>	Bulgaria
Tatyana DIMOVA, Bohos APRAHAMIAN, Marin Todorov MARINOV <b>Experimental evaluation of the purification of waste materials using belt magnetic separator</b>	Bulgaria
Tatyana DIMOVA, Maria MARINOVA, Bohos APRAHAMIAN, Georgi ZHELEV <b>Increasing the efficiency of technological processes in lattice-type permanent magnet separators</b>	Bulgaria
Marin MARINOV, Georgi ZHELEV, Maik STREBLAU, Tatyana DIMOVA <b>The effect of the load on electrical parameters of a three-phase induction device</b>	Bulgaria
Tatyana RADEVA <b>Photovoltaic energy usage for public educational building: a case study</b>	Bulgaria
Velichko ATANASOV, Dimo STOILOV <b>Determining the places for power remote disconnectors on medium voltage overhead lines s</b>	Bulgaria
Konstantin-Kiril SAVOV, Dimo STOILOV, Kristina HADZHIYSKA <b>An initial model for energy system optimization</b>	Bulgaria
Kostadin YOTOV, Stanka HADZHIKOLEVA, Emil HADZHIKOLEV, Daniela OROZOVA <b>Forecasting electricity consumption in a national electricity system</b>	Bulgaria
Margarita TERZIYSKA, Kostadin YOTOV, Emil HADZHIKOLEV, Zhelyazko TERZIYSKI, Stanka HADZHIKOLEVA <b>Forecasting electricity consumption with intelligent hybrid model</b>	Bulgaria
Magdalena GARVANOVA, Ivan GARVANOV, Daniela BORISSOVA <b>Specific absorption rate analysis of smartphone</b>	Bulgaria
Magdalena GARVANOVA, Ivan GARVANOV, Vladimir IVANOV, Daniela BORISSOVA <b>Measurement and estimation of the magnetic fields in electric vehicles</b>	Bulgaria

## POSTER SESSION P3

**Friday, 3 June, 14:00 - 15:30**

Ivan POPOV <b>Design of Simulink based adaptive state estimator in dynamic positioning system of marine vessel</b>	Bulgaria
Ivan POPOV <b>Parametric optimization of adaptive wave filter using an objective function</b>	Bulgaria
Milen VASILEV <b>Retrofit of speed control system of low speed marine engine</b>	Bulgaria
Milen VASILEV <b>Hybrid electro-hydraulic actuator for fuel control of prime movers – typical defects</b>	Bulgaria
Dragiya YANULOV <b>Modeling and examining the performance of virtually variable displacement pump driven by an asynchronous motor</b>	Bulgaria

Dragiya YANULOV <b>Comparative numerical study of digital hydraulic systems with and without soft switching</b>	Bulgaria
Veselin ATANASOV, Yordan TSANKOV, Yordan SIVKOV <b>Analyzing possible network solutions for IoT communication protocols and their applications in smart farming</b>	Bulgaria
Yordan SIVKOV, Veselin ATANASOV, Chavdar ALEXANDROV <b>Education practice for electrical engineering students in COVID-19 situation. Lesson learned and future application</b>	Bulgaria
Iva PETRINSKA, Dilyan IVANOV <b>Influence of the operational temperature on the characteristics of LED retrofit lamps</b>	Bulgaria
Iva PETRINSKA, Dilyan IVANOV <b>Illuminance meters calibration - deviation of the readings with time</b>	Bulgaria
Mihaela SLAVKOVA, Radoslav MILTCHEV, Kostadin MILANOV <b>Computer-aided design of current transformer for power electronics converters with voltage feedback</b>	Bulgaria
Georgi TOMOV <b>Reduction of electricity consumption in the production of thermally modified wood</b>	Bulgaria
Kostadin MILANOV, Mihaela SLAVKOVA, Radoslav MILTCHEV <b>Study of buck converter under supply voltage variations</b>	Bulgaria
Valentin MATEEV, Miglenna TODOROVA, Iliana MARINOVA <b>Modelling of linear magnetic gear</b>	Bulgaria
Valentin MATEEV, Martin RALCHEV, Iliana MARINOVA <b>3D printed polymer magnetic material by stereolithography technology</b>	Bulgaria
Dinjo KOSTOV, Iosko BALABOZOV, Georgi GANEV <b>A way to control of fault-current limiter by using a solid-state switching device</b>	Bulgaria
Iosko BALABOZOV, Ivan YATCHEV, Ivan HADZHIEV <b>Open-source electronic system for monitoring of some parameters in LV electrical panels</b>	Bulgaria
Dejan JOVANOVIC, Nenad CVETKOVIC, Dragana JOVANOVIC, Dragan VUCKOVIC, Zeljko HEDERIC <b>Wire grounding electrode placed near vertical cylindrical multilayered ground non-homogeneity</b>	Serbia, Croatia

## POSTER SESSION P4

**Friday, 3 June, 16:00 - 17:30**

Stanislav SIMEONOV, Ekaterina GOSPODINOVA <b>Exploring the possibility of improving the design of a fuel level measuring device using a compensating sensor</b>	Bulgaria
Lenko ERBAKANOV <b>Implementation of simplified method for constant v/f speed control of 3-phase induction motor</b>	Bulgaria
Daniela OROZOVA, Ivan POPCHEV, Milen BALTOV <b>Cyber-physical social systems towards blockchain and smart specialisation solutions</b>	Bulgaria
Milena GEORGIEVA, Daniela OROZOVA <b>Improving education through generalised nets and data science</b>	Bulgaria

Valentin NENOV, Hyusein YEMENDZHIEV, Stanislav SIMEONOV, Todor KOSTADINOV <b>Intelligent control of activated sludge reactor performance by DO consumption data</b>	Bulgaria
Radovesta STEWART, Colin STEWART, Todor KOSTADINOV, Sotir SOTIROV <b>Increasing physics engine realism using neural networks</b>	Bulgaria
Stanislav POPOV, Veselina BUREVA <b>Object-oriented modelling of home automation management system</b>	Bulgaria
Nikolay HINOV, Tsveti HRANOV, Bogdan GILEV <b>Model-based optimization of sepic DC-DC converter</b>	Bulgaria
Nikolay HINOV, Tsveti HRANOV, Bogdan GILEV <b>Modelling of an electronic technological system for induction melting of metals</b>	Bulgaria
Krassimir KISHKIN, Hristiyan KANCHEV, Dimitar ARNAUDOV <b>Modeling the influence of cells characteristics in battery bank</b>	Bulgaria
Gergana VACHEVA, Nikolay HINOV, Bogdan GILEV, Plamen STANCHEV <b>Charging station for electric vehicles, based on micro gas turbine, fuel cell and supercapacitor</b>	Bulgaria
Gergana VACHEVA, Vladimir DIMITROV, Plamen STANCHEV <b>Mathematical model of synchronous machines for examination of energy flows in electric vehicles</b>	Bulgaria
Georgi ZASHEV, Dimitar ARNAUDOV, Marin MARINOV <b>Frequency domain modeling of multiphase DC-DC converter with automotive application</b>	Bulgaria
Filip STOIMENOV, Vladimir DIMITROV, Dimitar ARNAUDOV <b>Impedance measurements for multiphase converters</b>	Bulgaria
Marina RASHEVSKAYA, Sergey YANCHENKO <b>Arc fault detection method in low-voltage networks based on changes in the harmonic distortion factor</b>	Russia



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