



AMPS 2025 15TH IEEE International Workshop on Applied Measurements for Power Systems

Bucharest, Romania ||| September 24 - 26, 2025

15th IEEE International Workshop on Applied
Measurements for Power Systems

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Welcome Message from the Chairmen

AMPS 2025, sponsored by the IEEE Instrumentation and Measurement Society and organized by the TC39 "Measurements in Power Systems", is the 15th edition of the IEEE International Workshop on Applied Measurements for Power Systems.

This year the AMPS workshop is held in Bucharest and is hosted by NUST Politehnica of Bucharest, Romania, thus welcoming all the attendees from different realities (academia, metrological institutes, research centers and industry) in a perfect venue for the deep discussions on power systems measurement topics. The vibrant exchange of views between participants has always been indeed AMPS trademark since from the beginning.

The papers presented in the proceedings have been divided into ten homogeneous technical sessions, whose titles clearly reflect the latest trends in measurements applications for modern electric power systems. Therefore, besides the most recent advancements in the subjects typically discussed in the previous editions, such as voltage and current sensors, power system monitoring, power quality, Phasor Measurement Units, state estimation, distributed measurement systems, this year confirms the interest already emerged in AMPS 2023 and 2024 about measurement data analytics and advanced diagnostic and testing systems and devices, with a particular focus on ICT solutions.

As per tradition of this workshop, we hope this event will represent a qualified forum for providing high-level contributions to the advancement of knowledge on these traditional and emerging topics. Welcome to AMPS 2025!

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Paolo Attilio Pegoraro, University of Cagliari, Cagliari, Italy

Technical Program Co-Chairs

Alessandro Mingotti, University of Bologna, Bologna, Italy

Sergio Toscani, Politecnico di Milano, Milano, Italy

Steering Committee Chair

Mario Luiso, University of Campania "Luigi Vanvitelli", Aversa, Italy

IEEE AMPS 2025 Organizers

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Mario Luiso, *University of Campania "Luigi Vanvitelli", Aversa, Italy*

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Technical Program: Wednesday, September 24

8:00 - 8:45

Registration

Room: Entrance Hall of Central Library at Politehnica Bucharest

8:45 – 9:00

Welcome Address

Speaker: Paolo Attilio Pegoraro (University of Cagliari, Italy)

Room: Room 2.2

9:00 - 10:40

S01: Voltage and Current Sensors I

Chair: Mario Luiso (University of Campania Luigi Vanvitelli, Italy)

Room: Room 2.2

9:00

Mitigating Temperature Effects in Rogowski Coils' Accuracy Through Physics-Informed Model

Virginia Negri, Alessandro Mingotti, Roberto Tinarelli, Lorenzo Peretto (University of Bologna, Italy);
Lala Shakti Swarup Ray, Bo Zhou, Paul Lukowicz (German Research Centre of Artificial Intelligence,
DFKI, and University of Kaiserslautern, Germany)

9:25

Parallel-Connected Voltage Generators for the Characterization of MV VTs up to 150 kHz

Mohamed Agazar (LNE, France); Antonio Delle Femine, Daniele Gallo, Claudio Iodice, Mario Luiso
(University of Campania Luigi Vanvitelli, Italy)

9:50

Evaluation of a Fiber-Optic Current Sensor for On-site Calibrations

Wei Zhao (VSL National Metrology Institute, The Netherlands); Chuansheng Li (National Institute of
Metrology, NIM, China); Domenico Giordano, Palma Sara Letizia, Davide Signorino (Istituto
Nazionale di Ricerca Metrologica, INRiM, Italy); Jari Hällström (VTT Technical Research Centre of
Finland Ltd, Finland); Gert Rietveld (University of Twente & VSL, The Netherlands)

10:15

Design of a Wideband Amplifier to test Instrument Current Transformers in the Supraharmonic Range

Andrea Mariscotti (University of Genova, Italy)

Technical Program: Wednesday, September 24 (cont)

10:40 - 11:10

Coffee Break

Room: Hallway outside Room 2.2

11:10 - 12:25

S02: ICT Solutions and Architectures for Power System Monitoring

Chair: Stefano Rinaldi (University of Brescia, Italy)

Room: Room 2.2

11:10

Design and Validation of a Flexible Digital Platform Integrating Heterogeneous Measurement Information

Radu Plamanescu, Grigore Stamatescu (University Politehnica of Bucharest, Romania); Andreea El-Leathey, Alexandru-Ionel Constantin, Adrian Nedelcu (ICPE-CA, Romania); Matej Vrtal, Vit Krcal, Radim Dvorak, Michal Ptacek (Brno University of Technology, Czech Republic)

11:35

Lightweight Digital Twin for Current Sensing Using Microcontroller-Integrated Rogowski Coil Model

Virginia Negri, Alessandro Mingotti, Roberto Tinarelli, Lorenzo Peretto (University of Bologna, Italy)

12:00

Integration of PMUs into MV Distribution Networks: Framework Development and Applications

Vit Krcal, Matej Vrtal, David Topolánek, Petr Toman (Brno University of Technology, Czech Republic); Jan Grossmann, Roman Hruza (ELVAC, Czech Republic); Radu Plamanescu (University Politehnica of Bucharest, Romania)

12:25 - 13:30

Lunch

Room: Hallway outside Room 2.2

Technical Program: Wednesday, September 24 (cont)

13:30 - 15:10

S03: Power Quality

Chair: Jan Meyer (Technische Universität Dresden, Germany)

Room: Room 2.2

13:30

**An Integrated Approach for Power Quality Monitoring in Transmission and Distribution Systems:
The Italian Scenario**

Michele Zanoni, Riccardo Chiameo, Liliana Tenti, Massimo Volta (RSE - Ricerca sul Sistema Energetico, Italy); Loredana Cristaldi, Christian Laurano, Andrea Moschetti, Sergio Toscani (Politecnico di Milano, Italy)

13:55

Case where the General Summation Law Underestimates the Aggregation of Voltage Unbalance Emission

Jacques Bezuidenhout, Johan Rens (North-West University, South Africa); Brandon Peterson (North-West University & Eskom, South Africa); Gerhard Botha (North-West University & DNV, South Africa)

14:20

**Supraharmonics in-situ Measurements in Distribution Networks. An Experimental Case-Study
Analysis of Standards-based Metrics**

Giovanni Artale, Antonio Cataliotti, Valentina Cosentino (University of Palermo, Italy); Antonio Delle Femine (University of Campania Luigi Vanvitelli, Italy); Dario Di Cara, Vito Ditta (National Research Council, Italy); Daniele Gallo, Mario Luiso (University of Campania Luigi Vanvitelli, Italy); Nicola Panzavecchia, Giovanni Tinè (National Research Council, Italy)

14:45

The Challenge in Using Summation Exponents to Summate RMS Harmonic Currents from Multiple Sources: A Comparative Assessment Using Aggregated Phasor Data

Pieter L Röntgen, Johan Rens (North-West University, South Africa); Brandon Peterson (North-West University & Eskom, South Africa); Gerhard Botha (North-West University & DNV, South Africa)

15:10 - 15:40

Coffee Break

Room: Hallway outside Room 2.2

Technical Program: Wednesday, September 24 (cont)

15:40 - 16:55

S04: Power System Monitoring

Chair: Andrea Mariscotti (University of Genova, Italy)

Room: Room 2.2

15:40

Characterization of the Temporal Behaviour and Variations between Electrical Phases of the Low Voltage Distribution Grid Access Impedance in the MHz Band

Javier Vildósola, Itziar Angulo, Igor Fernandez Perez (University of the Basque Country, UPV/EHU, Spain); Rafael S. Salles (Luleå University of Technology, Sweden); Jon González-Ramos, Alexander Gallarreta (University of the Basque Country, UPV/EHU, Spain); Sarah Rönnberg (Luleå University of Technology, Sweden); David de la Vega (University of the Basque Country, UPV/EHU, Spain)

16:05

Power flow Variability Index in a Transmission Grid

Anca Petruta Brincoveanu, Radu Cristian Opreanu, Ana Maria Dumitrescu, Mihaela Albu (University Politehnica of Bucharest, Romania)

16:30

Frequency- and Time-Domain Based Power Estimation in Shunt Capacitors: a Comparative Case Study Using Field Measurements

Rodrigo Rozenblit Tiferes, Giovanni Manassero Junior (Universidade de São Paulo, Brasil)

Technical Program: Thursday, September 25

9:00 - 10:40

S05: Phasor Measurement Units

Chair: Mihaela Albu (University Politehnica of Bucharest, Romania)

Room: Room 2.2

9:00

Evaluation of Delay Time in PMU Prototypes for Hardware-in-the-Loop Testing

Guglielmo Frigo (Swiss Federal Institute of Metrology METAS, Switzerland); Zhiwang Feng, Yljon Seferi, Graeme Burt (University of Strathclyde, United Kingdom)

9:25

The ROCOF-DFT: A Discrete Fourier Transform Kernel Adaptation for ROCOF Tracking

Cesar Andres Cazal (RWTH Aachen University, Germany); Guglielmo Frigo (Swiss Federal Institute of Metrology METAS, Switzerland); Ferdinanda Ponci, Antonello Monti (RWTH Aachen University, Germany)

9:50

Computationally Efficient and Accurate Phasor Estimation for Electrical Waveforms Affected by Both Harmonics and Interharmonics

Daniel Belega (University of Timisoara, Romania); Dario Petri (University of Trento, Italy)

10:15

Low Cost Analog Input Stage for PMU Applications in the Low Voltage Grid

Manuel Pitz, Benish Khan, Cesar Andres Cazal, Matthias Marcus Nowak, Antonello Monti (RWTH Aachen University, Germany)

10:40 - 11:10

Coffee Break

Room: Hallway outside Room 2.2

Technical Program: Thursday, September 25 (cont)

11:10 - 12:25

S06: Distributed Measurement Systems

Chair: David de la Vega (University of the Basque Country, UPV/EHU, Spain)

Room: Room 2.2

11:10

A Distributed Measurement System for Synchronized Energy Analysis in Railway Applications

Antonio Delle Femine, Daniele Gallo, Mario Luiso (University of Campania Luigi Vanvitelli, Italy); Jorge Quintana Fernández (Metro de Madrid, Spain); Palma Sara Letizia, Davide Signorino, Domenico Giordano (Istituto Nazionale di Ricerca Metrologica, INRiM, Italy)

11:35

Dash Plotly Web-based Multi-source Electrical Signals Monitoring and Analysis Tool

Adriana Burlibasa, Silviu Epure, Ciprian Vlad, Mariana Dumitrescu, Mihai Culea (Dunarea de Jos University of Galati, Romania); Ionut Nechita

12:00

Dynamic Estimation and Fusion of Frequency and ROCOF Data via Local Gossiping

Guglielmo Frigo (Swiss Federal Institute of Metrology METAS, Switzerland); David Macii, Dario Petri (University of Trento, Italy)

12:25 - 13:30

Lunch Break

Room: Hallway outside Room 2.2

Technical Program: Thursday, September 25 (cont)

13:30 - 15:10

S07: State Estimation

Chair: Guglielmo Frigo (Swiss Federal Institute of Metrology METAS, Switzerland)

Room: Room 2.2

13:30

Impact of Pseudo-Measurements Generation on Distribution System State Estimation

Manuela Pasella (University of Cagliari, Italy); Andrea Benigni (Forschungszentrum Jülich, Germany); Barbara Cannas (University of Cagliari, Italy); Daniele Carta (Forschungszentrum Jülich, Germany); Carlo Muscas, Paolo Attilio Pegoraro, Fabio Pisano, Carlo Sitzia (University of Cagliari, Italy)

13:55

A Digital Twin Architecture for Monitoring Medium Voltage Distribution Grid: The Real-Time State Estimation Use Case

Stefano Rinaldi (University of Brescia, Italy); Davide Della Giustina, Andrea Angioni (Unareti, Italy)

14:20

Distribution Grid Voltage Estimation by Correlated Gaussian Processes

Maximilian Buechel, Marcel Zimmer, Daniele Carta, Andrea Benigni (Forschungszentrum Jülich, Germany)

14:45

Multi-Snapshot PMU-based State Estimation Considering Line Parameters Uncertainty and Systematic Errors

Christian Laurano (Politecnico di Milano, Italy); Carlo Sitzia (University of Cagliari, Italy); Sergio Toscani, Gabriele D'Antona (Politecnico di Milano, Italy); Paolo Attilio Pegoraro (University of Cagliari, Italy)

15:10 - 15:40

Coffee Break

Room: Hallway outside Room 2.2

Technical Program: Thursday, September 25 (cont)

15:40 - 16:55

S08: Measurement Systems for Diagnostic and Grid Analysis

Chair: Daniele Carta (Forschungszentrum Jülich, Germany)

Room: Room 2.2

15:40

On the Definition of Power Grid Representative Test Waveforms for Sample-by-Sample Uncertainty Analysis

Alexander Gallarreta (University of the Basque Country, UPV/EHU, Spain); Heiko Füsler (Physikalisch-Technische Bundesanstalt, PTB, Germany); Yljon Seferi (University of Strathclyde, United Kingdom); Tezgül C. Öztürk (TÜBİTAK Ulusal Metroloji Enstitüsü, UME, Turkey); David de la Vega (University of the Basque Country, UPV/EHU, Spain); Brian G Stewart, Graeme Burt (University of Strathclyde, United Kingdom)

16:05

Lithium-Ion Battery State of Health Estimation Enhanced with Faults Indicator

Efstathios Fiorentis, Bogdan-Adrian Enache (University Politehnica of Bucharest, Romania)

16:30

Navigating Harmonics and Voltage Stability Beyond Standard Compliance In Industrial Power Systems

Sulaiman Elrajoubi, Ferdinanda Ponci, Antonello Monti (RWTH Aachen University, Germany); Markus Faesing, Hans-Jörg Eckoldt (DESY Hamburg, Germany)

19:30 - 21:30

Gala Dinner

Location: TBD

Technical Program: Friday, September 26

9:00 - 10:40

S09: Advanced Monitoring and Testing Systems and Devices

Chair: Daniel Belega (University of Timisoara, Romania)

Room: Room 2.2

9:00

Design and Compatibility of Different Stand Alone Merging Unit (SAMU) Calibration Testbeds

Ana Milagros Fuentes Herrera, Miguel Ángel Oliván (CIRCE Research Centre, Spain); Julio J. Melero (Instituto Universitario de Investigación Mixto ENERGAIA, Universidad de Zaragoza – CIRCE, Spain); Angela Espin-Delgado, Stefan Svensson (RISE Research Institutes of Sweden, Sweden); Pieter Van Der Kamp, Ernest Houtzager (VSL National Metrology Institute, The Netherlands); Jari Hällström, Tapio A. Lehtonen (VTT Technical Research Centre of Finland Ltd, Finland)

9:25

Phasor Data Concentrator for Detection and Analysis of Events in Synchrophasor Data Streams

Paolo Castello (University of Cagliari, Italy); Guglielmo Frigo (Swiss Federal Institute of Metrology METAS, Switzerland); Davide Sitzia, Sara Sulis (University of Cagliari, Italy)

9:50

Design of a low-frequency impedance measurement system applicable to LV grids in live conditions

Andrea Mariscotti (University of Genova, Italy)

10:15

Linear Time-Invariant State-Space PLL Modeling Based on Dynamic Harmonics Balance for Performance Analysis in Power Grid Applications

Atul Singh, Federico Cecati, David Macii (University of Trento, Italy)

10:40 - 11:10

Coffee Break

Room: Hallway outside Room 2.2

Technical Program: Friday, September 26 (cont)

11:10 - 12:25

S10: Voltage and Current Sensors II

Chair: Alessandro Mingotti (University of Bologna, Italy)

Room: Room 2.2

11:10

Influence of Test Signal Parameters on the Frequency Response Measurement of Current Transformers

Stefano Emilio Caria (INRiM & Politecnico di Torino); Gabriella Crotti (Istituto Nazionale di Ricerca Metrologica, INRiM, Italy); Antonio Delle Femine, Daniele Gallo (University of Campania Luigi Vanvitelli, Italy); Domenico Giordano, Palma Sara Letizia (Istituto Nazionale di Ricerca Metrologica, INRiM, Italy); Mario Luiso (University of Campania Luigi Vanvitelli, Italy); Paolo E Roccato, Davide Signorino (Istituto Nazionale di Ricerca Metrologica, INRiM, Italy)

11:35

Influence of Test Signal Parameters on the Frequency Response Measurement of Current Transformers

Victor Khokhlov, Robert Stiegler, Christian Jaeschke (Technische Universität Dresden, Germany); Roberto Schulze (OMICRON Electronics GmbH, Germany); Jan Meyer (Technische Universität Dresden, Germany); Erik Sperling (OMICRON Electronics GmbH, Switzerland)

12:00

Improved Wide-Band Active Power Measurement for di/dt Peak Resistant Front-End of Rogowski-Coil with Digital Integration and Compensation

Lukas Duhme, Gerd Bumiller (Hochschule Ruhr West, Germany)

12:25 - 12:45

Closing Ceremony

Room: Room 2.2