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INTELLIGENT ELECTRIC MOBILITY SYSTEMS: BATTERY STORAGE AND GRID INTEGRATION FOR SUSTAINABLE TRANSPORT

ORGANIZED BY
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SPECIAL SESSION OVERVIEW

The electrification of mobility is expanding beyond rail to road, naval, and air applications, requiring advances in electric drives, energy storage, and grid integration. Sustainable energy storage solutions, including Lithium-ion (LiB) batteries, supercapacitors, and fuel cells, play a key role in vehicle-to-grid (V2G) applications and second-life reuse.

Permanent magnet (PM) motors dominate electric mobility due to their high efficiency, but dependence on rare earth and environmental concerns are driving research into alternative solutions. Meanwhile, power electronics are moving towards wide bandgap semiconductors, improving integration and performance. However, large-scale deployment of Electric Vehicles (EVs) poses challenges in terms of recyclability, electromagnetic compatibility and power quality, requiring a holistic design approach.

The integration of Renewable Energy Sources (RES) into national and local grids, particularly within energy communities, is critical to ensure resilience and mitigate environmental impact.

All these research topics fall within the objectives of the MOST – Sustainable Mobility Center and received funding from the European Union Next-GenerationEU (PIANO NAZIONALE DI RIPRESA E RESILIENZA (PNRR) – MISSIONE 4 COMPONENTE 2, INVESTIMENTO 1.4 – D.D. 1033 17/06/2022, CN00000023).

TOPICS OF INTEREST

We invite original contributions addressing, but not limited, to the following topics:

- Intelligent Electric Mobility Systems: high-efficiency converters, lightweight electric machines, reliability, diagnostics and integration
- Sustainable energy storage: battery materials, second-life applications, recyclability and safety
- Power electronics for e-mobility: hybrid cells, battery packs and integrated control for performance optimization
- Fast and ultra-fast charging: infrastructure development and innovative charging solutions
- Mobility-Grid Interaction: control strategies and system architectures for integrating Electric Vehicles (EVs) with Renewable Energy Sources (RES), Battery Energy Storage Systems (BESS), and the electrical grid.

Contribute to the advancement of electric mobility and the development of sustainable transport technologies!

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