

## **ELECTRICAL ENERGY STORAGE SYSTEMS, POWER SUPPLIES AND ELECTRICAL POWER SYSTEMS IN NUCLEAR FUSION**

### **ORGANIZED BY**

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### **ABSTRACT:**

Nuclear fusion is the reaction that powers the Sun and the stars and allows life to develop and grow on Earth. Since the last century, Nuclear Fusion has been at the forefront of research because its replication would make it possible to generate clean, green and limitless electrical energy. In the future, nuclear fusion power plants are expected to spread throughout the world and play a more and more crucial role, reducing the contribution of fossil fuels and other polluting resources to the production of electricity. To achieve such an ambitious goal, many challenging problems in a wide range of engineering fields need to be solved, requiring the discovery of novel solutions and the development of new technologies. Among these, current research in the field of Nuclear Fusion also addresses electrical engineering issues, since the thermal energy extracted from fusion reactions must be converted into electrical energy before it can be delivered to the electrical grid and can be recirculated within the facility to power all the electrical consumers. Moreover, the unique nature of the electrical power requirements makes it imperative to study and to design innovative electrical storage systems and power supply topologies, while the reliable and robust assessment of electrical power systems is becoming more and more mandatory in order to increase the efficiency of the power plant and to mitigate its impact on the external electrical grid.

The focus of this Special Session is to collect scientific and technical manuscripts describing the current state of the art, the emerging technologies, and the latest advancements and innovations in electrical engineering for the advancement of nuclear fusion. The session aims to gather researchers, engineers, and experts to discuss a broad array of topics critical to the success of next-generation nuclear fusion power plants. Topics include (but are not limited to) advances and new technical solutions under investigation for electrical systems, power electronics, electrical energy storage systems, power supplies and electrical power systems in nuclear fusion.

The session will host presentations and discussions of original research work or comprehensive reviews. Additionally, participants will have the opportunity to present new challenges or results in ongoing advanced nuclear fusion projects and explore interdisciplinary collaborations. It is foreseen to inspire collaborative efforts and promote knowledge dissemination via, e.g., the submission for journal publication of a selection of presented works.

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## KEY TOPICS:

- High-current and high-voltage power supplies for tokamak magnets.
- Electrical distribution systems in nuclear fusion facilities.
- High-performance electric and magnetic energy storage systems.
- Novel solutions for power supplies for superconducting magnets.
- Novel solution for magnets protection.

