The EPS FORUM 2024

Monday 25 March 2024 - Wednesday 27 March 2024

Henry Ford Building

Scientific Programme

Atomic, molecular and optical physics for quantum technologies

The realization at the end of the 20th century that entanglement could be harnessed was groundbreaking, and a decisive step for the second quantum revolution. In this context, research in atomic, molecular, and optical physics has led to exciting scientific discoveries and the development of quantum technologies with a wide range of applications in communication and sensing, among others, which will be discussed at the round tables. At the center of these investigations are the fundamental laws of quantum mechanics and how they manifest in single atoms, molecules and many-body systems. These systems will be discussed in the ultracold and ultrafast regimes, how the interaction between them, and with photons, can be controlled and manipulated to explore fundamental problems in quantum physics, and where the boundaries and limitations might be encountered.

Applications of nuclear and particle physics to Society

Nuclear and particle physics is a vibrant and vital area of science that studies the basic properties of matter at the level of atomic nuclei and their fundamental constituents and interactions. The implementation of the research programme for carrying out the investigation of the deepest secrets of the Universe require the development of very sophisticated tools based on advanced technologies. The resulting technical progress benefits a great variety of solutions to challenging problems that affect our society.
While in day 1 the chair of NuPECC, Marek Lewitowicz, will overview the most significant nuclear and particle physics applications, the session scheduled in day 2 will be focused on more specific topics, which will be highlighted by leading scientists who have been greatly contributing over the last years to nuclear energy, health and cultural heritage and forensics.

Condensed matter and applications to industry

We intend to provide a sampling of some of the most exciting topics currently being investigated in condensed matter physics. Two tutorial lectures on 2D Materials and Large Facilities (Neutron and Synchrotron Sources) will introduce students (and other general audiences) to key materials and experiments that are currently being used to discover new physical properties of matter. A panel discussion with the participation of various start-ups and titled "Condensed Matter: Current Challenges, Advances and New Perspectives from the Atomic Scale to Health Physics" will show early-career researchers how to broaden their horizons in their future career. In addition, four scientific talks on hot topics in condensed matter will show attendees just how vibrant research in this field is today.

Energy management, pollution and climate; Artificial intelligence, brain inspired processing systems and applications

This topic will address recent progress in the fields of the energy for sustainable development and use of AI and deep learning techniques. In Day ,1 a tutorial talk will present the importance of Earth observation by satellites to collect data relevant for climate change adaptation, mitigation and for pollution and disaster risk reduction. A round table will then address the different components of energy management, environmental and sustainability issues. Day 2 will focus on artificial intelligence, brain inspired systems and applications. A tutorial talk will discuss in-memory computing based on artificial neural networks and a parallel session will be devoted to the recent developments of artificial intelligence, its applications and limits.

Photonics

Photonics has been recognized by the European Commission as one of Europe's key enabling technologies of the 21st Century. Many technologies are driven by photonic tools, with applications ranging from communications and metrology to manufacturing, to life sciences, health care and security. The EPS Forum 2024 will host a dedicated Photonics programme with two focus topics: laser science and photonic integrated circuitry (PIC). Lasers have been an enabling technology for both fundamental research and industry ever since their introduction almost 60 years ago. Photonic integrated circuitry based on III–V semiconductor materials are at the core of our modern communication networks and protocols. Advancements in the development of novel PIC platforms and materials opened new perspectives in fields such as metrology, life science, and quantum technology. The programme of the Forum will give participants an overview about current developments in laser science and PIC, in both academia and industry, and outlook on future trends

Other topics

All research outwith the given fields

Young Minds

The Young Minds Leadership Meeting