

Time	<p style="text-align: center;">ENERGY AND SUSTAINABILITY: Research Needs for a Sustainable Energy Transition ABSTRACTS</p>
09:00 – 09:30	<p style="text-align: center;">The Future of the Electrical Energy System: from Rotating Masses to Power Electronic</p> <p style="text-align: center;"><i>Gabriela Hug, Head of Power Systems Laboratory, ETHZ</i></p> <p>The electrical energy system is in a transition from traditional resources such as nuclear power, hydropower or coal-fired power plants to new resources such as PV and wind. Hence, synchronous machines which give the system a natural inertia are replaced by inverter connected resources. This raises various new challenges that go beyond the variability of the available energy. For example, the system inertia is reduced which leads to faster system dynamics. This presentation will show how the future electrical energy system in Switzerland could look like and the challenges that need to be solved to realize such a system and what role new control approaches can play.</p>
09:30 – 10:00	<p style="text-align: center;">The Swiss Energy Transition to NetZero</p> <p style="text-align: center;"><i>Thomas Justus Schmidt ^{1,2}</i></p> <p style="text-align: center;">¹ <i>Head of Energy & Environment Research Division, Paul Scherrer Institute, CH-5232 Villigen PSI</i> ² <i>Institute of Molecular Physical Sciences, ETH Zürich, CH-8093 Zürich</i></p> <p>The Swiss Federal Council as well as many other governments set the ambitious goal to reach net-zero greenhouse gas (GHG) emissions by mid of the century. As the required systemic and societal transitions will take decades, urgent action is imperative, as highlighted by the recent IPCC Report. Despite the well-defined target, many questions remain concerning transition pathways, social acceptance, technology developments, regulatory frameworks, and business cases. The diversity of these challenges clearly shows that only an integrated and trans-disciplinary approach can generate the required impact and guide stakeholders toward the NetZero target. This presentation will guide you through a short journey of energy efficiency in the energy transition, energy storage necessities, and possible pathways to reach the NetZero goal.</p>
10:00 – 10:30	<p style="text-align: center;">From Materials to Devices: The importance of physics in material science & technology for sustainable energy applications</p> <p style="text-align: center;"><i>Lorenz Herrmann, Head of Advanced Materials and Surfaces Department, EMPA</i></p> <p>A safe and sustainable energy supply as well as sustainable material cycles are two of the most urgent needs of our times. In all of these questions material science plays a pivotal role. At Empa we understand material science as an interdisciplinary approach bringing together chemistry, physics, biology and the engineering sciences in order to create innovations of industrial and societal relevance. One example for this is our initiative "Materials2Devices": By combining material synthesis and characterization on the nanoscale with research on upscaling and manufacturing processes, we are accelerating the adoption of basic science in real devices. Thereby the physical understanding of our new materials on the nanoscale plays a key role. During this talk, this will be illustrated by giving insights into different examples ranging from batteries & photovoltaics all the way to quantum heat engines.</p>
10:30 – 11:00	<p>Coffee Break</p>
11:00 – 11:30	<p style="text-align: center;">CERN's strategy for an environmentally responsible research</p> <p style="text-align: center;"><i>Sonja Kleiner, Head of the CERN HSE Environment Group</i></p> <p>As the World's largest particle physics research laboratory, CERN strives to deliver world-class scientific results and knowledge, while embedding environmental responsibility and sustainability in its activities. This contribution will present CERN's approach for environmentally responsible research. It will outline the present footprint of the Organization and the current projects, with a particular focus on energy related matters, aimed at minimising the laboratory's impact on the environment across its accelerators, experiments as well as its site and campus facilities. How CERN contributes to the development of technologies that may help to mitigating the impact of society on the environment will also be discussed.</p>
11:30 – 12:00	<p style="text-align: center;">A sustainable future in High-Energy physics</p> <p style="text-align: center;"><i>Patrick Koppenburg, Nikhef, Amsterdam & CERN, LHCb and future collider experiments</i></p> <p>The climate crisis and the degradation of the world's ecosystems require humanity to take immediate action. The international scientific community has a responsibility to limit the negative environmental impacts of basic research. The HECAP+ communities (High Energy Physics, Cosmology, Astroparticle Physics, and Hadron and Nuclear Physics) make use of common and similar experimental infrastructure, such as accelerators and observatories, and rely similarly on the processing of big data. Our communities therefore face similar challenges to improving the sustainability of our research. This talk will reflect on our work practices and research infrastructure and identify the opportunities and challenges, with a particular emphasis on the long-term future of particle physics.</p>
12:00 – 12:30	<p style="text-align: center;">Q&A and Panel Discussion</p> <p style="text-align: center;"><i>Moderator: Hugo Zbinden, Applied Physics, University of Geneva</i></p>
12:30	<p>END</p>