

T 109: Invited Talks 4

Time: Friday 11:00–12:30

Location: T-H15

Invited Talk T 109.1 Fri 11:00 T-H15
Ten years of Higgs boson measurements: what we know and what we don't know — ●CHRISTIAN GREFE — Physikalisches Institut, Universität Bonn

One decade after the discovery of the Higgs boson, the ATLAS and CMS experiments continue to publish more and more precise measurements of the Higgs sector, so far confirming the expectations of the Standard Model. With the start of LHC Run 3 ahead – which will double the existing pp -collision dataset – we will review the current knowledge of the fundamental properties of the Higgs boson.

In addition to the Higgs boson couplings, understanding the width and the CP properties of the Higgs boson is crucial to shed light on the open questions in particle physics: Is there CP violation in the Higgs sector? And are there invisible Higgs boson decays which would allow it to couple to a dark sector beyond the Standard Model? We will review the currently available measurements, their limitations and what to expect from Run 3 and beyond.

Invited Talk T 109.2 Fri 11:30 T-H15
Future of Silicon Tracking Detectors: LHC Upgrades and Beyond — ●GEORG STEINBRÜCK — Institut für Experimentalphysik, Universität Hamburg

In this presentation I will review silicon detector technologies for particle tracking in current and future hadron collider experiments.

Significant improvements were needed to reach the requirements for the Phase 2 upgrades of the LHC experiments. I will report on these challenges and the technological solutions with a focus on the upgrades of the CMS and ATLAS tracking detectors. While the collaborations are moving towards production, they are already looking into the future. An overview of further upgrade ideas for the LHC tracking detectors will be given.

The demands on silicon detectors for planned future hadron colliders are even more extreme with 1 MeV neutron equivalent fluences up to 10^{17} cm^{-2} and huge particle rates. The limiting factors for the use of silicon will be discussed, as well as what is relevant in extrapolating current technologies to the future.

Invited Talk T 109.3 Fri 12:00 T-H15
The dawn of high energy neutrino astronomy — ●ELISA RESCONI — Technical University of Munich, Department of Physics, James-Franck-Straße 1, 85748 Garching bei München

Current knowledge of the Universe is based on information carried by electromagnetic radiation, gravitational waves, neutrinos, and cosmic rays. For over a century, scientists have observed cosmic rays, but the understanding of their place of production is limited. As a product of cosmic ray interaction, neutrinos can shed light on the extreme part of the Universe. IceCube Neutrino Observatory has been leading neutrino astronomy research over the last ten years and is the only observatory with the exposure to detect high-energy neutrinos beyond Earth's atmosphere. This presentation will highlight the IceCube observations, including new recent results. Despite the exiting times, with IceCube operating alone and limited by the South Pole location and cubic-km scale, the neutrino astronomy efforts have yet to advance the field past infancy. It is clear that more observatories and larger telescopes, ultimately linked via a global network, are needed to advance fundamental discoveries in astro and particle physics. In this direction, a new opportunity has emerged over the last years to construct a new large volume neutrino telescope, the Pacific Ocean Neutrino Experiment (P-ONE), which will be based on the first time, within an existing oceanographic infrastructure. I will summarize how we have established a scientific relationship with Ocean Networks Canada to pioneer their global network as a testbed infrastructure and identified the optimal location and prepared the ground for first case deployment.