T 1: Invited Overview Talks I

Time: Monday 11:00–12:30 Location: HSZ/AUDI

Invited Talk T 1.1 Mon 11:00 HSZ/AUDI

What we learned about the Higgs Boson from the LHC so far — •Duc Bao Ta — Johannes Gutenberg-Universität Mainz

The Higgs boson in the Standard Modell of particle physics has a unique role as it is related to the mechanism that gives elementary particles their mass. Last year the large LHC experiments, ATLAS and CMS, released the most comprehensive overview of their results on the Higgs boson for the 10th year after its discovery. These results are based on the LHC run 2 dataset from 2015-2018, which constitutes only 5% of the ultimate dataset. However, it has already enabled us to study the Higgs boson properties in unprecedented detail. The two collaborations continue to study the dataset and explore more corners of the Higgs sector that might connect it to the open questions in particle physics, like the origin of CP violation or the nature of dark matter. In this presentation, I will review the current results of the Higgs boson from the LHC and give an outlook on what is planned and can be achieved with the data from the currently ongoing Run 3 or when the remaining 90-95% of the full dataset will have been collected and analysed in the future.

Invited Talk T 1.2 Mon 11:30 HSZ/AUDI

QCD at the LHC – Precision for Discoveries — •Malgorzata Worek — RWTH Aachen University

In this presentation, I will summarise the relevance of higher-order QCD effects to Standard Model processes at the Large Hadron Collider (LHC). Special emphasis will be placed on the physics of the top quark and QCD jets. Many models look at the production of top quarks as well as QCD jets as interesting channels to evidentiate signals of new physics. A good theoretical control of Standard Model backgrounds is, thus, a fundamental prerequisite for a correct interpretation of the possible signals of new physics that may arise in these channels. Since the top quark and QCD jets play an important role in virtually every LHC analysis, proper modeling of their production is essential both for SM measurements and for beyond the Standard Model searches. Such modelling will become even more important for high luminosity measurements and at future colliders.

Invited Talk T 1.3 Mon 12:00 HSZ/AUDI

The charm and beauty of flavour physics — •Marco Gersabeck — The University of Manchester, Manchester, UK

Precision flavour physics measurements have a long track record of providing some of the most powerful tests of the Standard Model, with sensitivity to scales of physics beyond the Standard Model well in excess of those directly accessible at colliders. This talk will review highlights among the latest set of results and report on the status of ongoing experiments. The recent discovery of CP violation in charm decays necessitates a range of further measurements to identify its origin and the latest analyses will be discussed. The talk will also include the most recent results on tests of lepton universality. The talk will further include an outlook on the next generation of flavour physics experiments.