T 2: Hauptvorträge (Invited Talks) I

Time: Monday 11:15–13:15 Location: H-Aula

Invited Talk T 2.1 Mon 11:15 H-Aula

Physics Beyond Colliders — •Joerg Jaeckel[1] and Physics Beyond Colliders Study Group[2] — [1]ITP Heidelberg, Philosophenweg 16, 69120 Heidelberg — [2]CERN

Physics Beyond Collider is a study mandated by CERN management to explore the options for future experiments complementary to those at colliders. In this talk we will consider the experiments discussed in this context over the last few years with a particular focus on the fundamental physics questions that they could explore and hopefully answer.

Invited Talk T 2.2 Mon 11:55 H-Aula

Going the extra mile to push the frontier — •Alexander Mann — Ludwig-Maximilians-Universität München

With the completion of the Run-2 dataset, a major checkpoint in the LHC physics program has been reached. For several years, this dataset will be the largest ever taken at the high-energy frontier and enable searches for physics beyond the Standard Model to explore new regions of phase space.

With more data comes more sensitivity, but the more important boost typically arises from new and refined analysis techniques that allow to tackle more challenging scenarios with low cross sections, small acceptance or requiring dedicated reconstruction. The Run-2 dataset allows a wealth of interesting models to be studied — in this presentation, we will look at the overall status and at some selected recent results from the LHC searches in detail.

Invited Talk T 2.3 Mon 12:35 H-Aula

Cosmic Nucleosynthesis as a Multi-Messenger Challenge — •Roland Diehl — Max Planck Institut für extraterrestrische Physik, 85748 Garching, Germany

The origin of cosmic elements and isotopes is among the fundamental challenges of astrophysics. Identifying the origins of specific elements in supernova explosions, or most-recently in binary neutron star collisions, therefore promise breakthrough insights. In this talk, we review the astronomical messengers towards an understanding of cosmic nucleosynthesis in its diversity. Nuclear fusion reactions in cosmic sites produce new isotopes and elements. Observations of such cosmic nucleosynthesis can be direct, or circumstantial/indirect. The decay of unstable isotopes provides a unique and direct trace of a specific event and its nucleosynthesis; stardust or cosmic ray compositions within the solar system can be analysed, but are are less direct, offset in time and space. Indirectly, the effects of violent energy release in such an event, e.g. gravitational waves or a cooling envelope that re-radiates radioactive energy input in a supernova, also reflect aspects of the nuclear-reaction astrophysics. The characteristic evolutionary changes over cosmic times in abundances of cosmic-gas components, as they can be observed in stars that formed from an evolving seed composition, are commonly best known as observables of cosmic nucleosynthesis, as they had led to recognition of the cosmic compositional evolution. We will discuss how these multiple messengers of cosmic nucleosynthesis complement each other, starting from the kilonova/gravitational-wave event GW170817.