

T 24: Invited Overview Talks II

Time: Tuesday 11:00–12:30

Location: HSZ/AUDI

Invited Talk T 24.1 Tue 11:00 HSZ/AUDI
Searching for Long-Lived Particles at the LHC and Beyond
 — ●JULIETTE ALIMENA — DESY, Hamburg

Particles beyond the standard model (SM) can generically have lifetimes that are long compared to SM particles at the weak scale. When produced at experiments such as the Large Hadron Collider (LHC) at CERN, these long-lived particles (LLPs) can decay far from the interaction vertex of the primary proton-proton collision. Such LLP signatures are distinct from those of promptly decaying particles that are targeted by the majority of searches for new physics at the LHC, often requiring customized techniques to identify, for example, significantly displaced decay vertices, tracks with atypical properties, and short track segments. In this talk, I will present the latest searches for LLPs at the LHC and other experiments and then give my view of where the field will go in the future.

Invited Talk T 24.2 Tue 11:30 HSZ/AUDI
The Neutrino-Dawn of Galaxies — ●WOLFGANG RHODE —
 Fakultät Physik, TU Dortmund

For decades, generations of underground detectors have been opening more and more the window to the neutrino sky. Quickly, the background shine of atmospheric neutrinos could be separated from the bright light of atmospheric muons. Ten years ago, astrophysical neutrinos' first faint isotropic glow was detected. After a brief gamma-flare of TXS 0506+056 in 2017, which coincided with a matching high-energy neutrino, it now appears that a time-independent neutrino signal from

galaxies is finally arising: NGC 1068 in muon neutrinos and our Galaxy in cascading neutrino events of all flavors. The potential of neutrino telescopes is simultaneously being exploited to investigate several other important physical or methodological questions. The status of these questions will be reported. In addition, it is discussed what steps one needs to take in the future to look at the neutrino sky in detail - and to answer the fundamental physics questions involved.

Invited Talk T 24.3 Tue 12:00 HSZ/AUDI
Galactic cosmic rays: What have we learned and what's next?
 — ●PHILIPP MERTSCH — Institute for Theoretical Particle Physics
 and Cosmology (TTK), RWTH Aachen University, Sommerfeldstr. 16,
 52074 Aachen, Germany

Cosmic rays constitute an important ingredient in the galactic ecosystem and hold lessons beyond the Milky Way, for instance in regulating galaxy formation and evolution. In addition, cosmic rays lend themselves to searches for new physics, like dark matter or primordial antimatter. All of these studies, however, require answering the century-old question of cosmic ray origin. Over the last ten years, there has been an abundance of new data from space-based experiments like AMS-02, CALET and DAMPE. Modelling of these data allow inferences on the various types of cosmic ray sources and the conditions determining their transport, for instance galactic magnetic fields. What emerges is a rather complex picture and thus existing models need to be revised, if not completely overhauled. I will highlight the lessons learned and discuss the open questions and what kind of instrumentation is required for answering them.