

T 53: Invited Topical Talks II-B

Time: Wednesday 14:00–15:20

Location: HSZ/0003

Invited Topical Talk T 53.1 Wed 14:00 HSZ/0003
LST-1: Initial scientific results from the first CTA telescope
 — ●DOMINIK ELSAESSER for the CTA-Collaboration — Fakultät Physik, TU Dortmund

The Cherenkov Telescope Array (CTA) will lead the frontier of ground-based gamma-ray astronomy with its unprecedented sensitivity in the energy range between 20 GeV to 300 TeV. CTA will be composed of two telescope sites, in the northern hemisphere on the Roque de Los Muchachos Observatory in La Palma, Spain and in the southern hemisphere at the Paranal Observatory in the Atacama Desert in Chile, and of three telescope types: Large, Medium, and Small sized telescopes. The Large-Sized Telescopes (LSTs) are specially designed for low-energy and transient phenomena and will dominate CTA's sensitivity in the energy range from 20 GeV to 150 GeV. The northern CTA site at Roque de Los Muchachos, La Palma, will host an array of four LSTs, each with a mirror diameter of 23m. The prototype, LST-1, was inaugurated in October 2018 and has since been in its commissioning phase. In this talk, we report on the first results from scientific observations using LST-1. Finally, we will discuss prospects for LST 2-4.

Invited Topical Talk T 53.2 Wed 14:20 HSZ/0003
Multimessenger astronomy with the Pierre Auger Observatory
 — ●MARCUS NIECHCIOL for the Pierre Auger-Collaboration — Center for Particle Physics Siegen, Experimentelle Astroteilchenphysik, Universität Siegen

The Pierre Auger Observatory is the largest air-shower experiment in the world, offering an unprecedented exposure not only to charged cosmic rays, but also to neutral particles at the highest energies. The Observatory can therefore contribute significantly to current efforts in multimessenger astronomy. For example, the upper limits on the incoming flux of ultra-high-energy (UHE) photons and neutrinos determined from Auger data are the most stringent to date, severely constraining current models for the origin of UHE cosmic rays. Follow-up searches for neutral particles in association with gravitational wave events and other transient events, such as the anomalous blazar TXS 0506+056, complement those performed by specialized instruments at lower energies, extending the energy range of current multimessenger studies to the UHE regime.

In the contribution, the various activities concerning multimessen-

ger astronomy at the Pierre Auger Observatory are presented and the current results are summarized. In addition, future perspectives in the scope of the ongoing AugerPrime upgrade will be discussed.

Invited Topical Talk T 53.3 Wed 14:40 HSZ/0003
Positron annihilation as an astrophysical messenger
 — ●THOMAS SIEGERT — Institut für Theoretische Physik und Astrophysik, Julius Maximilians Universität, Würzburg, Germany

One of the major tasks of astrophysics is to understand the emission mechanisms of observed sources and regions in the sky. Only by pinpointing down these mechanisms, it is possible to derive physical parameters and learn about the evolution of astrophysical objects. Alas, many observations of high-energy phenomena are ambiguous, requiring more and orthogonal information. The nature of several sources, among others accreting X-ray binary systems, core-collapse and thermonuclear supernovae, cosmic-rays, stellar flares and potentially dark matter, all show signatures of positron production and annihilation. Utilising this underrated emission mechanism can shed light on unsolved problems in astrophysics and cosmology.

In this talk, I will show examples of how we can learn from these gamma-ray signatures already now, and what might be possible in the context of new gamma-ray satellite missions, such as the accepted NASA mission COSI.

Invited Topical Talk T 53.4 Wed 15:00 HSZ/0003
The first results of the XENONnT experiment and an outlook to the future DARWIN observatory
 — ●ANDRII TERLIUK for the XENON-Collaboration — Universität Heidelberg, Heidelberg, Germany — Max-Planck-Institut für Kernphysik, Heidelberg, Germany

The nature of Dark Matter is one of the most important open questions in today's particle physics and cosmology. The XENONnT experiment at the Gran Sasso Laboratory in Italy aims to discover it using a dual-phase time projection chamber filled with 6 tonnes of liquid xenon. It was commissioned in 2021 and shows an excellent performance in terms of background and purity levels. In this talk we will present the status and results obtained with the first XENONnT science run. Furthermore, we will introduce the future DARWIN observatory that will have the mass of at least 50 tonnes of liquid xenon, while further improving background levels and purity.