

T 50: Eingeladene Vorträge (Invited Topical Talks) IV

Time: Wednesday 14:00–15:30

Location: Td

Invited Topical Talk T 50.1 Wed 14:00 Td
Gamma-ray Propagation as a Probe for Cosmology and Fundamental Physics — ●MANUEL MEYER — Erlangen Center for Astroparticle Physics, Erwin-Rommel-Str. 1, 91058 Erlangen, Germany

Observations of gamma rays produced in active galactic nuclei – the most powerful persistent sources in the Universe – offer the unique opportunity to study a range of open questions in cosmology and fundamental physics. In particular, gamma-ray observations can constrain the interaction of photons with axion-like particles as well as the strength of intergalactic magnetic fields. Such fields are thought to act as a seed for magnetic fields ubiquitously observed in galaxies and galaxy clusters. In this talk, I will review how current and future gamma-ray observatories enable us to study these phenomena.

Invited Topical Talk T 50.2 Wed 14:30 Td
Results and Status of the XENON Dark Matter experiment — ●MICHAEL MURRA — Institut für Kernphysik (WWU Münster), Münster, Germany

The XENON1T experiment for the direct detection of dark matter with a dual phase time projection chamber (TPC) utilized 3.2 t of liquid xenon. With its 1(t×yr) data, it sets the most stringent limits on the spin-independent scattering cross section of Weakly Interacting Massive Particles (WIMP) on nucleons for nearly the complete range of WIMP masses above 120 MeV/c².

The unprecedented low electronic recoil (ER) background allows for other physics searches as well. One example is the first observation of

the two-neutrino double electron capture in Xe-124 with a half-life of 1.8×10^{22} yr, the longest decay ever measured directly. Furthermore, an energy excess at low energies in the ER spectrum was found: Possible origins can come from new particles like axions, a neutrino magnetic moment or from the decay of trace amounts of tritium within the xenon.

The next-generation experiment XENONnT, with 8.4 t of xenon, will not only become one order of magnitude more sensitive to WIMP nucleon interactions, it will also be able to clarify the origin of this low energy excess.

This talk will summarize the most important results from XENON1T and their physics context, and give an update on the XENONnT status, with emphasis on the radon removal system to reach the required xenon radio-purity.

Invited Topical Talk T 50.3 Wed 15:00 Td
Opportunistic direct search for axion Dark Matter — ●BABETTE DÖBRICH — CERN

The last decade has witnessed a large increase of new direct searches for an old candidate for constituting Dark Matter: the axion. The aim of the talk is to convey the reasons for the growing interest in the Dark Matter axion. In addition, the talk will give a rough overview of the corresponding experimental landscape. As a concrete example, opportunistic searches for axion Dark Matter at existing (and proposed) dipole magnets using custom-made radio-frequency structures are presented, along with initial experimental results of these efforts.