

SYDM 1: Symposium Dark Matter

Time: Wednesday 10:30–12:45

Location: H-Aula

Invited Talk SYDM 1.1 Wed 10:30 H-Aula
Producing the missing matter of the Universe on Earth —
 •ALEXANDER GROHSJEAN — DESY, Notkestrasse 85, 22607 Hamburg

Understanding dark matter is one of the most tantalizing challenges in today’s science. While its gravitational effect on large scale structures is well established, its nature remains obscure. An attractive solution to the dark matter problem is provided by new species of particles that are not contained in the Standard Model. Producing and detecting these particles is one of the major quests of particle and astroparticle physics. The masses of these particles span a wide range from very light particles that could be produced through light in strong magnetic fields up to extremely heavy particles which could be produced by high-energy accelerators such as the Large Hadron Collider at CERN. I will discuss some of the most promising theory models to explain dark matter, give an overview of different experiments to search for dark matter particles, and will close with an outlook on the next major milestones.

Invited Talk SYDM 1.2 Wed 11:15 H-Aula
Searching for physics beyond the Standard Model in nuclei
 — •MARTIN HOFRICHTER — University of Bern

Searches for physics beyond the Standard Model (BSM) proceed at several complementary frontiers: high-energy collider experiments, low-energy precision observables, and astrophysical searches. In recent

years, BSM searches using atomic nuclei have become an integral part of the precision frontier, including the search for dark matter in direct-detection experiments. In the talk, I will discuss the challenges of extracting information on BSM physics from such nuclear probes, in particular, how nuclear and hadronic physics input is critical to constrain the required matrix elements and nuclear responses.

Invited Talk SYDM 1.3 Wed 12:00 H-Aula
Detecting on Earth the missing matter of the Universe —
 •FEDERICA PETRICCA — Max-Planck-Institut für Physik, München, Germany

Nowadays we have an extremely accurate model of our Universe, but still most of its content eludes our observation. Detecting with Earth-bound experiments the missing matter is one of the most intriguing challenges in modern physics and is of compelling necessity for our understanding. The experimental efforts to decipher the nature of dark matter underwent amazing development in recent years and a new generation of large exposure high sensitivity detectors is ready to accept the challenge. In this contest, a multi-target multi-technology approach is needed to look into the different mass regions of possible dark matter candidates to maximise the detection probability. The most sensitive approaches that are opening new frontiers of this search will be reviewed together with a glance on future perspectives. Although not certain, a discovery might be at hand.