HK 47: Invited Talks

Time: Friday 9:00–10:30 Location: MED 00.915

Invited Talk HK 47.1 Fri 9:00 MED 00.915

Supernova signatures on Earth and beyond — •Jenny Feige — Museum für Naturkunde, Berlin, Germany

The detection of cosmic signatures in deep-sea, ice, and lunar samples has made an important contribution to nuclear astrophysics in recent years. In particular, ^{60}Fe from near-Earth supernovae has been imprinted during the time periods 2-3 and 7-8 Myr ago, together with ^{244}Pu, which is produced exclusively by the rapid neutron capture process. These data, which establish a link between supernovae and the r-process, add another piece to the puzzle of the possible r-process sites.

This data also corroborates theoretical studies that suggest that more than 10 SNe exploded at a distance of 50-150 pc over the last 10-15 Myr. Their overriding shock fronts created a volume of hot gas that is seen in observational data and referred to as the Local Bubble, which currently engulfs our Solar System.

Here, I review the advancements made during the recent years in (1) the detection of different interstellar radioisotopes in deep-ocean and terrestrial records, and (2) what these detections reveal on the nature of the interstellar matter our Solar System encountered in the past.

Invited Talk HK 47.2 Fri 9:30 MED 00.915

ALICE 3 - The next-generation heavy-ion experiment at the LHC — •Lars Döpper for the ALICE Germany-Collaboration — Helmholtz-Institut für Strahlen- und Kernphysik, Universität Bonn — Forschungs- und Technologiezentrum Detektorphysik, Universität Bonn

ALICE 3 is a completely new heavy-ion setup at the LHC, proposed as the successor and next generation of the current ALICE detector. To utilize the LHC to its full potential as a heavy-ion collider during Run 5, a completely new detector is required and envisioned to start operation after the Long Shutdown 4 in 2036.

Building on the physics achievements of Runs 3 and 4, ALICE 3 is designed to address key open questions in heavy-ion physics, with a particular focus on the heavy-flavour sector at low transverse momentum. These measurements will provide unique sensitivity to the time evolution of the quark-gluon plasma and its approach to thermal equilibrium. To facilitate these precision measurements, ALICE 3 will consist of a full silicon-pixel tracking system, covering the pseudorapidity range of at least $|\eta| < 2.5$. This tracking system at the heart of ALICE 3 is further complemented by systems for particle identification. All of this will be encased within a new superconducting solenoid magnet with a field strength of 2 T.

In this talk I will give an overview about the motivation behind this new detector, the different detector subsystems and some of the challenges we have yet to overcome on our journey towards ALICE 3.

This work is supported by BMFTR.

Invited Talk HK 47.3 Fri 10:00 MED 00.915

Towards Physics Operation of the CBM Experiment at FAIR — •Adrian Rodríguez Rodríguez for the CBM-Collaboration — GSI Helmholtzzentrum für Schwerionenforschung GmbH

The Compressed Baryonic Matter (CBM) experiment at FAIR is designed to explore strongly interacting matter at high net-baryon densities, created in nucleus–nucleus collisions at $\sqrt{S_{NN}} = 2.5$–4.9 GeV. Addressing this physics program requires a novel experimental approach capable of sustaining interaction rates of up to 10 MHz. CBM therefore implements a triggerless, free-streaming readout scheme, combined with a fully integrated detector, data transport, and online computing architecture. The experiment is now transitioning from prototyping to large-scale realization. A central detector subsystem is the Silicon Tracking System (STS), which provides charged-particle momentum reconstruction with a resolution better than 2%. Embedded in a 1 Tm magnetic field, the STS is a low-mass, large-acceptance, radiation-hard silicon tracker composed of 876 double-sided microstrip modules arranged in eight stations. Module production and qualification are well advanced, and integration activities have progressed to the assembly of the first functional detector sub-units. In parallel, the FAIR Phase-0 program enables performance measurements of CBM detector components and validates their operation under realistic heavy-ion conditions. This contribution reviews the CBM physics goals and experimental concept, with emphasis on the STS, summarizing the status of detector construction and recent results from integration and commissioning towards the upcoming physics phase.