
SYKG 1: Kosmologie und Gravitation

Zeit: Mittwoch 14:00–16:15

Raum: HS Chemie

Plenarvortrag SYKG 1.1 Mi 14:00 HS Chemie
The Cosmic Microwave background and the Standard Model of Cosmology — •MATTHIAS BARTELMANN — Institut für Theoretische Astrophysik, Universität Heidelberg, Albert-Ueberlestr. 2, 69120 Heidelberg

Structures in the cosmic microwave background, whose discovery was awarded with the Nobel Prize in 2006, have allowed precise determinations of cosmological parameters. It is now justified to speak about a standard model of cosmology, although fundamental questions remain, indicating that a new era of cosmological research has begun. I shall summarize what we have learned from the cosmic microwave background, describe what the standard model of cosmology is constructed upon and what it entails, and what the most fundamental questions are that now arise from it.

Plenarvortrag SYKG 1.2 Mi 14:45 HS Chemie
Astroparticle Physics at Colliders — •MANUEL DREES — Physikalisches Inst. d. Univ. Bonn, Nussallee 12, 53115 Bonn

To date no clear deviation from the Standard Model (SM) of particle physics has been found in traditional, accelerator-based, particle physics experiments. On the other hand, there are several cosmologi-

cal observations that cannot be explained within the SM. These imply the existence of Dark Energy and Dark Matter, the baryon asymmetry of the universe, and the occurrence of a very early inflationary phase. Most of these observations can be explained in theoretically well motivated extensions of the SM. In this talk I will discuss to what extent experiments at future colliders will be able to decide which, if any, of these explanations are correct, and how these experiments can help to improve our understanding of the (early) Universe.

Plenarvortrag SYKG 1.3 Mi 15:30 HS Chemie
Recent Experimental Tests of Gravitation — •ERIC ADELBERGER — University of Washington, Seattle

Laboratory studies of gravity have reached remarkable levels of sensitivity that probe interesting ideas at the interface of particle physics and gravitation that are beyond the reach of current accelerators. I will review recent tests of the Inverse-Square Law that study length scales below the 85 micrometer scale associated with the observed dark-energy density, and Equivalence Principle tests involving laboratory objects, astronomical bodies and galactic dark matter. Finally I will discuss sensitive tests for Lorentz-symmetry violation using electron spins.