T 123: Hauptvorträge 7

Zeit: Freitag 11:00–12:30 Raum: RW 1

Hauptvortrag T 123.1 Fr 11:00 RW 1

The first results from the AMS experiment on the International Space Station — •Stefan Schael — RWTH Aachen

The Alpha Magnetic Spectrometer, AMS, is a general purpose high energy particle physics detector. It was installed on the International Space Station, ISS, on 19 May 2011 to conduct a unique long duration mission of fundamental physics research in space. The first AMS results are based on the data collected during the initial 2 years of operations on the ISS. The positron fraction, that is, the ratio of the positron flux to the combined flux of positrons and electrons, is presented in the energy range from 0.5 to 350 GeV. Over the last 2 decades, there has been strong interest in the cosmic ray positron fraction in both particle physics and astrophysics. The very accurate data show that the positron fraction is steadily increasing from 10 to 250 GeV, but, from 20 to 250 GeV, the slope decreases by an order of magnitude. The positron fraction spectrum shows no fine structure. In addition the first results from AMS on the cosmic ray proton, helium, electron and positron spectra as well as the important Boron to Carbon ratio measurement will be shown. Perspectives for the future and possible implications for some dark matter models will be discussed.

Hauptvortrag T 123.2 Fr 11:45 RW 1

The importance of LHC data for the interpretation of ultra-high energy cosmic ray interactions — •Ralf Ulrich — Karlsruhe Institute of Technology, Karlsruhe

The Earth is exposed to a flux of cosmic ray particles that is reaching up to the highest energies per particle ever observed. These ultra-high energy cosmic rays are detected only via their interactions with the atmosphere. Thus, to understand the nature of those particles, it is necessary to make optimal use also of accelerator experiments to study very high energy interactions in controlled lab environments. This is complementary to the main program of high-energy physics at accelerators, since for cosmic rays it is the high cross-section processes and the particle production in the forward phase space that are of highest priority. Such measurements require only small integrated luminosities. The impact of existing LHC measurements up to $\sqrt{s}$ =7TeV on the analysis of cosmic-ray data is presented, and the importance of dedicated forward detectors is outlined. Also the advantage of a potential light ion at LHC is discussed, and finally an outlook on the impact of a possible fixed target experiment with LHC beam is given. To fully exploit accelerator measurements is crucial to bring us a big step closer towards understanding the fundamental nature of cosmic rays at ultra-high energies.