HK 68: Invited Talks 5

Time: Friday 11:00–13:00 Location: T/HS1

Invited Talk HK 68.1 Fri 11:00 T/HS1

The GBAR antimatter gravity experiment — •Patrice Perez — IRFU, CEA Saclay France

The GBAR project (Gravitational Behaviour of Antihydrogen at Rest) at CERN, will measure the free fall acceleration of ultracold neutral antihydrogen atoms in the terrestrial gravitational field. The experiment consists in preparing antihydrogen ions (one antiproton and two positrons) and sympathetically cool them with Be+ ions to a few 10 microK. The ultracold ions will then be photo-ionized just above threshold, and the free-fall time over a known distance measured. I will describe the project, the accuracy that can be reached by standard techniques, and with possible improvements using quantum reflection of antihydrogen on surfaces.

Invited Talk HK 68.2 Fri 11:40 T/HS1

Jet Physics with ALICE at the LHC — •Oliver Busch for the ALICE-Collaboration — University of Tsukuba, Japan — Physialisches Institut, Ruprecht-Karls Universitaet Heidelberg, Germany

Jets are defined in QCD as cascades of consecutive emissions of partons from an initial hard scattering. The process of parton showering and subsequent hadronisation is broadly known as fragmentation. High-energy nucleus-nucleus collisions allow us to probe parton fragmentation within a QCD medium and the properties of this medium via the modification of the jet spectrum and jet structure. Measurements in pp and p-Pb collisions provide an elementary baseline, allow us to investigate perturbative and non-perturbative aspects of particle production and to disentangle final state, potential nuclear initial state, and cold nuclear matter effects.

ALICE at the LHC is a general-purpose heavy ion experiment designed to study the physics of strongly interacting matter and the Quark-Gluon-Plasma, combining excellent charged particle reconstuction and identificitation over a wide momentum range with electromagnetic calorimetry. We present measurements of jet production cross sections, jet structure and jet fragmentation in pp, p-Pb and Pb-Pb collisions. First results on particle identified jet fragmentation will be shown. We will discuss perspectives for LHC run 2 starting in 2015.

Invited Talk HK 68.3 Fri 12:20 T/HS1

Penning-trap mass spectrometry for neutrino physics — •Sergey Eliseev[1], Klaus Blaum[1], Michael Block[2], Christine Böhm[1], Andreas Dörr[1], Christian Droese[3], Pavel Filianin[4], Mikhail Goncharov[1], Enrique Minaya Ramirez[1], Dmitriy Nesterenko[4], Yuri Novikov[4], Alexander Rischka[1], and Lutz Schweikhard[3] — [1]Max-Planck Institute for Nuclear Physics, Heidelberg, Germany — [2]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany — [3]Institut für Physik, Ernst-Moritz-Arndt-Universität, Greifswald, Germany — [4]Petersburg Nuclear Physics Institute, St. Petersburg, Russia

The discovery of neutrino oscillations has proven neutrinos are massive particles. However, this does not provide information on the type of the neutrino and its mass. An answer to these questions lies in a study of beta transitions, i.e., beta- and double-beta- decays as well as electron and double-electron captures. A crucial parameter in this study is the Q-value of the beta transitions, which has to be measured with an accuracy of 100 eV in the case of the determination of the neutrino type and better than 1 eV if the neutrino mass is concerned. Tremendous progress in Penning traps has finally allowed such high precision Q-value measurements. This contribution will be an overview of the results of the measurements performed with the Penning-trap mass spectrometer SHIPTRAP and present a physical program for the next generation Penning-trap mass spectrometer PENTATRAP, which is under construction at Max-Planck Institute for Nuclear Physics/Germany.