AKjDPG 1: Tutorial: Mass Spectrometry

Time: Sunday 17:00–18:30 Location: HS 3042

Tutorial AKjDPG 1.1 Sun 17:00 HS 3042

High-precision Penning-trap mass spectrometry: Basics and Applications — •Klaus Blaum — Max-Planck-Institut für Kernphysik, Saupfercheckweg 1, 69117 Heidelberg

Like few other parameters, the mass of an atom, and its inherent connection with the atomic and nuclear binding energy and thus with the acting forces is a fundamental property, a unique fingerprint of the atomic nucleus. Depending on the mass precision reached the applications range from the verification of nuclear mass models, nuclear astrophysics, determination of fundamental constants, to a test of the Standard Model of particle physics. The introduction of Penning traps and storage rings into the field of mass spectrometry has made these methods a prime choice for high-precision mass measurements on short-lived and stable nuclides. In this tutorial the basics of Penning-trap mass spectrometry and its most recent applications will be presented.

Tutorial AKjDPG 1.2 Sun 17:45 HS 3042

Radioactive ions in heavy-ion storage rings: Intersection of nuclear, atomic and astrophysics — •Yury A Litvinov — GSI Helmholtz Center for Heavy Ion Research GmbH, Planckstrasse 1, 64291 Darmstadt

Storage of freshly produced secondary particles in an ion trap or a storage ring is a straightforward way to achieve the most efficient use of these rare species. Heavy-ion storage rings are multi-purpose machines with versatile capabilities for beam manipulations. The number of physics cases possible to address is enormous. Following the introduction to storage rings, the focus of the tutorial will be on precision experiments with highly-charged ions at the intersection of atomic physics, nuclear structure and astrophysics. We will mainly discuss the storage-ring mass spectrometry, which is complimentary to the one at the Penning traps, and exotic radioactive decays, which open up only in highly-charged ions.