

Precision mass measurements on radioactive ions for nuclear astrophysics and fundamental studies

KLAUS BLAUM

Max-Planck-Institut für Kernphysik, 69117 Heidelberg, Germany

Like few other parameters, the mass of an atom and its inherent connection with the atomic and nuclear binding energy is a fundamental property, a unique fingerprint of the atomic nucleus. Each nuclide comes with its own mass value different from all others. With the nowadays achievable accuracy in Penning-trap and storage ring mass spectrometry on short-lived exotic nuclides, precision fundamental tests can be performed [1], among them a test of the Standard Model, in particular with regard to the weak interaction and the unitarity of the Cabibbo–Kobayashi–Maskawa quark mixing matrix. In addition, accurate mass values of specific nuclides are important for nuclear astrophysics and neutrino physics as well as for the search of physics beyond the Standard Model. The present status in high-precision Penning-trap and storage ring mass spectrometry on short-lived nuclides for fundamental studies as well as recent experimental results and future prospects will be presented.

References

[1] K. Blaum, Yu. N. Novikov, G. Werth, *Contemp. Physics*, Vol. 51, 149-175, 2010.