ISOLTRAP’s multi-reflection time-of-flight mass separator/spectrometer

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State-of-the-art precision measurements have already been performed on many radioactive ions with the Penning-trap mass spectrometer ISOLTRAP [1] at ISOLDE/CERN. However, for the study of more and more exotic atomic nuclei, minute production rates often accompanied by huge isobaric background or half-lives down to milliseconds pose enormous challenges that require new experimental techniques. Thus, the ISOLTRAP setup has recently been enhanced with an electrostatic ion-beam trap acting as a multi-reflection time-of-flight mass separator/spectrometer (MR-ToF MS) [2-4]. It can be used for beam purification as exemplified in the case of the Penning-trap mass measurement of ⁸²Zn [5]. In addition, it can act itself as a mass spectrometer either for an analysis of the ion beam provided by the ISOLDE facility [4] or for precision mass spectrometry of short-lived nuclides that are out of reach of the Penning trap, as shown recently in the case of neutron-rich calcium isotopes [5].

References