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Masses of ^{70}As, ^{49,50}Sc and ^{73}Br isotopes

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Atomic masses provide direct insights on key nuclear structure phenomena, such as shell effects or onsets of deformation, and the way they evolve far from stability. In the field of astrophysics, the masses of exotic species constitute one of the most critical nuclear physics inputs in nucleosynthesis calculations.
The ISOLTRAP, located at the radioactive ion-beam facility ISOLDE/CERN [1], pioneered the on-line Penning-trap mass spectrometry of unstable isotopes. During its thirty years of operation, over 400 nuclides have been measured. With the well-established Time-of-Flight Ion Cyclotron-Resonance (ToF-ICR) technique the achievable relative uncertainty is on the level of 10^{-8}. To improve the ISOLTRAP's ability to deliver purified beams to the measurement Penning trap, a Multi-Reflection Time-of-Flight Mass Separator (MR-ToF MS) has been constructed [2]. This device is routinely used as mass spectrometer on its own. This contribution will present the principles of both mass measurement techniques through recent investigations of ^{70}As, ^{49,50}Sc and ^{73}Br isotopes.
To push such investigations towards more exotic and rare radioisotopes the efficient transportation, collection, accumulation and cooling of the beam is required. To this end, radio-frequency cooler and buncher (RFQ-CB) devices have become the tool of choice [3]. This poster will highlight recent technical developments laying the groundwork for the overall improvement of RFQ-CB and the alignment of ISOLTRAP's horizontal beam line.

1. S. Kreim et al.// Nucl. Instrum. Meth. B. 2013.V.317. P.492-500
2. F. Wienholtz et al.// Int. J. Mass Spectr. 2017. V.421. P.285-293
3. F. Herfurth et al.// Nucl. Instrum. Meth. A. 2001. V.469. P.254-275

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