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Probing the evolution of nuclear structure thanks to high accuracy mass measurements with ISOLTRAP at CERN/ISOLDE.

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Due to the inherent relationship with the binding energy, nuclear masses hold a fingerprint of the interactions taking place within a given nucleus. Small as it is, about one percent of the total mass of the system, the binding energy can give precious information on such phenomena as nuclear shell effects and deformation, especially on the way they evolve far from stability.

The introduction of Penning traps into the field of mass spectrometry has made this method a prime choice for high-accuracy measurements on stable and short-lived nuclides. Over the last three decades, the continuous development of ion trapping techniques has constantly pushed forward the limit of what is achievable, in terms of precision and resolving power, such that the ever more demanding experimental conditions can be handled.

A very recent experimental program dedicated to the mass measurement of exotic Chromium isotopes has been undertaken with the pioneering Penning trap mass spectrometer ISOLTRAP at ISOLDE (CERN). Refined masses in this region of the nuclear chart are essential to tackle the delicate question of the evolution of nuclear structure towards the so-called second "island of inversion"around N=40. So far, the masses measured in the Chromium chain were too imprecise to undoubtedly address the question of the development of nuclear deformation towards 64Cr where spectroscopy data indicates that, for this given region of the nuclear chart, a maximal quadrupole deformation is reached.

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