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High-precision mass measurements for nuclear structure

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High-precision atomic mass measurements of radioactive nuclides provide a way to determine nuclear binding energies that can be used to benchmark nuclear models. Important information on nuclear structure, e.g., shell gaps and their evolution, pairing effects and isospin symmetry, can be extracted from the ground-state binding energies. In addition, Penning-trap mass spectrometry, and in particular its phase-imaging ion cyclotron resonance (PI-ICR) technique, has enabled high-precision measurements of isomeric states. The PI-ICR method is very useful for low-lying (< 100 keV) beta-decaying isomers with half-lives longer than around 100 ms. Excitation energies of such isomers are often challenging to unambiguously determine via other techniques. Sometimes the method can also reveal new isomeric states. In this contribution, I will give an overview on high-precision mass measurements with an emphasis on isomeric states and recent results from the JYFLTRAP double Penning trap at the Ion Guide Isotope Separator On-Line (IGISOL) facility.

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