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Recent trends in the determination of nuclear masses

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The mass of the nucleus, through its binding energy, continues to be of capital importance not only for various aspects of nuclear physics, but also for other branches of physics, notably weak-interaction studies and astrophysics. The authors first describe the modern experimental techniques dedicated to the particularly challenging task of measuring the mass of exotic nuclides and make detailed comparisons. Though tremendous progress in these and the associated production techniques has been made, allowing access to nuclides very far from stability, it is still not yet possible to produce many nuclides involved in stellar nucleosynthesis, especially the r process, leaving no choice but to resort to theory. The review thus goes on to describe and critically compare the various modern mass formulas that may be used to extrapolate from the data towards the neutron drip line. Special attention is devoted to the crucial interplay between theory and experiment, showing how new measurements far from stability can considerably reduce the ambiguity in extrapolations to nuclides even further away.