First results using a new technology for measuring masses of very short-lived nuclides with very high accuracy:
The MISTRAL program at ISOLDE

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With goals in mind such as elucidation of nuclear structure or constraints on nuclear mass models for reliable extrapolation into areas of astrophysical interest, MISTRAL (Mass measurement at ISolde using a Transmission RAdiofrequency spectrometer on-Line) is an experimental program to measure masses of very short-lived nuclei ($T_{\frac{1}{2}} < 1s$), with a very high accuracy (5×10^{-7}).
The cyclotron frequency of an ion in an homogeneous magnetic field is determined by modulating the kinetic energy of the ion orbit inside the spectrometer using a radiofrequency voltage. The mass is obtained by comparison of the cyclotron frequency of the unknown mass to that of a reference mass.
Last year we had two data taking periods with radioactive beams and measured masses of 22 isotopes of Na$^{(1)}$, Al$^{(1)}$, K, Ca and Ti. Our systematic errors are now under control and we achieved the expected accuracy. Even for the weakly produced ^{30}Na ($T_{\frac{1}{2}}$=48ms), the accuracy was still 8×10^{-7}. We are now preparing another experiment for the end of April 1999.
Basic principles of the MISTRAL experiment and a discussion on results already obtained will be presented.

(1) This work is part of C. Toader's thesis.