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High-precision mass measurement programme around the N=82 shell closure with the Penning trap mass spectrometer MLLTRAP at ALTO

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The international ISOL facility ALTO, located at Orsay in France, provides stable ion beams based on a 15 MV tandem accelerator and neutron-rich radioactive ion beams from the interaction of a γ -flux induced by a 50 MeV 10 μ A electron beam in a uranium carbide target. New setups are under preparation to extend the fundamental properties measured at ALTO of ground and excited states of exotic nuclei. As for example, high-precision mass measurements for an accurate determination of the nuclear binding energy. To perform those measurements two devices will be hosted at ALTO: a radiofrequency quadrupole to cool and bunch the continuous radioactive beam and the double penning trap mass spectrometer MLLTRAP, commissioned off-line at the Maier-Leibnitz Laboratory (MLL) in Munich, Germany. The unique ion production at the ALTO facility allows mass measurements in a neutron rich area of major interest around ^{132}Sn . In this context, it is proposed to use neutron-rich silver isotopes ($Z = 47$, $A > 121$) to explore the possible weakening of the shell gap for $Z < 50$ and its impact on the $A = 130$ r-process elemental abundances. The already well measured masses ($A < 121$) in the silver isotopic chain will be used for the on-line commissioning. In addition, the development started at MLL on a novel detector-trap for in-trap decay spectroscopy will be carried out at ALTO. It will provide background free spectra via direct in-situ spectroscopy of stored ions. The status and timeline of the novel setup will be presented.

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