PRECISION MASS MEASUREMENTS BEYOND NEUTRON-RICH ^{132}Sn AT JYFLTRAP

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Atomic masses of nuclei near the doubly magic nucleus ^{132}Sn are of key interest for nuclear structure studies. Precise atomic masses allow the extraction of quantities such as neutron and two-neutron separation energies through which changes in nuclear structure can be revealed. Additionally, high-precision mass values in this region contribute to studies of the r-process nucleosynthesis path in nuclear astrophysics.

We have measured atomic masses of several nuclei near ^{132}Sn at the University of Jyväskylä, Finland, using the JYFLTRAP double Penning trap setup [1]. The nuclei of interest were produced using the IGISOL method [2] which results in a fast and chemically inselective extraction of short-living ions. Our measurements extended to the neutron rich nuclei ^{135}Sn, ^{136}Sb and ^{140}Te. Several of the nuclei have low-lying isomeric states. Since high-precision mass measurements with Penning traps require monoisomeric samples, we used a sophisticated cleaning method to remove the unwanted states [3].

Masses were measured to a precision on the order of 5 keV or better. Not only ground state masses were measured but also isomeric states where applicable. The achieved precision afforded a detailed study of neutron pairing [4]. In this contribution, experimental results and comparison to theoretical calculations will be presented.

References

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