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Penning-trap mass measurements of 100-102Sn

The mass of the heaviest $Z=N$ doubly-magic nuclide, ^{100}Sn , has never been directly measured so far. This iconic nucleus, along with its neighbouring nuclei, presents an enormous challenge for nuclear models, particularly in understanding shell closure evolution, isospin symmetry breaking and proton- neutron pairing. Additionally, $Z=N$ nuclides manifest an enhanced binding energy (known as the Wigner energy), due to the equal occupation of identical proton and neutron orbitals, making precise masses in the region crucial to deepen our understanding of this Wigner energy.

Recent beta-decay experiments as well as mass measurements gave contradictory results on the Gamow-Teller strength of the ^{100}Sn beta decay. A precise mass measurement of ^{100}Sn would help to solve this controversy. Despite numerous mass measurements in this region over the last years, large uncertainties remain for some isotopes, while others have yet to be measured. In this LOI, we propose to focus on the neutron-deficient 100-102Sn isotopes. By performing the first direct mass measurements of ^{100}Sn and ^{102}Sn , we aim to reduce their binding energy uncertainties by more than two orders of magnitude.

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