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Mass measurements of isomeric states in neutron-deficient $^{195,197}\text{Po}$ isotopes at ISOLTRAP

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In this work neutron-deficient isotopes $^{195(\text{g,m})\text{Po}}$ and $^{197(\text{g,m})\text{Po}}$ have been investigated by using high-precision Penning-trap mass spectrometry at ISOLTRAP [1]. In addition, decay measurements on these isotopes were performed with the assistance of ISOLTRAP's multi-reflection time-of-flight mass spectrometer (MR-TOF MS) [2], which successfully enabled us to deliver an isobarically pure beam [2] to the decay point, while the resonant ionization laser ion source (RILIS) of ISOLDE was used to selectively enhance the isomer or the ground state [3] of the investigated isotopes. The mass values of $(^{195,197}\text{m,gPo})$ were measured with high-precision Penning-trap mass spectrometry using the well-established TOF-ICR technique [4], from which we determined the excitation energy of the $13/2^+$ state in $^{195,197}\text{Po}$ for the first time, completing the knowledge of the energy systematics in the region. With this new information, the masses of the isomeric states of lead, radon, and radium in this region can be obtained from α -decay chains. The relevance to shape coexistence in the neutron-deficient lead region will be discussed.

References:

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