

Shape coexistence and charge radii in gold and astatine isotopes studied by in-source laser spectroscopy at RILIS-ISOLDE

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On behalf of York-KU Leuven-Gatchina-Mainz-Bratislava-Liverpool-ISOLDE collaboration

The competition between spherical and deformed nuclear shapes at low energy gives rise to shape coexistence in the region of the neutron-deficient lead isotopes with $Z=82$ and $N=104$ [1]. In order to determine to which extend the ground and/or isomeric states of those and neighboring nuclides are affected by this phenomenon, an extended campaign of investigation of changes in the mean-square charge radii is on-going at ISOLDE. By combining the high sensitivity of the in-source laser spectroscopy technique, ISOLDE mass separation and Windmill alpha-decay spectroscopy setup [2], it has been possible to study long isotopic chains of lead [3] and polonium [4], down to $N=100$ and $N=107$ respectively, and, recently, thallium isotopic chain down to $N=98$ [5].

In this contribution, we will present the systematics of charge radii in thallium isotopes [5] together with the first preliminary results of the 2012 experimental campaign at ISOLDE (IS534 experiment) to study charge radii in the long chains of the astatine and lightest gold isotopes [6]. In the gold and astatine cases, next to Faraday cup and Windmill measurements, also the Multi-Reflection Time-of-Flight (MR-ToF) mass separation technique [7] involving the ISOLTRAP collaboration was used.

References

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