

Laser- and decay spectroscopy of neutron-deficient Tl isotopes

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One of the regions of the nuclear chart that has drawn considerable interest is that of the neutron-deficient Pb isotopes with $Z \sim 82$ and $N \sim 104$. This region exhibits a dramatic manifestation of shape coexistence.

The occurrence of competing proton intruder states in the odd-Z Tl isotopes opens the ground for complex structures at low energy leading to isomerism. However, the spectroscopic elucidation of such structures has proven to be highly demanding. The decay schemes are extremely complex and low-energy, highly converted transitions must be reliably identified and located in the odd-mass decay schemes. This knowledge is crucial for the measurement of charge-state distributions ($\delta\langle r^2 \rangle$) through the resonant laser ionization technique.

Combining the high-sensitivity of the in-source laser spectroscopy technique and characteristic decay spectroscopy, exotic Tl isotopes ($Z = 81$) down to $N = 98$ have been studied in July 2011. The goal of these studies is to deduce mean-square charge radii of the ground-state and isomeric-states of the most neutron-deficient Tl isotopes. Complementary decay data on isomerically purified sources were additionally collected. In this contribution, we shall report on the present status of the decay- and laser spectroscopy analysis of these isotopes.

Primary author: VAN BEVEREN, Celine (K)

Co-author: RAPISARDA, Elisa (CERN)

Presenter: VAN BEVEREN, Celine (K)

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