Shape coexistence and charge radii in the lead region studied by in-source laser spectroscopy at RILIS-ISOLDE

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The competition between spherical and deformed configurations gives rise to shape coexistence in the neutron-deficient isotopes around Z~82 and N~104 [1] while on the neutron-rich side, effects due to octupole deformation in the vicinity of N~133 could be expected [2]. In order to determine to which extent the ground and isomeric states of these nuclides are affected by these phenomena, an extensive campaign of investigation of changes in the mean-square charge radii and electromagnetic moments is being conducted by our collaboration at the mass-separator ISOLDE (CERN). The measurements rely on the high sensitivity provided by the in-source laser spectroscopy technique [3, 4].

In this contribution, we will present the extended systematics of charge radii and magnetic moments recently obtained for the mercury (April 2015), gold (May 2015) and astatine (September 2014) isotopic chains at ISOLDE, see Figure for charge radii. In all three cases, the Windmill decay spectroscopy setup [5] and the Multi-Reflection Time-of-Flight (MR-TOF) mass separation technique [6] were used. The preliminary results for the very recent experiment (July 2016) aimed at charge radii in the bismuth chain will also be presented.

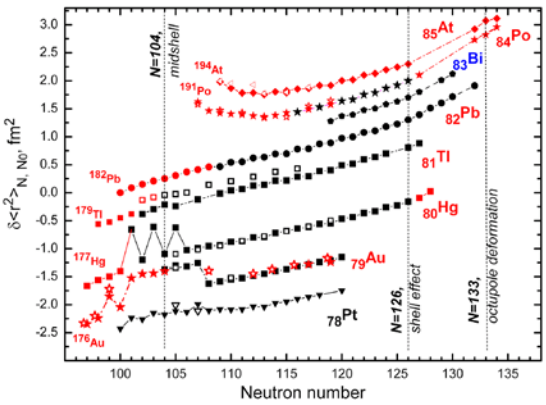

Figure. Systematics of charge radii in the lead region, data in red are results of this Collaboration.

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