

In-source Laser Photoionization Spectroscopy of Pb, Bi and Po Isotopes at ISOLDE

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Shape coexistence at low excitation energy in nuclei has continuously shown much interest on both experimental and theoretical fronts. The region around the neutron mid-shell ($N = 104$) and closed proton shell ($Z = 82$) is of special interest. For example, in Pb at $N = 104$, it has been found that the three lowest lying states have 0^+ as spin and parity values, these states have been associated with different shapes in the nucleus: spherical and deformed (prolate and oblate). Significant mixing of the deformed states into spherical ground state would result in an increased nuclear charge radius.

At ISOLDE laser spectroscopy studies of neutron deficient isotopes (and isomers) of Pb and Bi have been extended to $N=100-107$ (Pb) and $N=106,108$ (Bi). The measured values of the mean charge radius variations and nuclear magnetic moments will be presented and compared with the recent theoretical calculations (for Pb isotopes: IBM and beyond mean field calculations). Our data support the predominantly spherical shape of the ground state of the Pb isotopes near the neutron mid-shell ($N=104$).

The results of the first tests of photoionization schemes for Po will also be presented.

Author: Dr SELIVERSTOV, Maxim (Institut fuer Physik, Johannes Gutenberg Universitaet, Mainz)

Presenter: Dr SELIVERSTOV, Maxim (Institut fuer Physik, Johannes Gutenberg Universitaet, Mainz)

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