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Shape staggering, shape coexistence and beta-delayed fission in bismuth isotopes studied by in-source laser spectroscopy (IS608)

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On behalf of Leuven-Gatchina-ISOLDE-Mainz-Manchester-York and Windmill-ISOLTRAP-RILIS collaboration

By combining the high sensitivity of the in-source laser spectroscopy technique, ISOLDE mass separation, Windmill alpha-decay spectroscopy setup and Multi-Reflection Time-of-Flight (MR-TOF, ISOLTRAP collaboration) mass separation technique it was possible to study the long isotopic chain of bismuth isotopes (187-218Bi) in the framework of the IS608 experiment [1]. The preliminary results of the charge radii changes and electromagnetic moments in bismuth isotopes, deduced from the isotope shifts (IS) and hyperfine structure (hfs) measurements, are presented. The large odd-even shape staggering at 187-189Bi similar to the well-known staggering in the Hg isotopes at the same neutron numbers was observed. Shape coexistence in the odd-A Bi nuclei was demonstrated (intruder isomers, 191-201Bi). The noticeable deviation of the charge radii trend for the ground states of the neutron deficient odd-A Bi isotopes from that for the (spherical) Pb nuclei was found.

Along with the IS/hfs measurements, beta-delayed fission (βDF) in 188, 190Bi was studied. For the first time it was possible to implement the isomeric selective βDF-measurement to check the spin dependence of βDF-probability for two isomeric states in 188Bi.

[1] A.N. Andreyev. A. E. Barzakh, P. Van Duppen et al., http://cds.cern.ch/record/2059118/files/INTC-P-443.pdf

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