The Geiger-Nuttall law broken in the lightest Po isotopes*

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Shape coexistence is a well-established phenomenon in vicinity of the Z=82 shell closure. Unfortunately, due to low production cross-section and high background from fission, the most neutron-deficient Po isotopes cannot be presently reached with in-beam techniques, ^{190}Po being the lightest Po isotope studied with this method ($\sigma(^{190}\mathrm{Po})\sim$ 200 nb) [1]. On the other hand, α decay is proved to be a very sensitive tool to study shape coexistence in nuclei, providing information on both parent and daughter states involved in the decay. Furthermore, nuclei with production cross-sections in the sub-nanobarn region become accessible.

This contribution reviews the results of the recent experiments at the velocity filter SHIP (GSI, Darmstadt) in which two new very neutron-deficient isotopes ^{186,187}Po were identified [2] and decay properties of $^{188-192}$Po were re-studied in details.

A striking observation from our experiments is the strong retardation of the α decay of the even-even ^{186,188,190}Po isotopes in comparison with the Geiger-Nuttall law, which stipulates a linear decrease of the half-life as a function of the decay energy: $\mathrm{Log}(T_{1/2}) \sim Q_{\alpha}^{-1/2}$. For example, in ^{186}Po the measured half-life is more than two orders of magnitude *longer* in comparison with the expected value from the Geiger-Nuttall law using a linear fit for the heavier isotopes $^{196-210}$Po [2]. The observed effect is even stronger than the deviation from systematics when crossing the N=126 neutron shell.

In the contribution we will link the observed behavior to the configuration change between the parent Po and daughter Pb nuclei close and beyond the neutron mid-shell at N=104.

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[1] D. Wiseman *et al*, Contribution to this Conference.
[2] A. N. Andreyev *et al*, to be published.