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Superallowed alpha decay to doubly magic ^{100}Sn

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Alpha decay has been a probe of nuclear structure and clustering in nuclei since the dawn of nuclear physics. However, microscopic description of alpha-decay rates remains to be a challenge. During the talk, the recent observation of the superallowed alpha-decay chain ^{108}Xe-^{104}Te to doubly magic ^{100}Sn [1], using the recoil-decay correlation technique with the Argonne Fragment Mass Analyzer at ATLAS, will be presented. This is an important stepping-stone towards developing a microscopic model of alpha decay since it is only the second case of alpha decay to a doubly magic nucleus, besides the benchmark ^{212}Po alpha decay to ^{208}Pb. The decay properties of ^{108}Xe and ^{104}Te indicate that in at least in one of them the reduced alpha-decay width is a factor of 5 larger than in ^{212}Po. The enhanced alpha-particle preformation probability could be the result of stronger interactions between protons and neutrons, which occupy the same orbitals in N=Z nuclei. During the talk, the alpha emitters in the ^{100}Sn region will be compared with their counterparts in the ^{212}Po region, and with the existing alpha-decay models. Prospects for alpha-decay studies in the ^{100}Sn region will be also discussed.
[1] K. Auranen, D. Seweryniak et al., Phys. Rev. Lett. 121, 182501 (2018)

Primary author: Dr SEWERYNIAK, Dariusz (Argonne National Laboratory)

Presenter: Dr SEWERYNIAK, Dariusz (Argonne National Laboratory)

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