TASCA 23
April 25 - 27, 2023
20th Workshop on Recoil Separator for Superheavy Element Chemistry & Physics

Probing the fission-landscape of superheavy nuclei

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To date, superheavy nuclei (SHN) with proton and neutron numbers up to Z = 118 and up to N = 177, respectively, are known. They were synthesized mostly in the heavy-ion induced reactions with atom-at-a-time rates and identified predominantly by their alpha-particle emission and rarely by fission. Corresponding experimental data, e.g., partial half-lives of these radioactive decays confirm the concept of the island of stability against the fission, which was initially predicted to exist at around the Z=114 and N=184.

On the other hand, properties of SHN related to fission process, i.e., fission half-life, fission hindrance, the fragments mass distribution etc., are still scarcely known [1]. This circumstance has a primary reason, which is due to the lack of a comprehensive experimental data on the fission, which is well-known to be a quite complex process having a stochastic nature [2].

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At the SHE-Chemistry department (GSI) a research program with a focus on exploring the fission-landscape of SHN is actively ongoing [3-6]. One of the main goal is the measurement of the comprehensive experimental data on the fission-observables that will be useful to be used in the theoretical descriptions of fission process. First steps towards this goal is the construction and fulfill of the well-pronounced systematics for the fission-observables and its explanation/interpretation within the semi-empirical approach [7-9].

I will present the current status and results of this research program.

References

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