



Synthesis of heavy nuclei in multinucleon transfer reaction Xe-136 + U-238 close to zero degrees

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Information on the heaviest elements have been obtained up to now via fusion-evaporation reactions. It is however well known that the only nuclei one can reach using fusion-evaporation reactions are neutron deficient and moreover in a very limited number (because of the limited number of beam-target combinations). An alternative to fusion-evaporation can be deep-inelastic collisions. Indeed, theoretical calculations [1] predict large cross-sections for neutron-rich heavy elements production close to zero degrees and recent experiments have been performed showing exciting results [2, 3, 4]. At the end of 2019, we have performed a first preliminary test at Argonne National Laboratory. The goal of the experiment was to investigate deep inelastic reactions mechanisms in the heavy elements region using the Gammasphere germanium array coupled to the AGFA (Argonne gas-filled analyzer) separator with the implantation-decay station (PPAC, DSSD and silicon tunnels) and germanium clover detectors XArray at the focal plane.

In this talk I will report on the result obtained in the test experiments and I will give you some details about the further experiments and developments planned.

References

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- [3] A. Di Nitto et al. Phys. Let. B, 784:199-205, 2018.
- [4] J.S. Barrett et al. Phys. Rev. C, 91:064615, 2015.