



Overview of the current scientific activities in superheavy element research at the FLNR

D.I. Solovyev

Flerov Laboratory of Nuclear Reactions, Joint Institute for Nuclear Research, Dubna, Russia

Results from recent experiments with ^{50}Ti and ^{54}Cr beams [1,2] conducted at the SHE Factory will be presented. The estimated drop in cross-sections resulting from the changing the ion beam from Ca to Ti/Cr will be discussed, with the aim of identifying the optimal target–beam combination and beam energy for future experiments on the synthesis of new elements. Preliminary results obtained from the $^{48}\text{Ca} + ^{237}\text{Np}$ reaction will also be presented.

A new gas-filled separator based on a superconducting solenoid is currently under construction at FLNR [3]. The main purpose of the setup is to increase efficiency and event rates in gas-phase chemistry experiments with superheavy elements. Simulation results of the SHE image size at the focal plane of GASSOL will be discussed, and the benefits of using a solenoidal magnet will be demonstrated. The current status of the construction, expected experimental challenges, and a preliminary plan for test experiments will be presented and discussed.

References

- [1] Yu. Ts. Oganessian, et al., Investigation of reactions with ^{50}Ti and ^{54}Cr for the synthesis of new elements, *Phys. Rev. C* **112**, 014603 (2025).
- [2] Yu. Ts. Oganessian, et al., Cross section and decay properties of nuclei produced in the $^{242}\text{Pu}(^{50}\text{Ti}, 3n)^{289}\text{Lv}$ reaction, *Phys. Rev. C*, 014614 (2026)
- [3] D.I. Solovyev, et al., Simulation of ion optics in a gas-filled solenoid GASSOL, *NIM A* **1052**, 168263 (2023)