

## Referee report to the 49<sup>th</sup> PAC at JINR on the theme "Status of the GALS set-up"

GALS project explores possibilities for producing, separating and investigating new heavy neutron-rich nuclei created in low-energy multi-nucleon transfer reactions.

Such nuclei/isotopes are of high importance for nuclear physics, astrophysics nucleosynthesis and r-process. Thus, all known isotopes of (trans)Fermium are located above the  $\beta$ -stability line, in the proton-rich region. Then, the so-called Fermium gap prevents the production of even heavier elements in an alternative process of heavy element production at nuclear reactors in a sequence of neutron captures and  $\beta$ -decays – it would be important to know the boundaries of this gap for eventual overcoming of this problem in one or another way.

GALS project is going to complement the existing fragment separators and other setups in terms of separation of heavy nuclei with electric charge  $Z > 70$  by their atomic number. GALS uses a combined method of separation based on stopping nuclei in a gas cell, their subsequent resonance laser ionization, and their separation in magnetic field.

During the previous two years, the team has reached a significant progress in the setting up the new experimental facility. Thus, the laser equipment has been received and is being installed; some subsystems have been received; the separator magnet has been produced; first gas cell design has been completed; and first design of the tape station has been completed.

The project program for the following three years includes the completion of a setup for laser modernization; the investigation of the ionization schemes for the elements of interest; the installation of main production and separation part of the facility; the detector, control and acquisition systems development; full-scale experiments on production and study of properties of new heavy neutron rich nuclei at the cyclotron U400M.

This exciting program, and the plan of its implementation, is going to boost the field and has to be supported.

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