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Properties of heavy nuclei by laser spectroscopy methods.

Author: Sergey Zemlyanoy[1]

Co-authors: Robert Bark [2]; Alexander Rodin [3]; Gennady Myshinski [3]; Viktor Zhemenik [3]; Yury Kudryavtsev [4]; Valentine Fedosseev [5]

[1] *Joint Institute for Nuclear Research*

[2] *iThemba LABS*

[3] *JINR*

[4] *Instituut voor Kern- en Stralingsfysica, Leuven, Belgium*

[5] *CERN, Switzerland*

Corresponding Author: zemlya@jinr.ru

A new setup, based on stopping nuclei in the gas cell and subsequent resonance laser ionization and separation by magnetic field or time of flight is under stage of realization at JINR Flerov Lab. This

setup is devoted to synthesis and study of new heavy nuclei formed in low energy multi-nucleon transfer or fusion reactions.

The heavy nuclei are very important for nuclear physics investigations, for the understanding of fusion – evaporation processes, stability of heavy nuclei, limits of existence of heavy and superheavy nuclei, astrophysical nucleosynthesis and r-process. The properties of heavy nuclei as nuclear shape and size is a key point in constructing of nuclear models and predictions of properties of new nuclei. Ionization potentials and mobility of atoms and ions of heavy elements are extremely important in understanding their chemical properties and role of relativistic effects.

A creation and launch of this facility will open a new field of research in low-energy heavy-ion physics, and new horizons in the study of unexplored “north-east” area of the nuclear map. It could be helpful also for finding a new way for production of heavy and superheavy nuclei and investigation of their properties.

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