

Super Heavy Elements - experimental opportunities for HIL ?

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The upgrade of U-200p cyclotron currently operated at HIL Warsaw to the high current new accelerator, e.g, DS-280 cyclotron, was proposed and preliminary discussed during the recent workshop at Kazimierz Dolny, September 2018. The potential studies of Super Heavy Elements (SHE) were considered among the attractive scientific motivations for such upgrade.

I'll briefly summarize the status of the search for new super heavy elements and nuclei, and the plans for new experiments to be performed within next five years. The joint studies aiming in the physics of new elements involve ORNL/UTK collaborating with RIKEN and JAEA (Japan) and JINR (Russia).

I'll list the main scientific motivations for the SHE studies pointing to the possible future contributions from upgraded HIL. Before the search for new SHE nuclei can be attempted, the experiments on the reaction mechanism, fission mechanism and eventually isomeric states in the SHE isotopes can be possibly performed. However, such contributions to the SHE field will require the investments beyond acquiring new cyclotron suitable for such investigations. The construction and operation of a high transmission gas filled separator is among main new investments needed. The infrastructure should include an appropriate shielding structures and the licensed target laboratory allowed and capable to process radioactive actinide targets. The upgraded HIL should have all permits needed to receive, process and operate with radioactive actinide materials.

Identifying a local team of physicists experienced in the decay spectroscopy and interested in driving the research on super heavy nuclei at HIL is mandatory to the potential success of SHE-related experiments in Poland.