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The DC-140 project: new multipurpose applied science facility at FLNR JINR Accelerator Complex.

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The Flerov Laboratory of Nuclear Reactions at the Joint Institute for Nuclear Research continues its work on the creation of a multipurpose scientific and applied complex based on the new DC-140 cyclotron. The complex includes three experimental channels and is intended applied use of heavy ion beams, in fields of: the production of the heterogeneous micro - and nano-structured materials; testing of electronic components (avionics and space electronics) for radiation hardness; ion-implantation nanotechnology and radiation materials science.

Basing on FLNR long term experience in these fields and aiming to boost the plant performance, FLNR in 2020 started the Design Study of the dedicated applied science facility which should consist of new machine and modern beamlines for the certain applied activity. From the common user's requirements, operation simplicity and cost reasons the main parameters of future machine and experimental setups were chosen. The facility will be based on a new DC-140 isochronous cyclotron. Following the modern user's requirements DC-140 will be the multiparticle, double - energy machine, capable with light and heavy ions up to bismuth will accelerate the heavy ions with mass-to-charge ratio A/Z of the range from 4.9 to 8.25 up to fixed energies 2.1 and 4.8 MeV per nucleon.

Following the industries progress and its requests (thicker nuclear membranes needs, new composite material for material science, thick complicated multilayer topology of components and its' elements miniaturization) the standards start to be changed. To follow new requirements and to improve the facility performance, the next generation facility should provide some important issues, and DC-140 project will offer these to user. First, the simplicity in operation (in terms of 24x7 beam usage and dedicated beam parameters); second, the ion specific energy of 4.8 MeV per nucleon will provide the ion range in Si around 50 mkm; third, the "beam cocktail" option (quick switching between ion species) and two independent casemates for experimental setups will extremely boost the time efficiency of beam using for single user (example: one could obtain usual set of 5 ion species and make the full-program SEE tests in couples of days).

The status of the project, details and methodology will be presented. The new facility should be available for users in 2026.

Primary author: MITROFANOV, Semen (JINR FLNR)

Co-authors: Dr IVANOV, Gennadiy (FLNR JINR); Dr GULBEKYAN, Georgy (FLNR JINR); Dr KALAGIN, Igor (FLNR JINR); Dr IVANENKO, Ivan (FLNR JINR); Dr FRANKO, Josef (FLNR JINR); Dr KAZARINOV, Nikolay (FLNR JINR); Dr OSIPOV, Nikolay (FLNR JINR); Dr APEL, Pavel (FLNR JINR); Dr SEMIN, Vasilii (FLNR JINR); Dr BEKHTEREV, Vlad (FLNR JINR); Dr SKURATOV, Vladimir (FLNR JINR)

Presenter: MITROFANOV, Semen (JINR FLNR)

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