The effect of the "FLAT-TOP" resonant system of the DC-280 accelerator on the accelerated ion beam.

Vinogradov P.I., Protasov A.A.

*Joint Institute for Nuclear Research, Moscow Region, Dubna, Russia.*

E-mai: pvi.vinogradov@yandex.ru

In 2018, the world's first Superheavy Element Factory (STE) was put into operation at the Flerov Laboratory of Nuclear Reactions (FLNR) of the Joint Institute for Nuclear Research (JINR) – based on the new DC-280 cyclotron [1].

A feature of this accelerator is the increased total efficiency of beam transmission in the accelerator (from the ion source to the target of the physical installation) to the level of 50%. Increased efficiency of beam transmission in the cyclotron chamber is achieved using a "flat-top" system [2]. The principle of operation of the "flat-top" system is to add an additional high-frequency (HF) voltage to the main one, which operates at the 3rd harmonic relative to the main accelerating system DC-280. The "Flat-top" system was designed to create a flat shape of the vertex of the accelerating voltage of the cyclotron

The work was carried out, during which the effect of the additional accelerating system "flat-top" on the beam of accelerated ions was studied and verified. This technology makes it possible to reduce the energy spread in accelerated ion clumps and implement an effective single-turn output, which consequently increases the efficiency of beam transmission.

1. Launch of the DC-280 cyclotron – the base unit of the JINR Superheavy Elements Factory. G.G. Gulbekyan, S.N. Dmitriev, M.G. Itkis, Yu.Ts. Oganesyan, B.N. Gikal, I.V. Kalagin, V.A. Semin, S.L. Bogomolov, V.F.Buzmakov, I.A. Ivanenko, N.Yu. Kazarinov, N.F. Osipov, S.V. Pashchenko, V.A. Sokolov, N.N. Pchelkin, S.V. Prokhorov, M.V. Khabarov, K.B. Gikal. Joint Institute for Nuclear Research, 141980 Dubna, Russia.
2. "FLAT-TOP" cyclotron system DC-280. G.G. Gulbekyan, V.A. Buzmakov, V.B. Zarubin, I.A. Ivanenko, N.Yu. Kazarinov. G.A. Karamysheva, I. Franko. Joint Institute for Nuclear Research, Dubna.