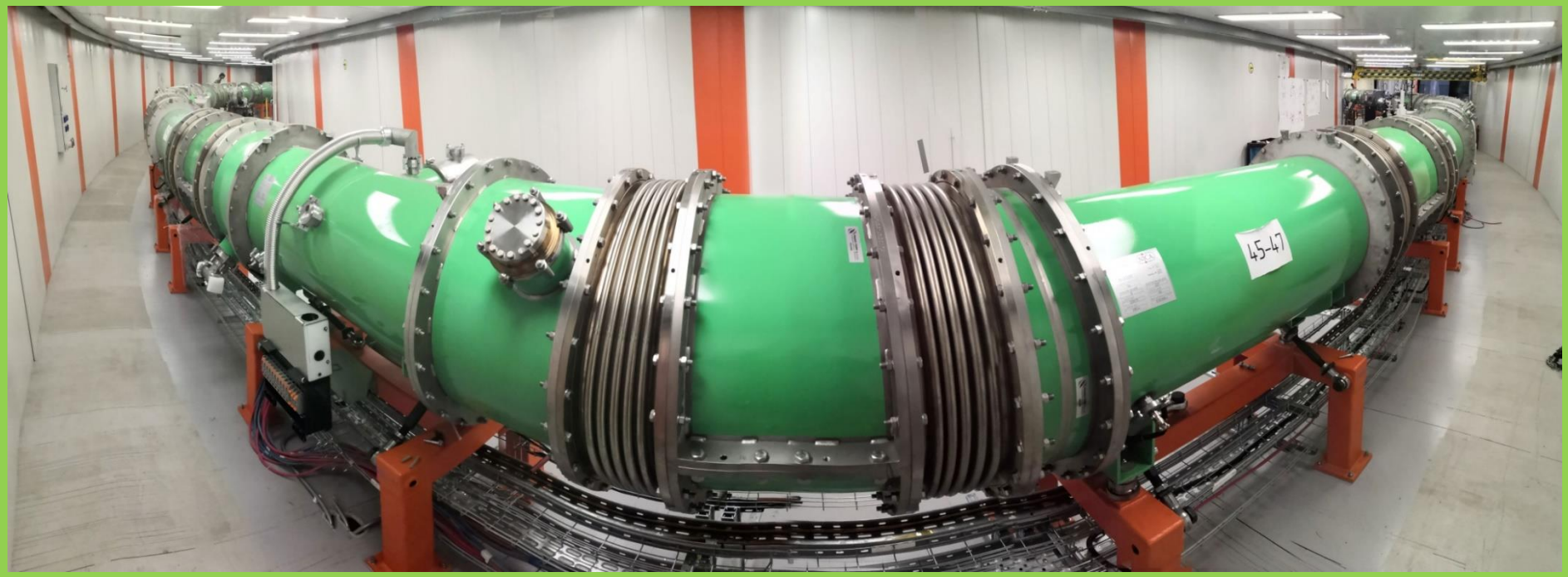
Development of NICA Accelerator COMPLEX

E.Syresin, on behalf of the team



Development of the ion sources

E.D.Donets, E.E.Donets

The construction of KRION-6T was completed; the source was used in the Nuclotron run #50 to accelerate argon ions. During the run #55 a program of experiments with carbon, argon and krypton beams was carried out

V.Fimushkin

The construction of SPI was completed, two runs were carried out as part of the research program with polarized deuteron beams, for the first time at the Nuclotron an acceleration of a polarized proton beam was provided

New laser and new plasma sources were created and used in the HILAC, Nuclotron and Booster runs

V.Monchinsky

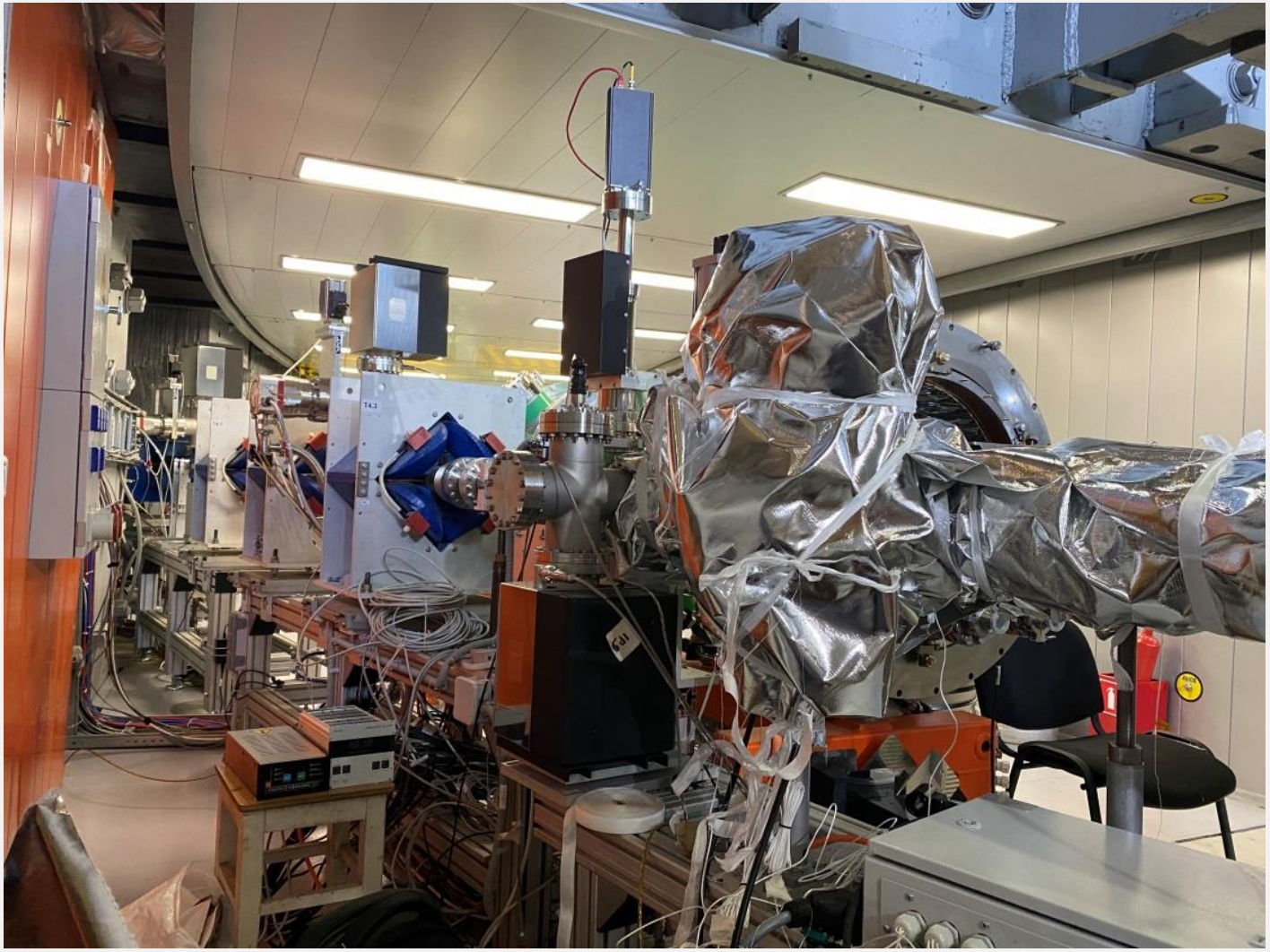
The heavy ion linear accelerator

A.Butenko, A.Govorov

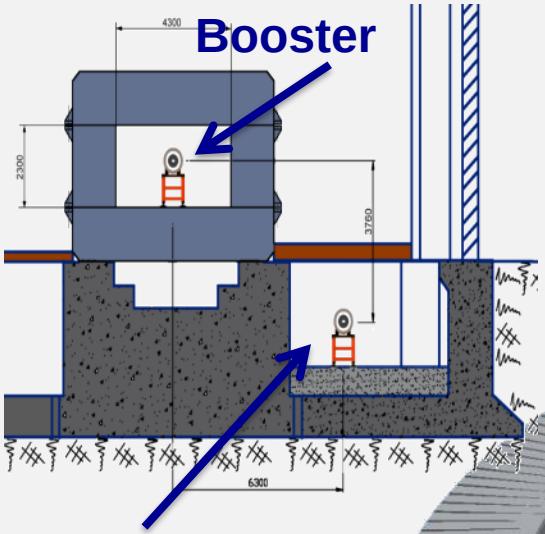
October 2016. Physical start-up of the HILAc – carbon beam was accelerated to the design energy.

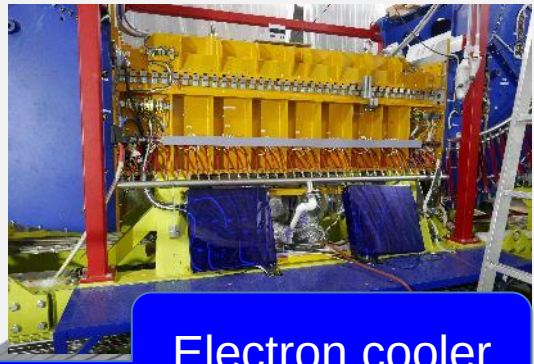
HILAC – Booster transfer line

A.Tuzikov



Booster





Electron cooler

injection

Reference section

Power supply

extraction

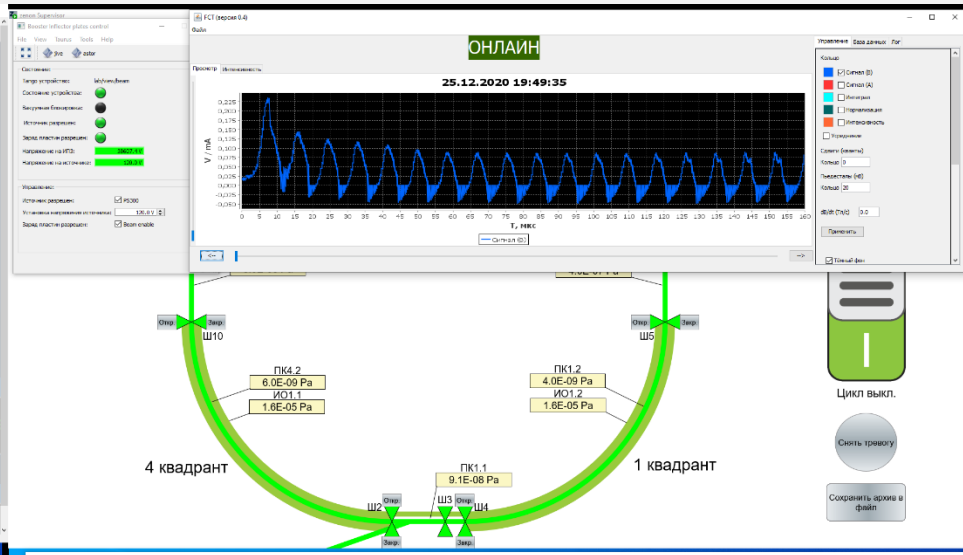
RF stations

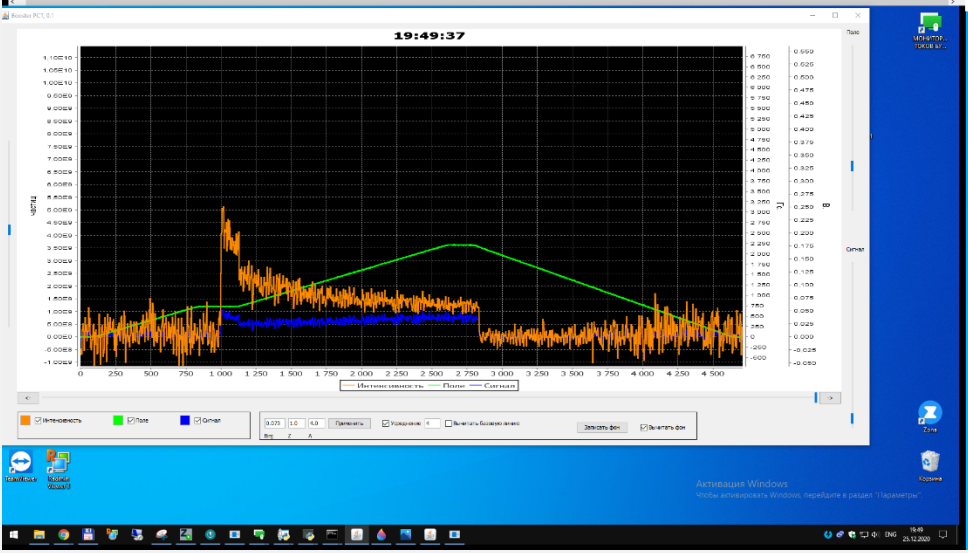
Nuclotron

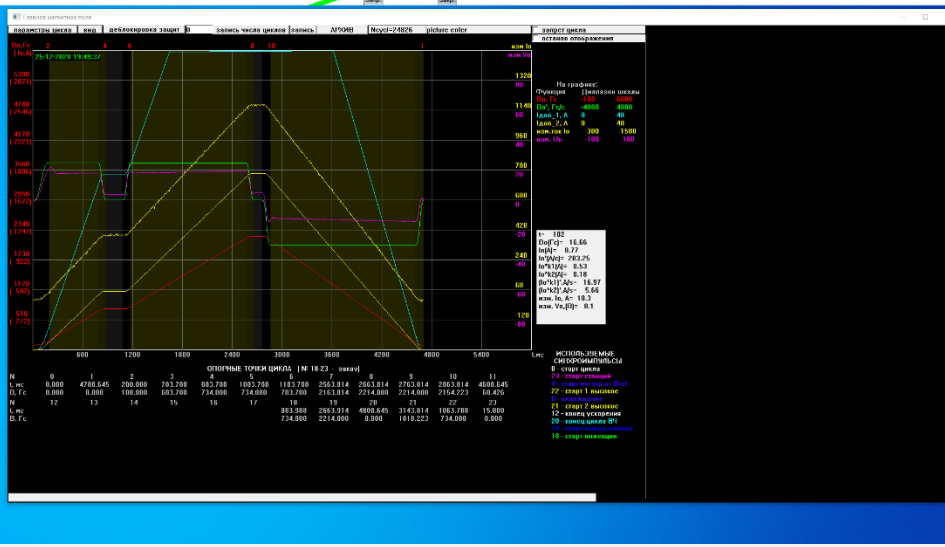
Booster

Official start of the commissioning

The Booster commissioning







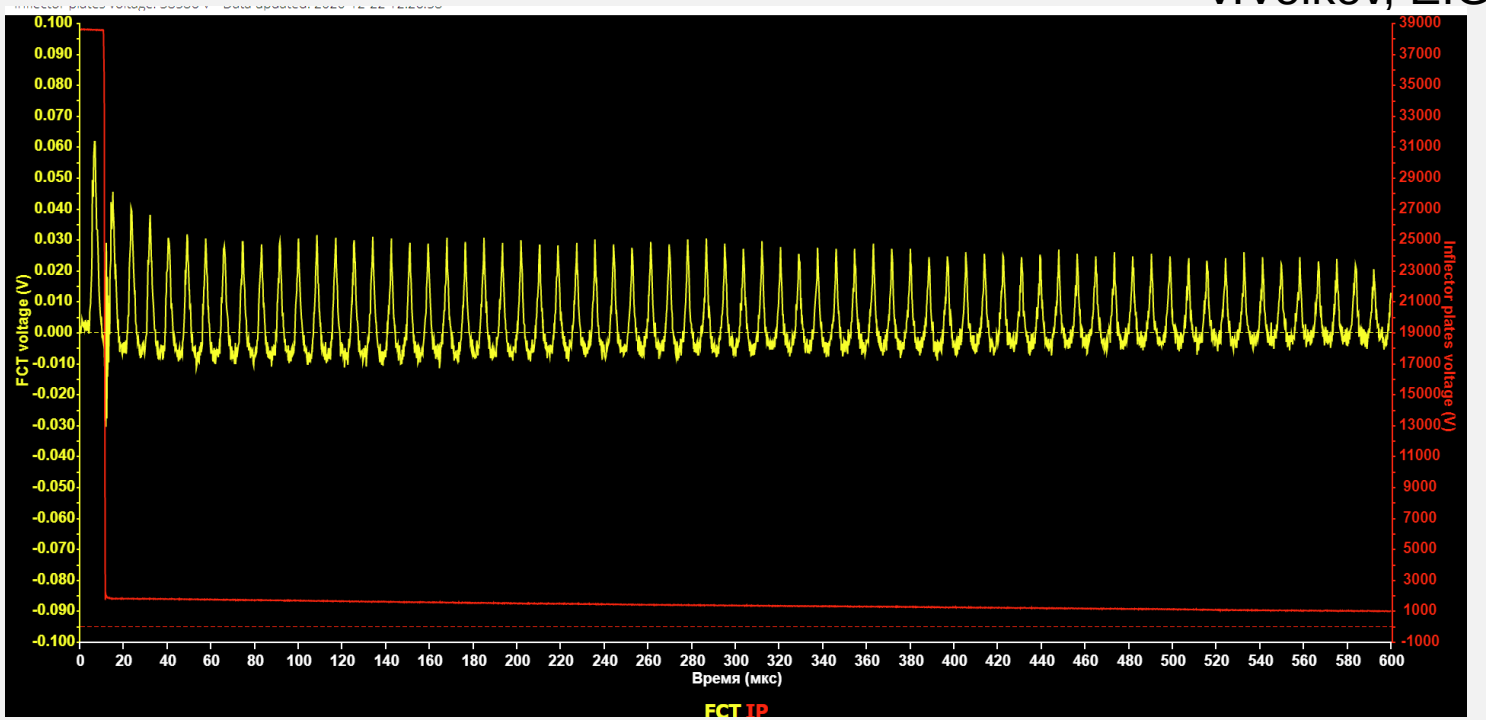
First run of the Booster operation

A.Alfeev

12.11 – 03.12: assembly and test of vacuum system
05.12 – 11.12: cooling, thermometry commissioning
12.12 – 18.12: commissioning of quench protection system, tuning of power supply, tuning of the HILAC – Booster transfer line
19.12: first circulating beam He^{1+}
19.12 – 30.12: test of beam diagnostics, beam acceleration, test of electron cooling, test of power supply, magnetic and cryogenic systems at design field

Fast current transformer

V.Volkov, E.Gorbachev

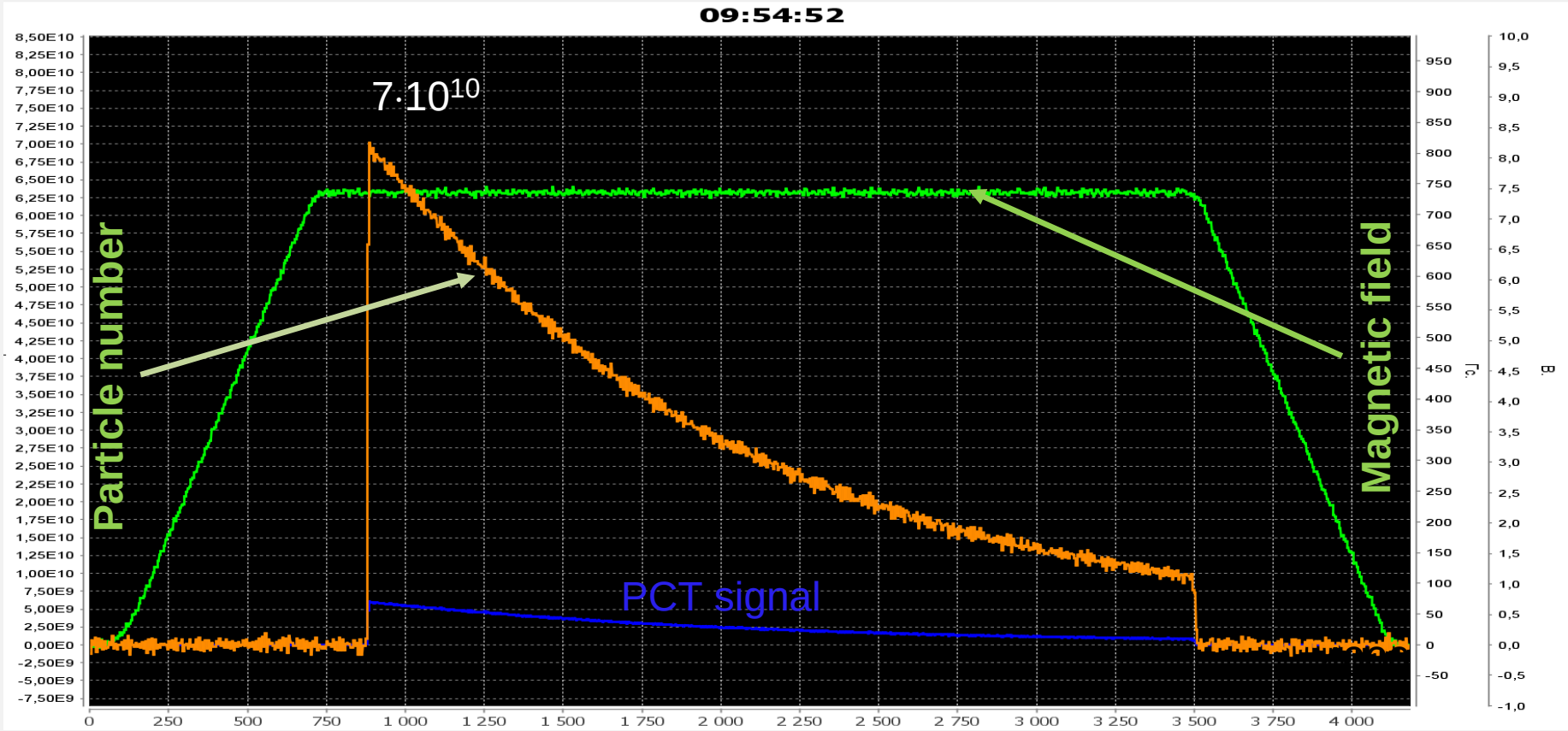


600 μs

Beam circulation

Parametric current transformer

V.Volkov, V.Andreev

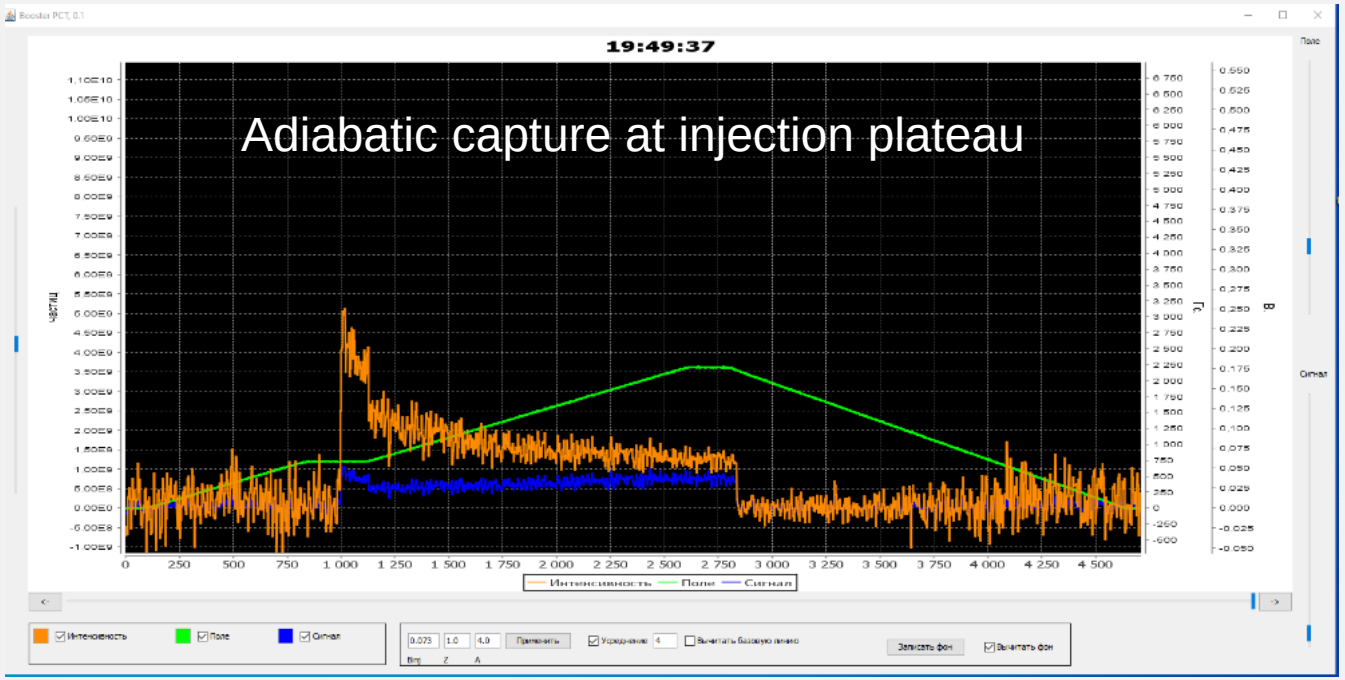


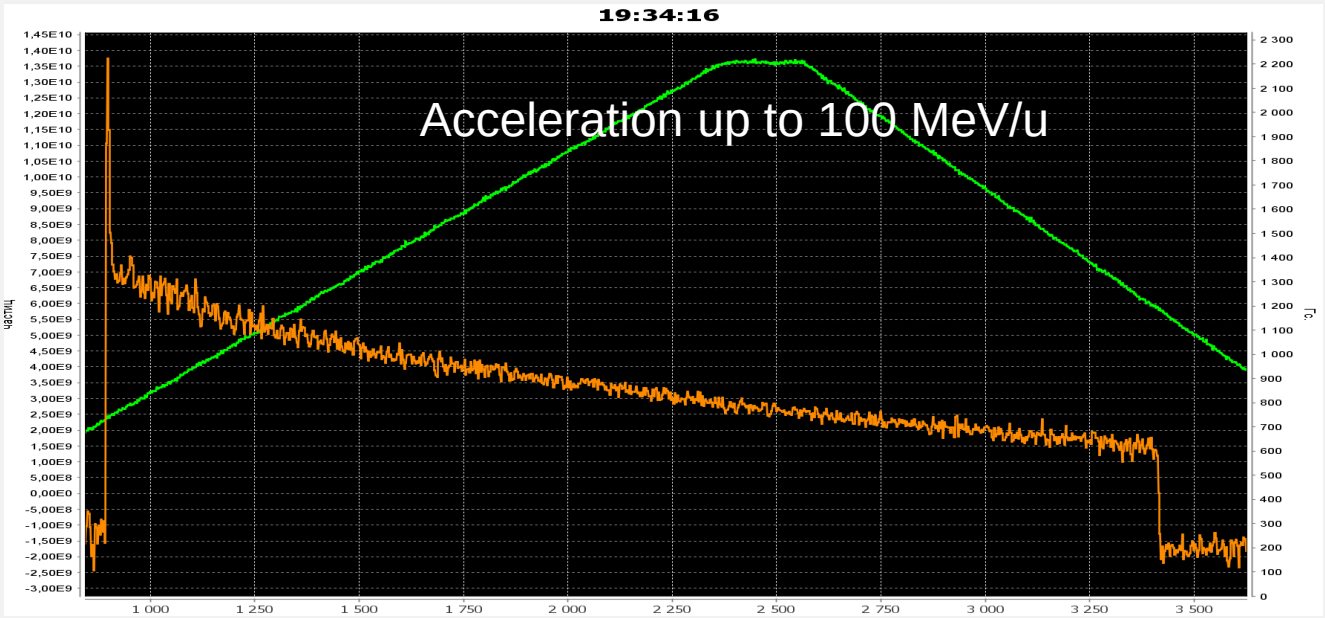
$7 \cdot 10^{10}$ elementary charges ~ $2 \cdot 10^{9}$ Au^{31+}

Life-time is about 2 s, equivalent pressure of residual gas is $3 \div 6 \cdot 10^{-8}$ Pa

Beam acceleration

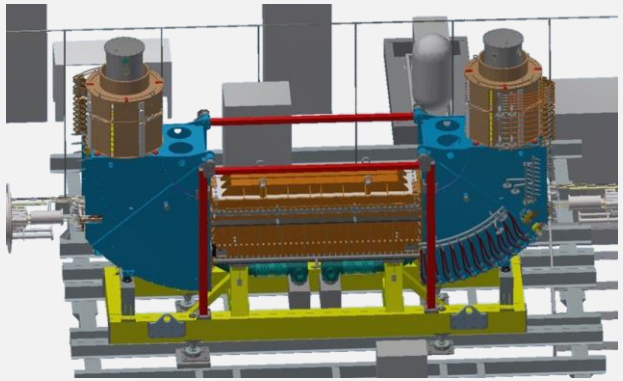
O.Brovko





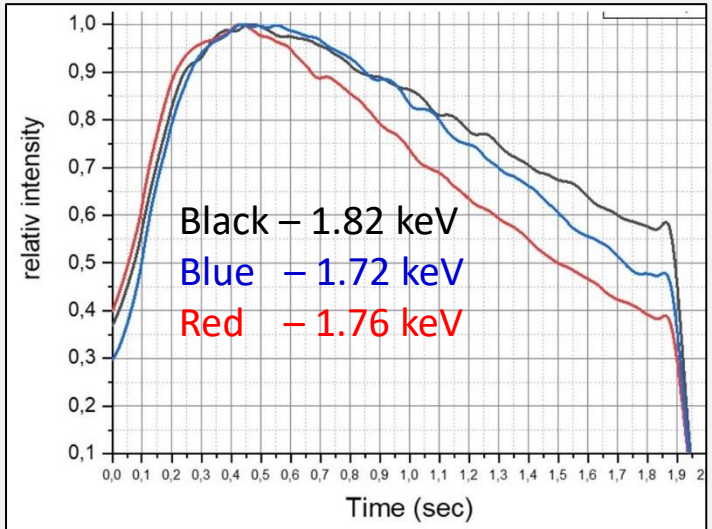
Electron cooling system

I.Meshkov, A.Kobets



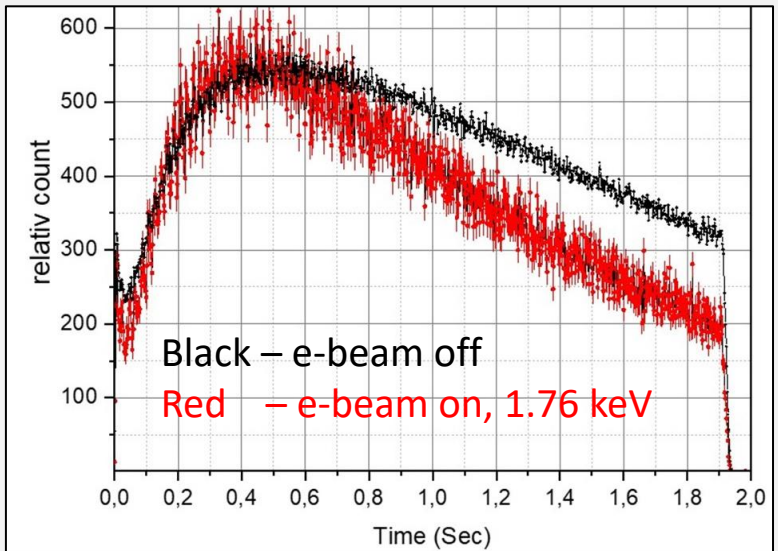
Operation at injection energy

Solenoid magnetic field 700 Gs
Electron beam current 150 mA
Optimal electron energy 1.76 keV
Residual gas pressure $4 \cdot 10^{-8}$ Pa



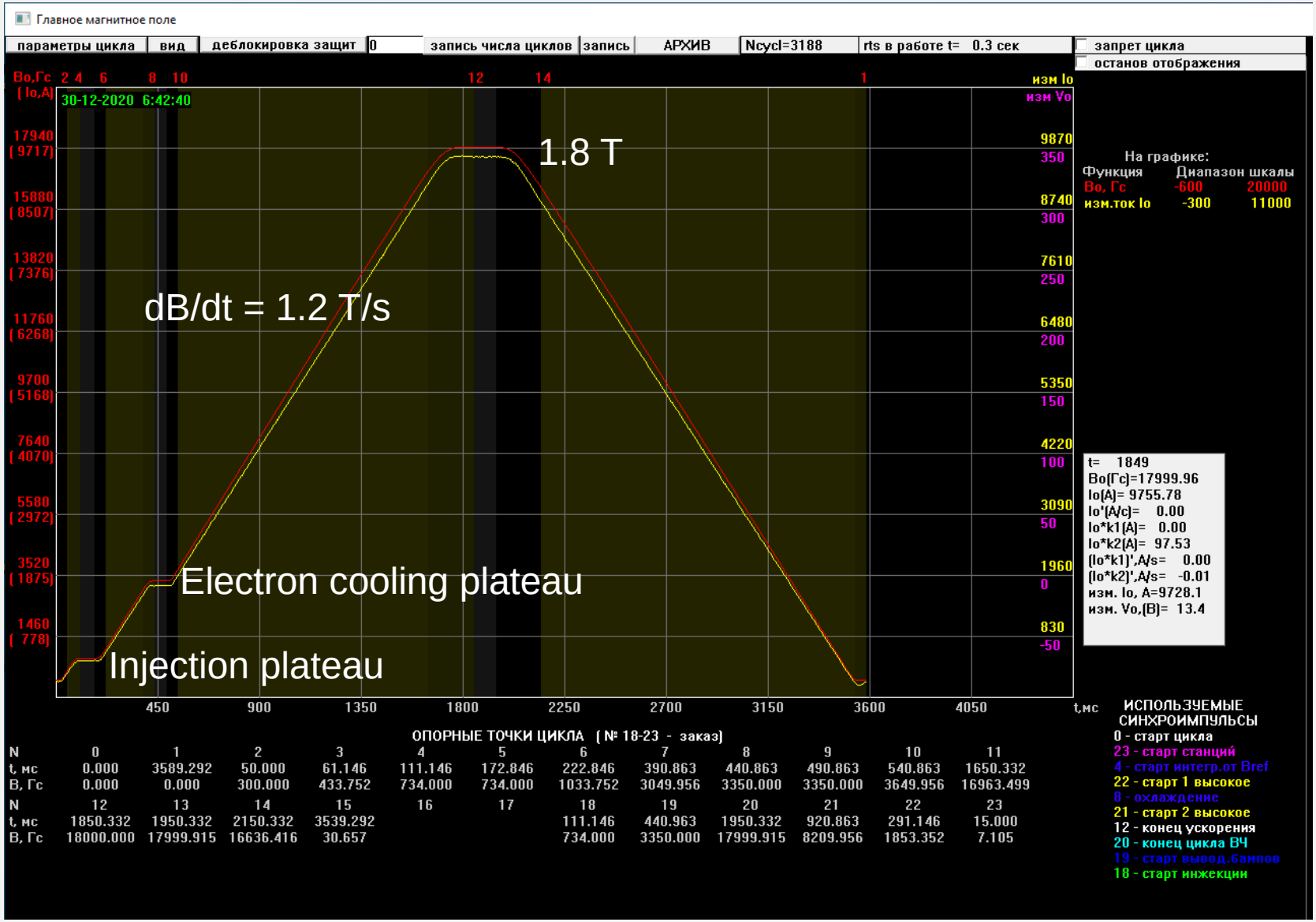
A.Baldin Ionization profilometer

Action of the electron beam leads to decrease of the ion beam life-time due to ion-electron recombination



Design magnetic field cycle

H.Khodzhibagiyan, A.Butenko, V.Karpinsky

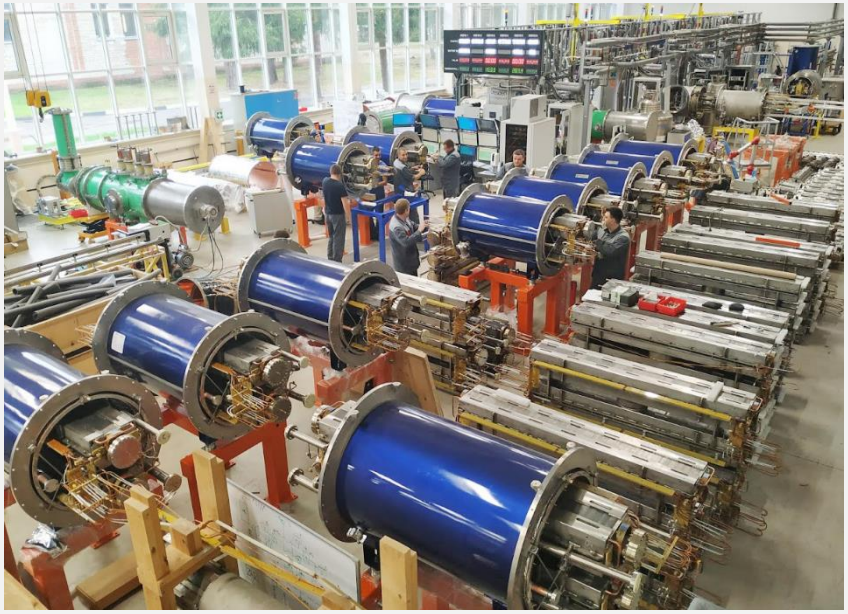


Collider building

November 2020

Progress in the collider construction & design

- Main elements of the magnetic optics of the Nuclotron-collider transport channel were fabricated, fabrication of the power supply system, beam diagnostics devices are in the final stage.
- Serial production of the collider cryo-magnetic system is in progress, 80% of the dipole magnets are fabricated and tested
- Two RF1 stations are constructed and transferred to JINR; construction of RF2 is in the final stage, prototypes of RF3 are tested,-
- Construction of the collider electron cooling system, construction of the Light Ion Linear Accelerator LILAc, Technical design of the SC energy storage have been started.



Thank you for attention