JINR

Joint Institute for Nuclear Research

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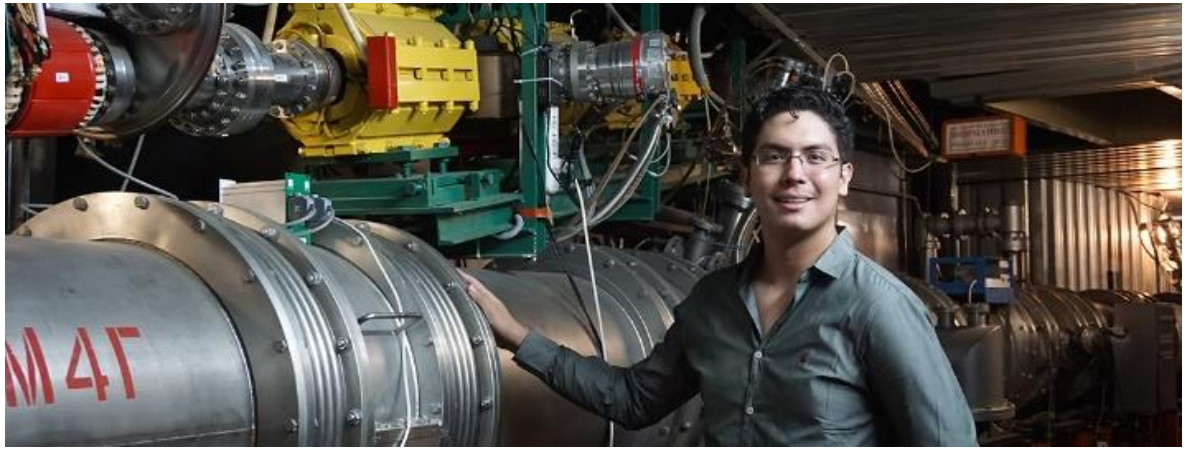
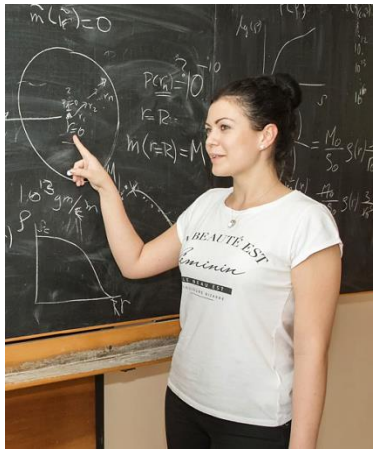


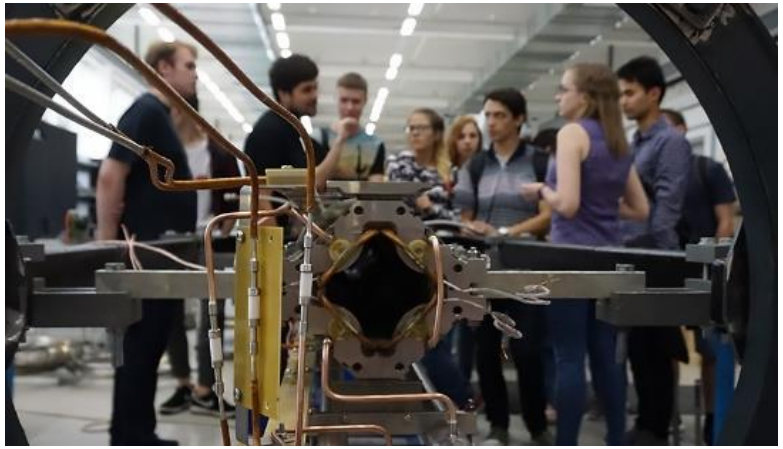
World-class
research projects

Unique
opportunities
for training

Variety
of student
programmes



Wide range
of research fields



OUTLINE

Who are we?

Where are we?

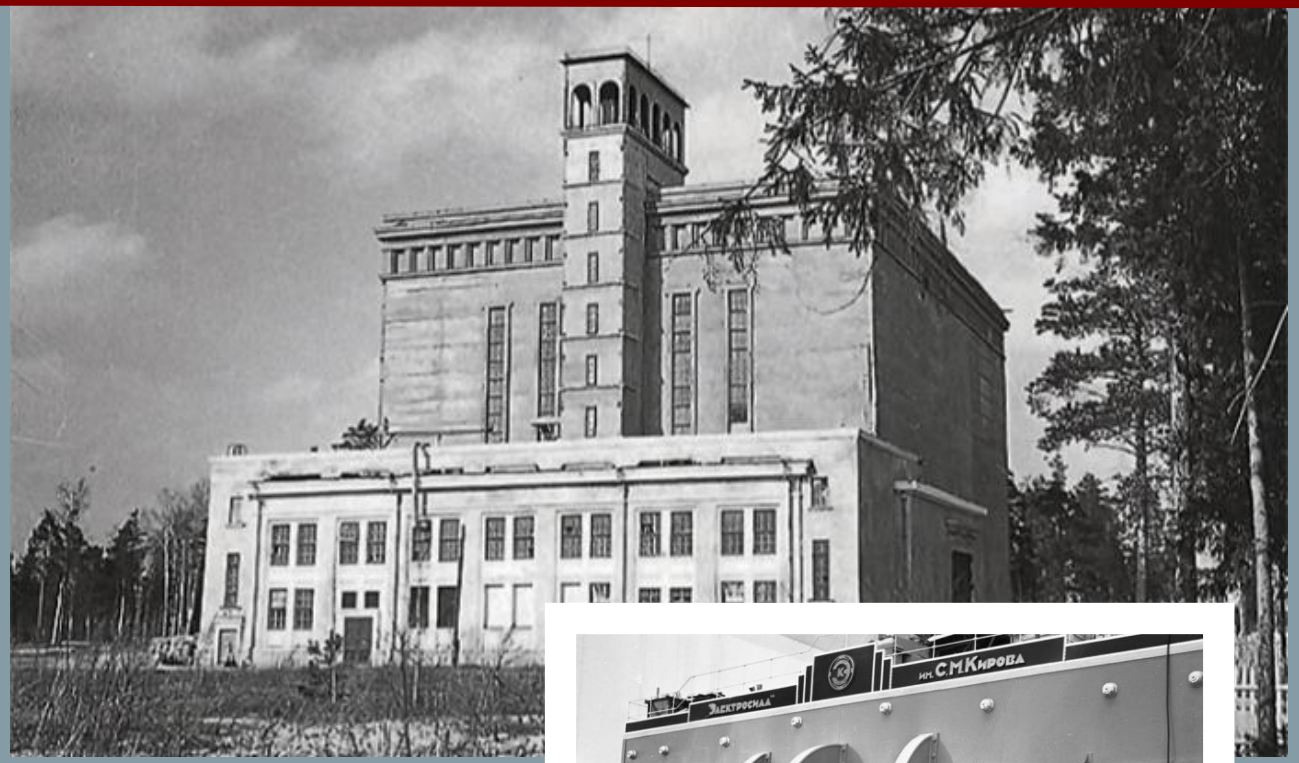
What are we?

Joint institute for nuclear research

was founded on 26 March, 1956

Albania Bulgaria China Czechoslovakia GDR Hungary D.P Korea Mongolia Poland Romania USSR Vietnam

Facilities existing in 1956



Phasotron

Synchrophasotron

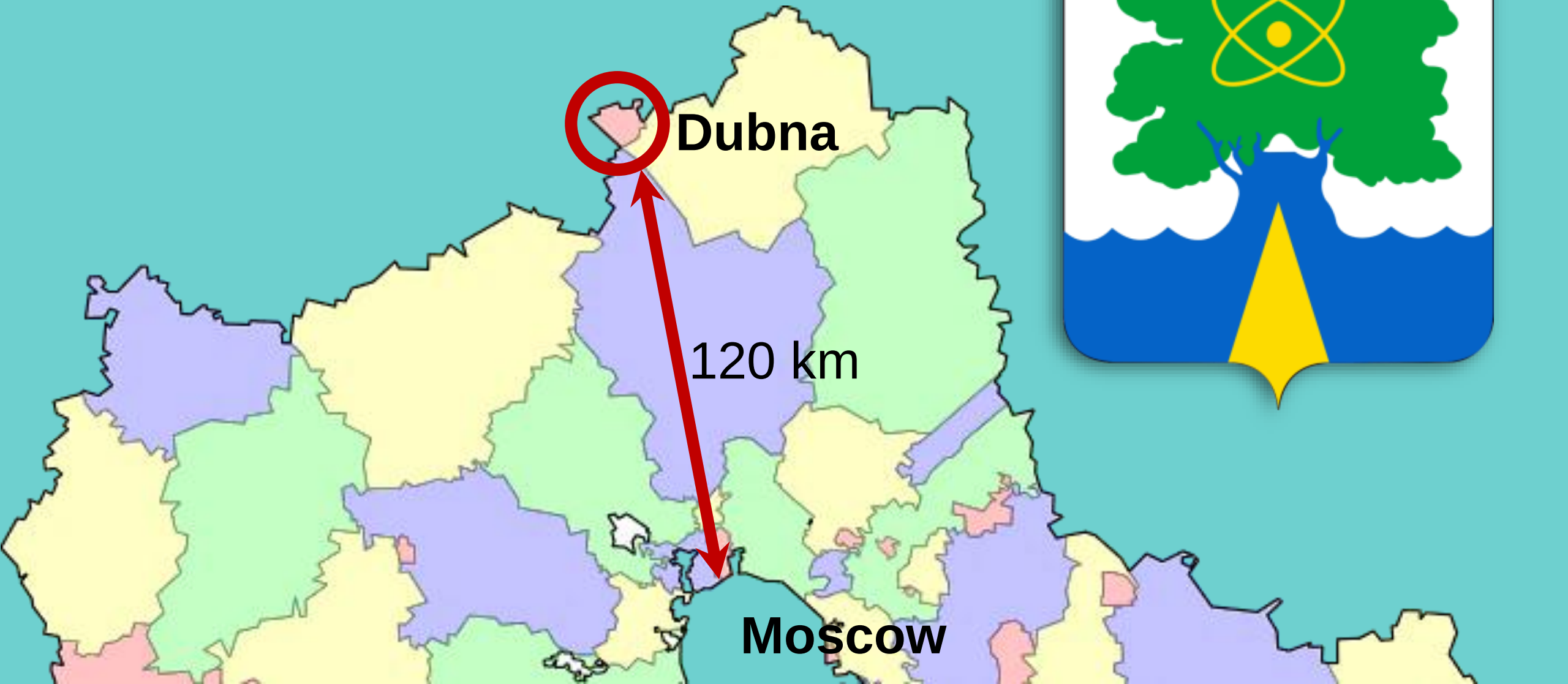
What does JINR join?

18 Member States

6 Associate members

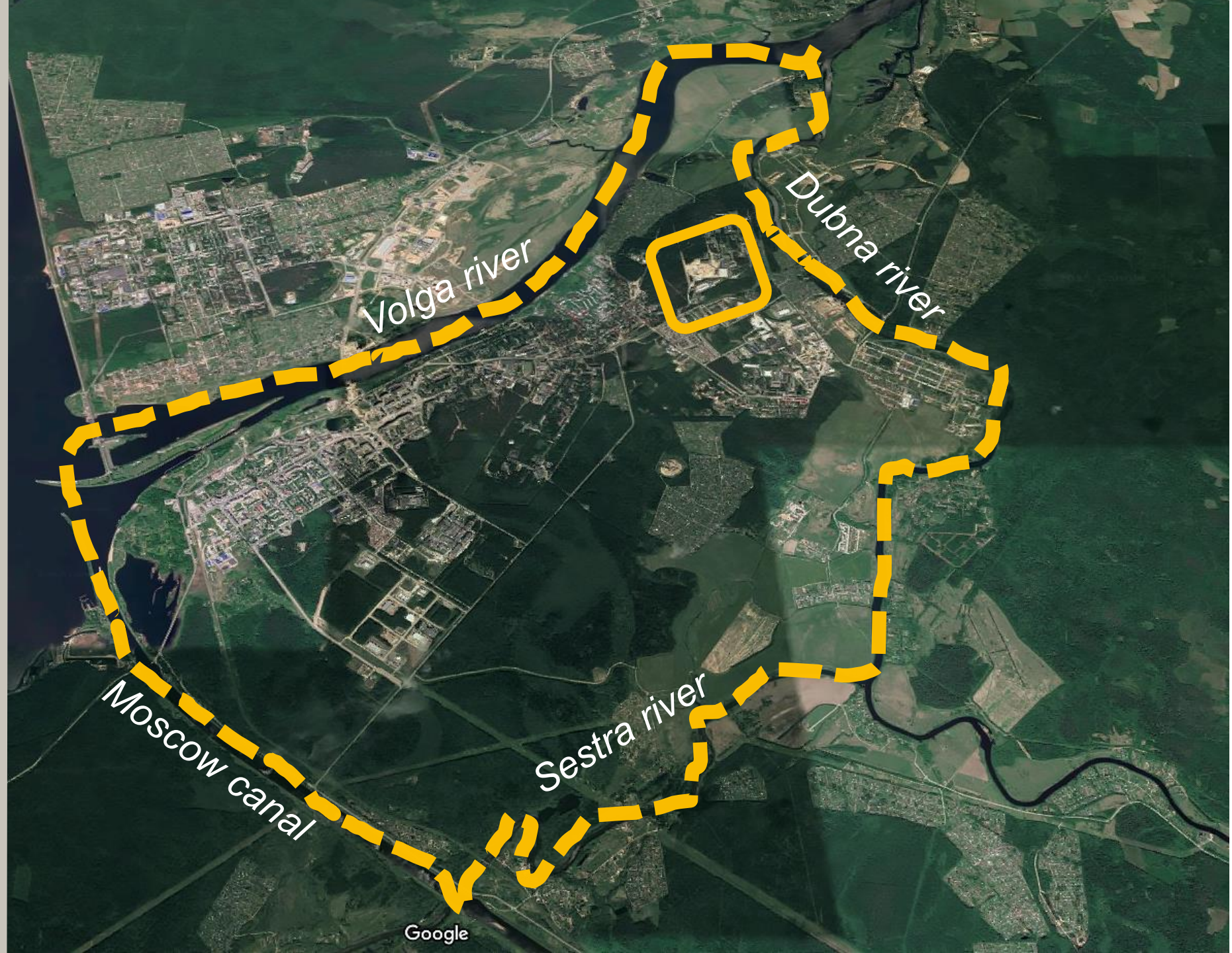
Science brings nations together

Science City Dubna



Dubna

island
of stability



Dubna

island
of stability

NICA construction site

Dubna

city with a special academic atmosphere

JINR

Dubna State University

Special Economic Zone

Dubna

The only city in Russia after which the chemical element is named !

*the name Moscovium refers to the Moscow region, where the Joint Institute for Nuclear Research is located

What does JINR join?

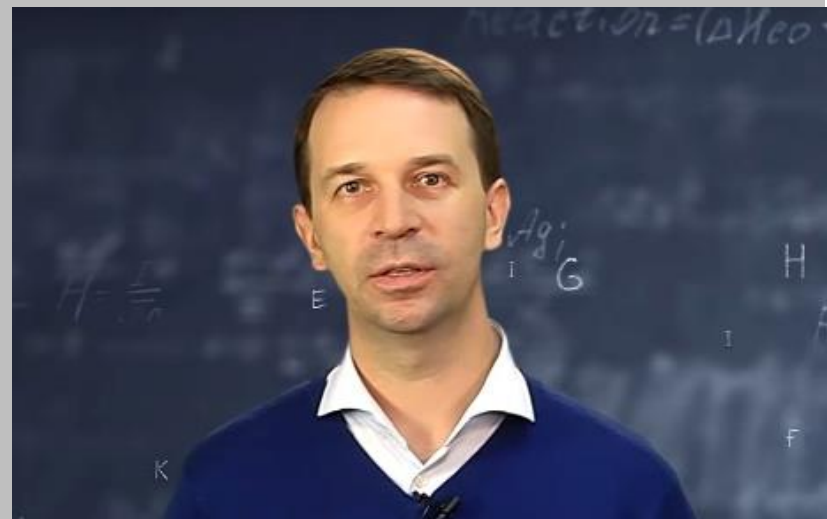
over 5300 staff members

1200 researchers

~1000 Candidates of science (PhD's) and Doctors of science (Habilitation)

>2000 engineers and technicians

World-famous experts and young scientists



What does JINR join?

unique research facilities

NICA

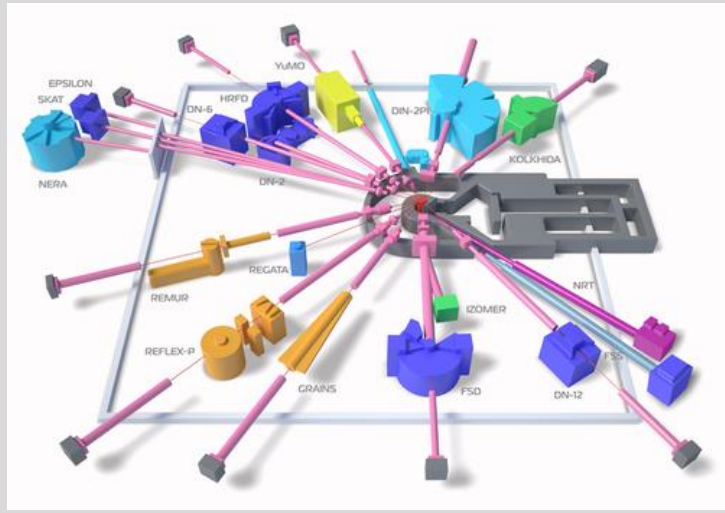
Accelerating complex with a collider

SHE Factory

Synthesis of superheavy chemical elements

Baikal

Deep underwater neutrino telescope

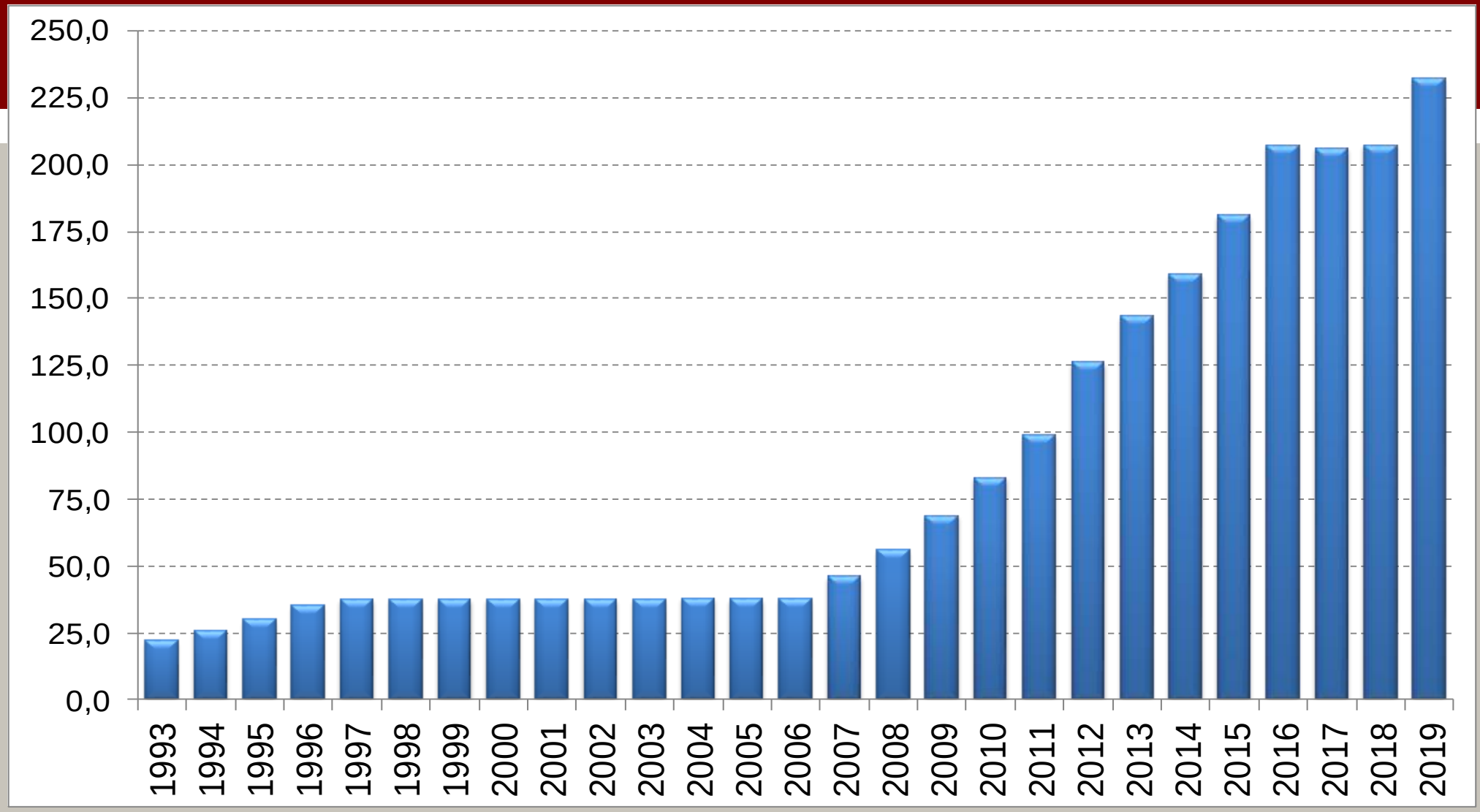


IBR-2

Pulsed reactor

and more…

JINR Budget, M$



JINR government bodies

Plenipotentiary Committee

Scientific Council

- PAC* for Particle Physics
- PAC for Nuclear Physics
- PAC for Condensed Matter Physics

Directorate

- Science and Technology Council
- 7 Laboratories
- University Centre
- Administration

Financial Committee

* – Programme Advisory Committee

What does JINR join?

- fundamental and applied research
- international collaborations
- training programmes

What does JINR join?

7 laboratories

- Veksler and Baldin Laboratory of High Energy Physics
- Dzhelepov Laboratory of Nuclear Problems
- Bogoliubov Laboratory of Theoretical Physics
- Frank Laboratory of Neutron Physics
- Flerov Laboratory of Nuclear Reactions
- Laboratory of Information Technologies
- Laboratory of Radiation Biology

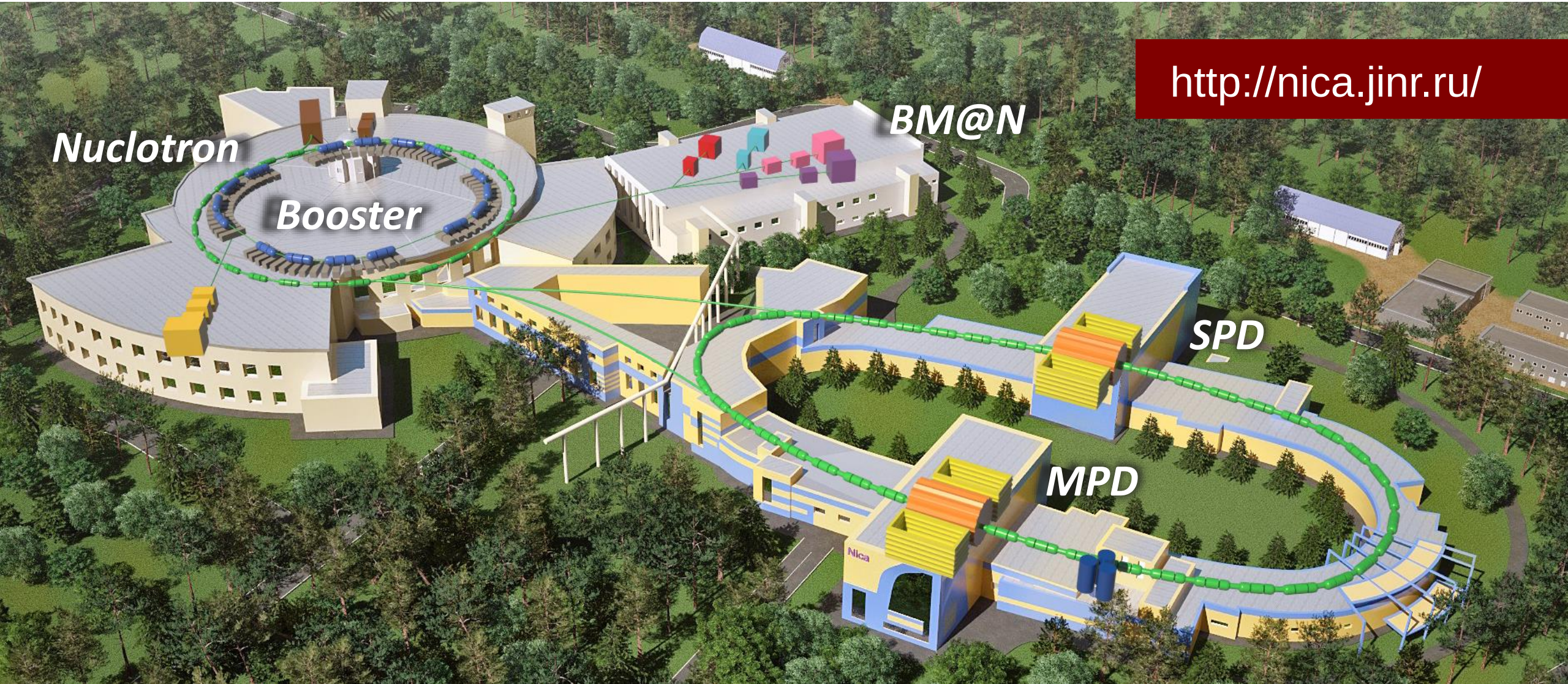
and JINR University Centre !



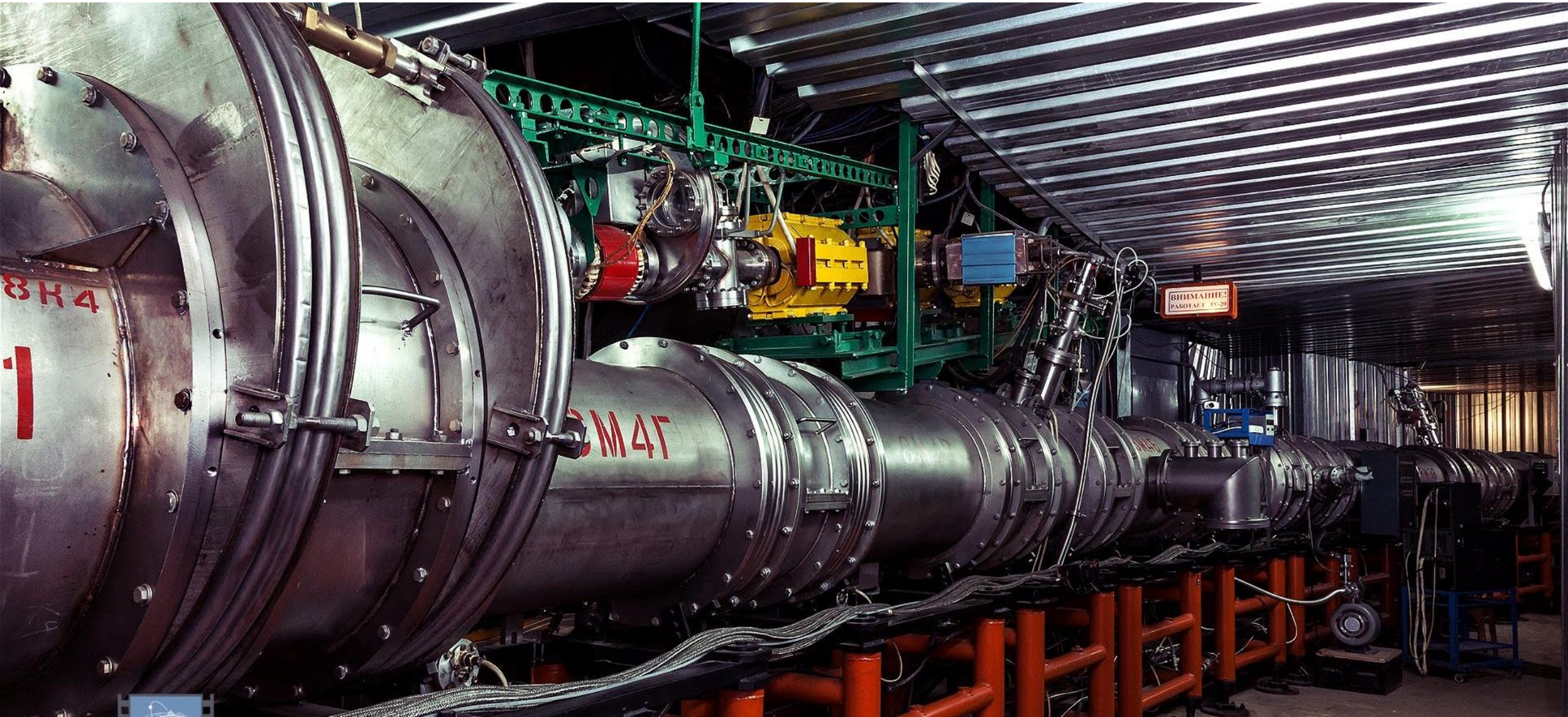

Veksler and Baldin Laboratory
of High Energy Physics

Nuclotron-based Ion Collider Facility

Mega science project at JINR



Nuclotron Superconducting accelerator



Synchrophasotron

First high-energy proton accelerator in USSR

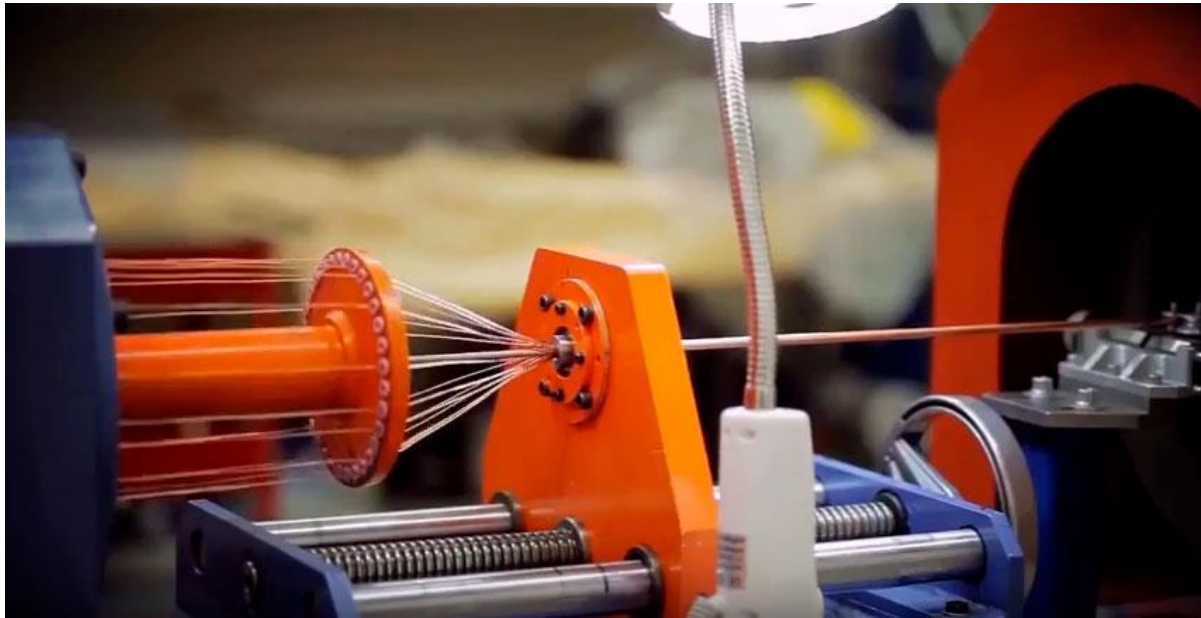
1957-2002 Facility in operation

November 20, 2020

The **NICA Booster** was launched

Superconducting magnets assembly hall

Assembling and testing of superconducting magnets for NICA & FAIR



Dzhelepov Laboratory of Nuclear Problems

Baikal neutrino telescope

Depth – 1366 m

Distance from the coast – 3.6 km,

55 km from Irkutsk

Well-developed infrastructure (railway, power lines)

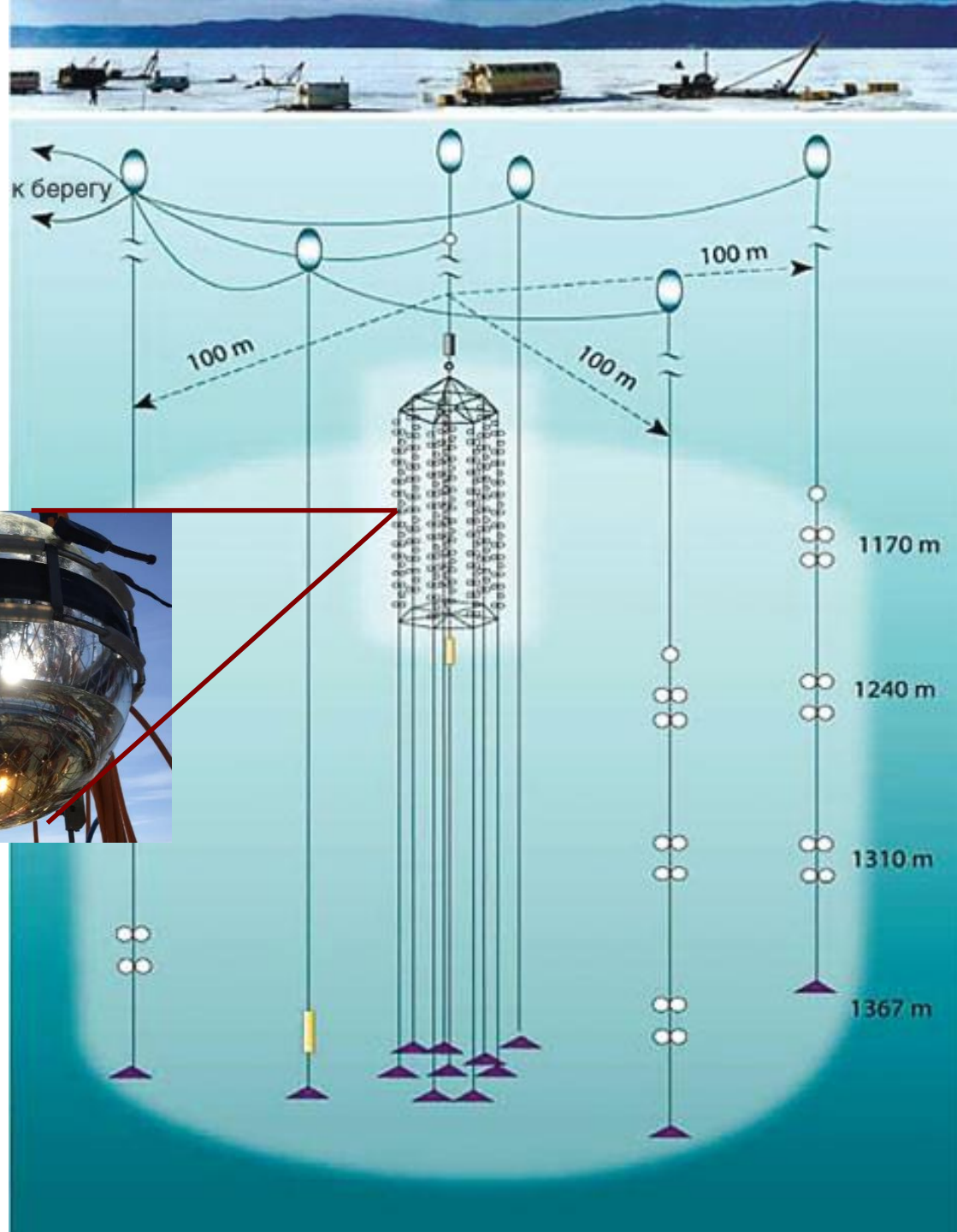
Fresh water

No bioluminescence of a flare type

Strong ice in winter time (5 months)

The "Dubna" cluster started collecting data in 2016.

In 2019 2 new clusters were installed



Neutrino experiments at Kalinin NPP

(Tver region, 285 km from Dubna)

GEMMA (completed)
neutrino magnetic moment

DANSS (ongoing)
reactor monitoring and search for sterile neutrino oscillations

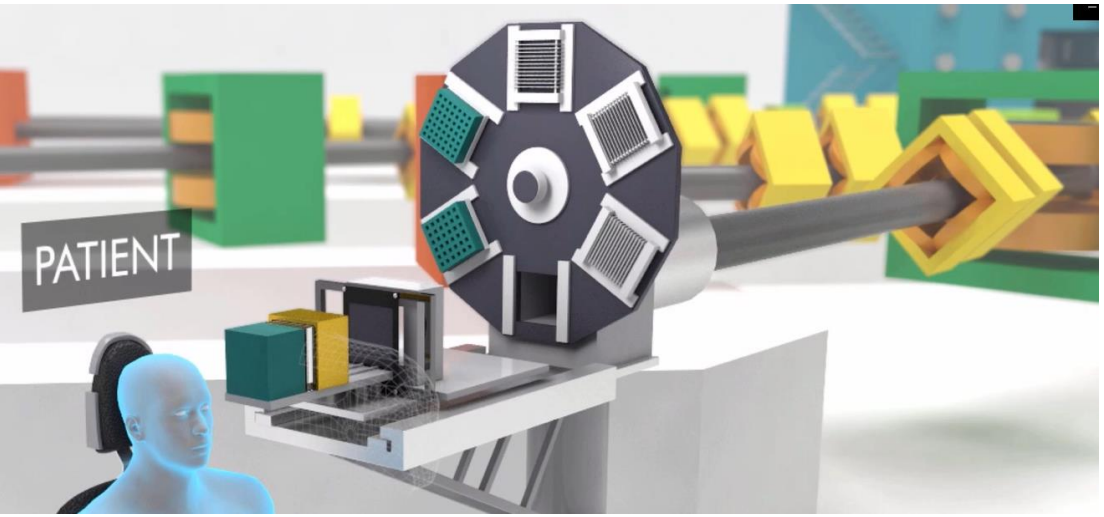
ν GeN (in preparation)
coherent ν -Ge scattering

Production and testing of photomultipliers for neutrino experiments

Phasotron

Launched in **1949**

Still in operation



Today the **Phasotron**
is used for medical purposes
to irradiate cancer tumours

Frank Laboratory
of Neutron Physics

FLNP

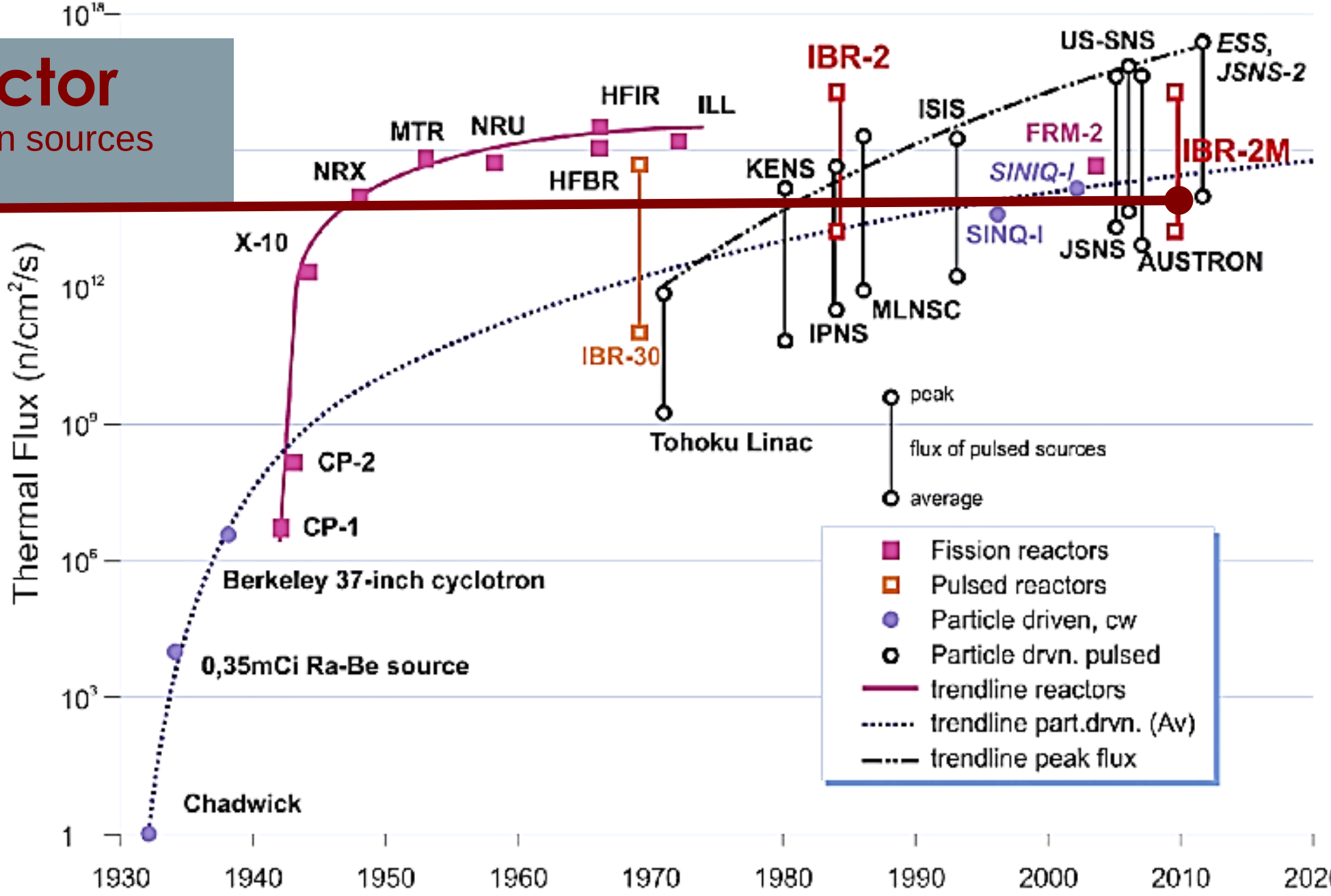
IBR-2 reactor

The most powerful
pulsed neutron source
in the world

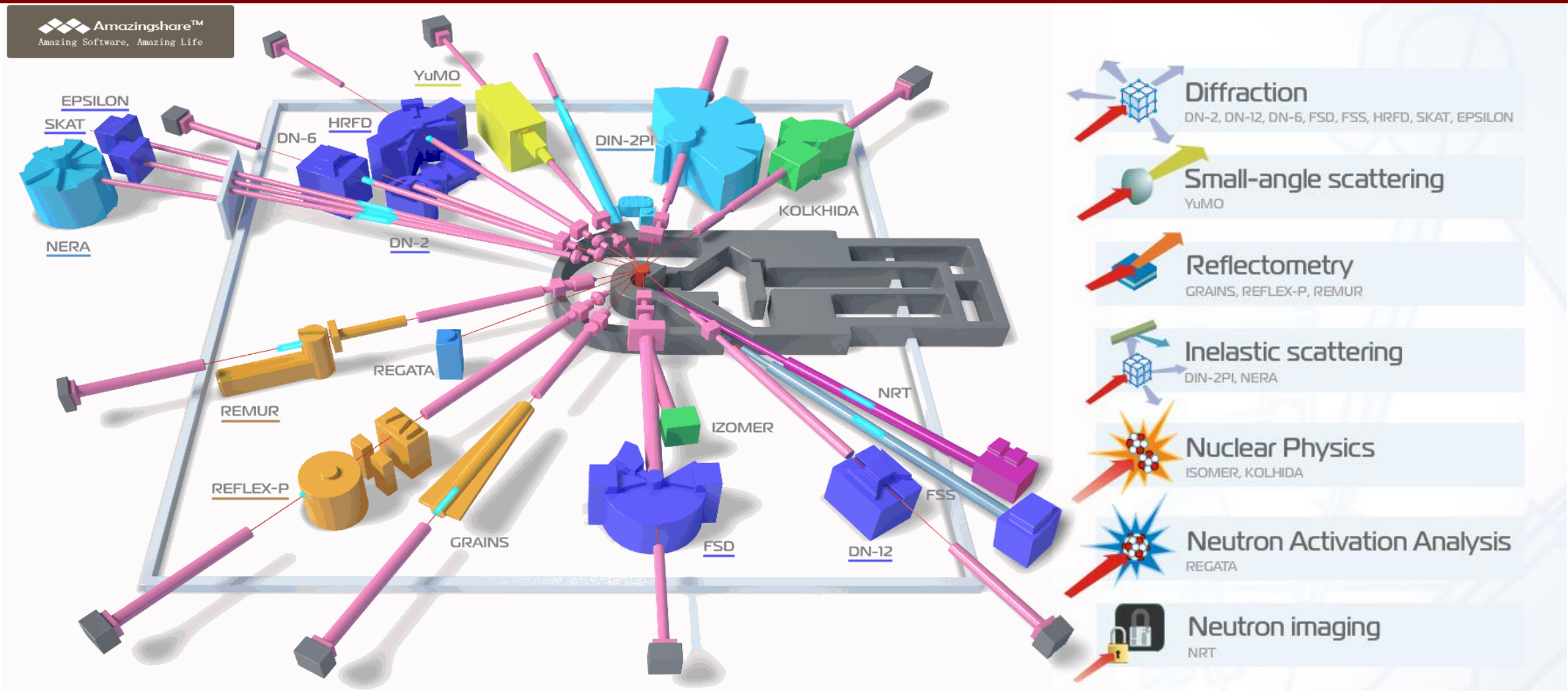
Mean power: 2 MW
Pulse frequency: 5 Hz
Pulse width for fast neutrons: 200 μs
Thermal neutrons flux density
on the moderator
Surface: 1013n/cm^2 /s
Maximum in pulse: 1016 n/cm^2 /s

IBR-2 reactor

among the neutron sources
in the world



IBR-2 reactor **spectrometers**



A world-friendly User Programme

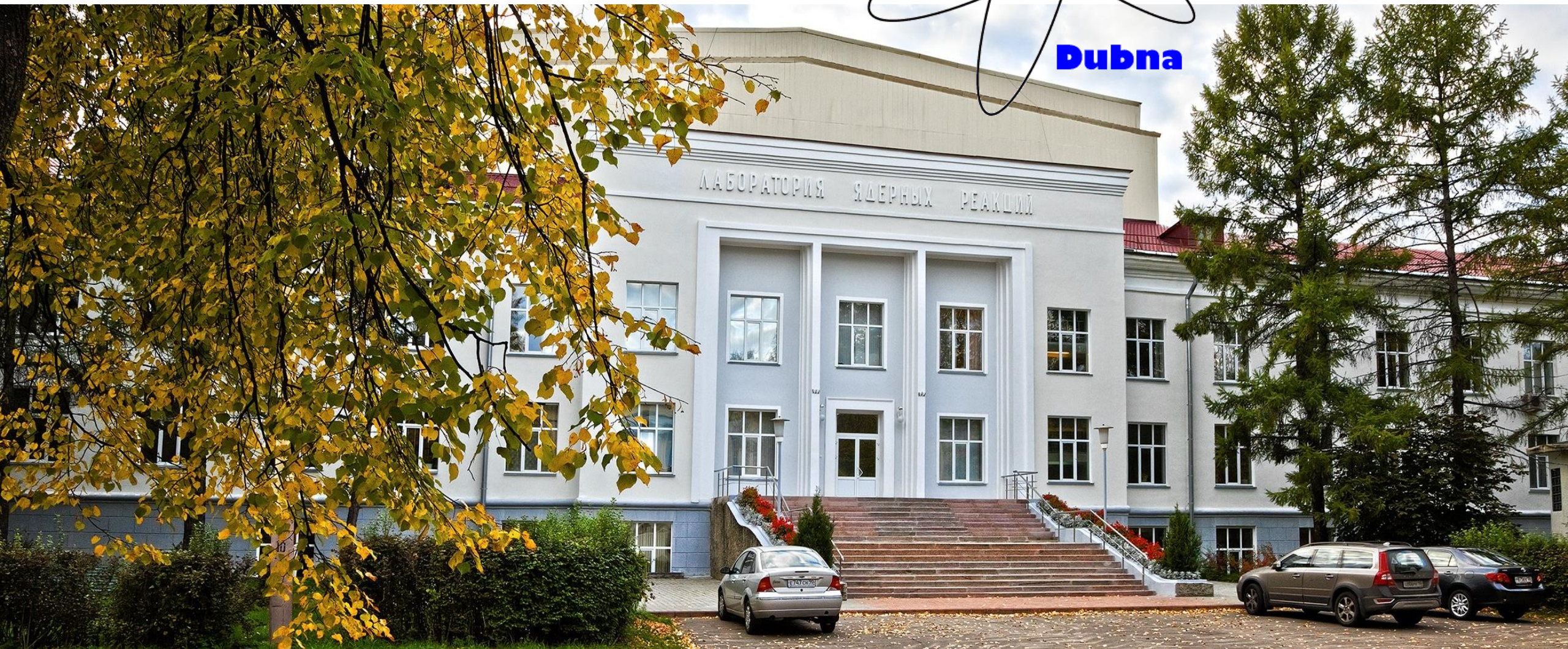
Flerov Laboratory of Nuclear Reactions

JINR

114 Flerovium

FLNR

Dubna



Synthesis of super heavy elements in Dubna

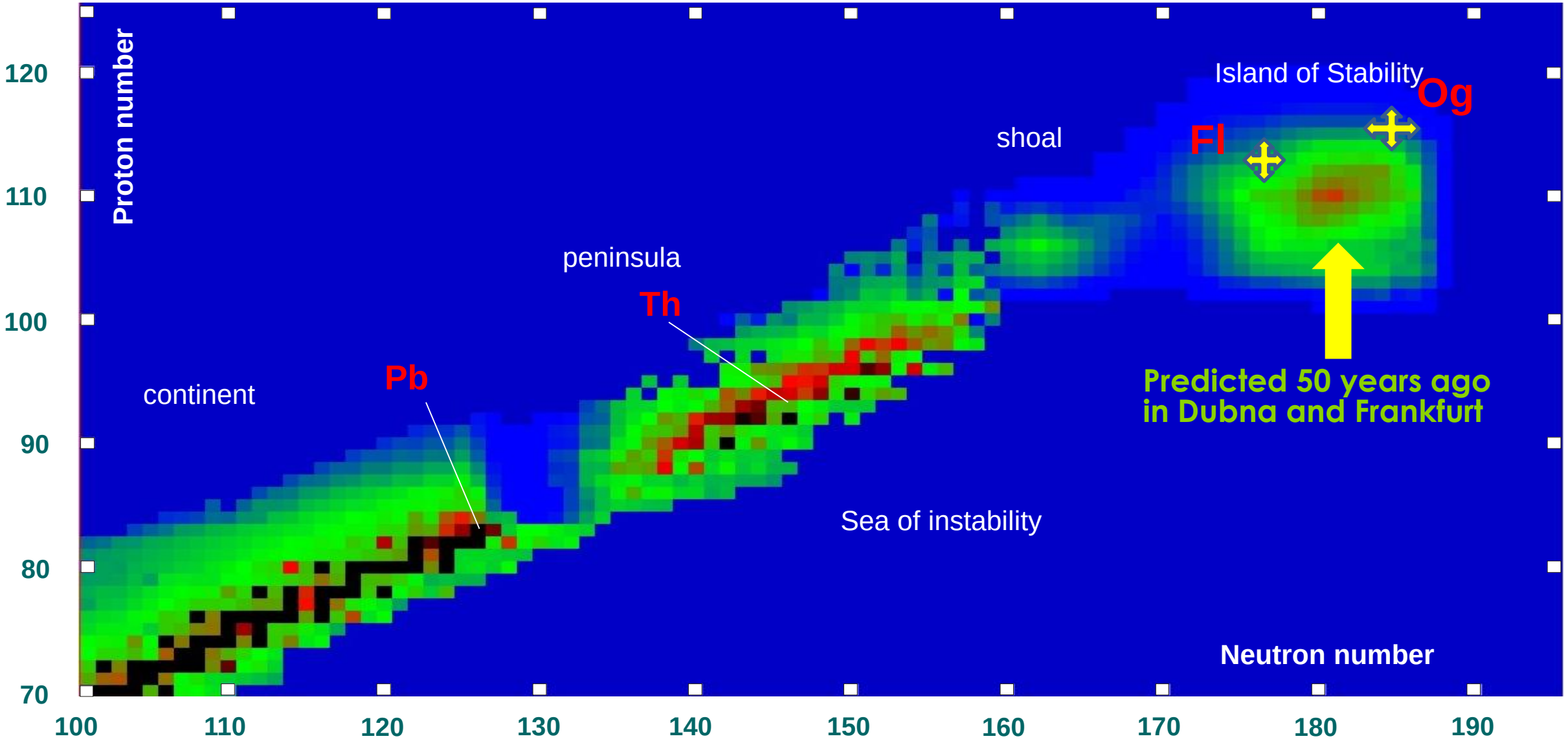
1964 – 1975 – ***102***, ***103***, ***104***, ***105*** *(Dubnium)*, ***106***, ***108***
2000 – ***114*** *(Flerovium)*,
2002 – ***116*** *(Livermorium)*,
2003 – ***113*** *(Nihonium)*, ***115*** *(Moscovium)*, ***118*** *(Oganesson)*,
2009 – ***117*** *(Tennessine)*

G.N. Flerov

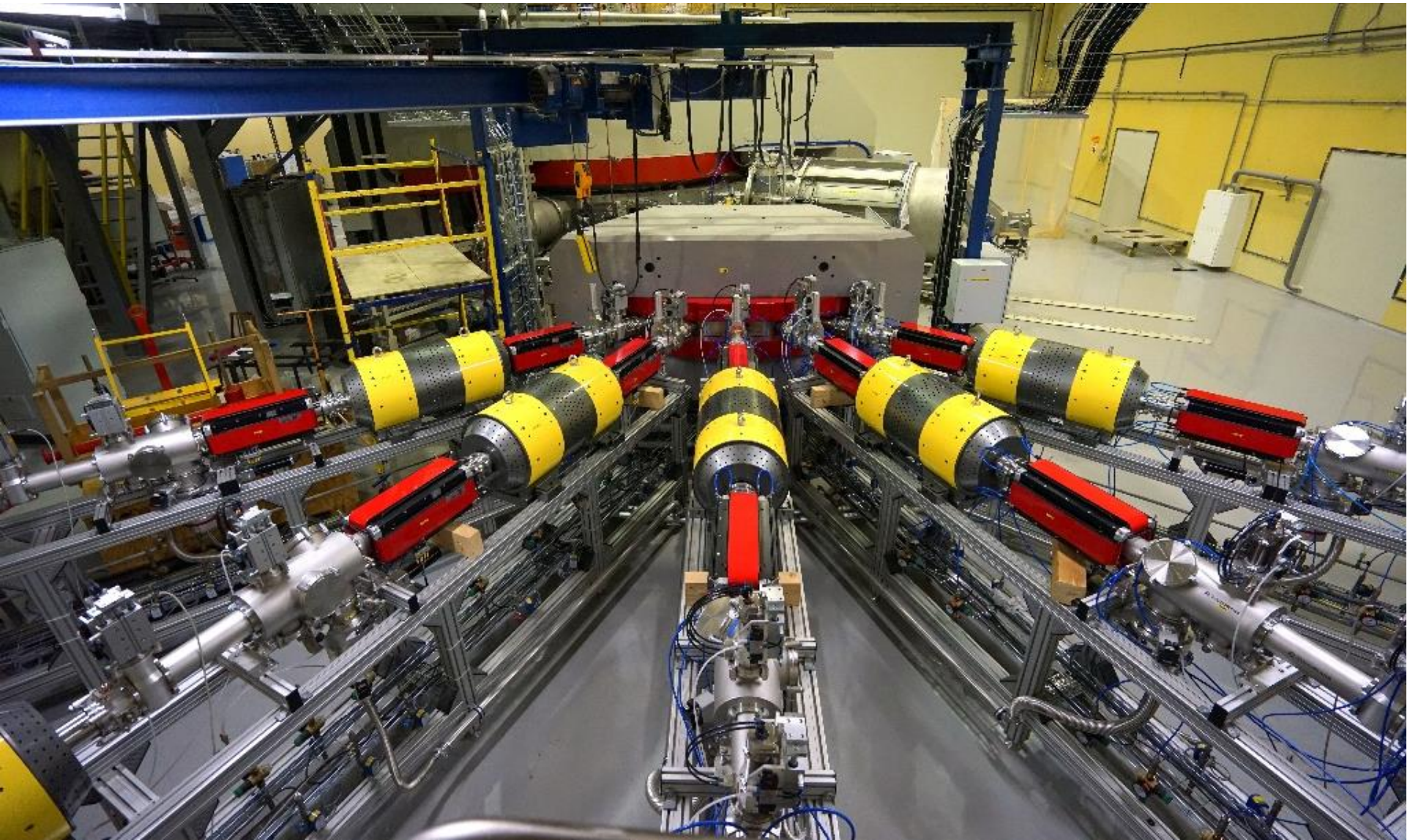
Yu. Ts. Oganiessian

11 of **18** elements
discovered in
the last 60 years were
first synthesised in Dubna

Search for the **Island of Stability**



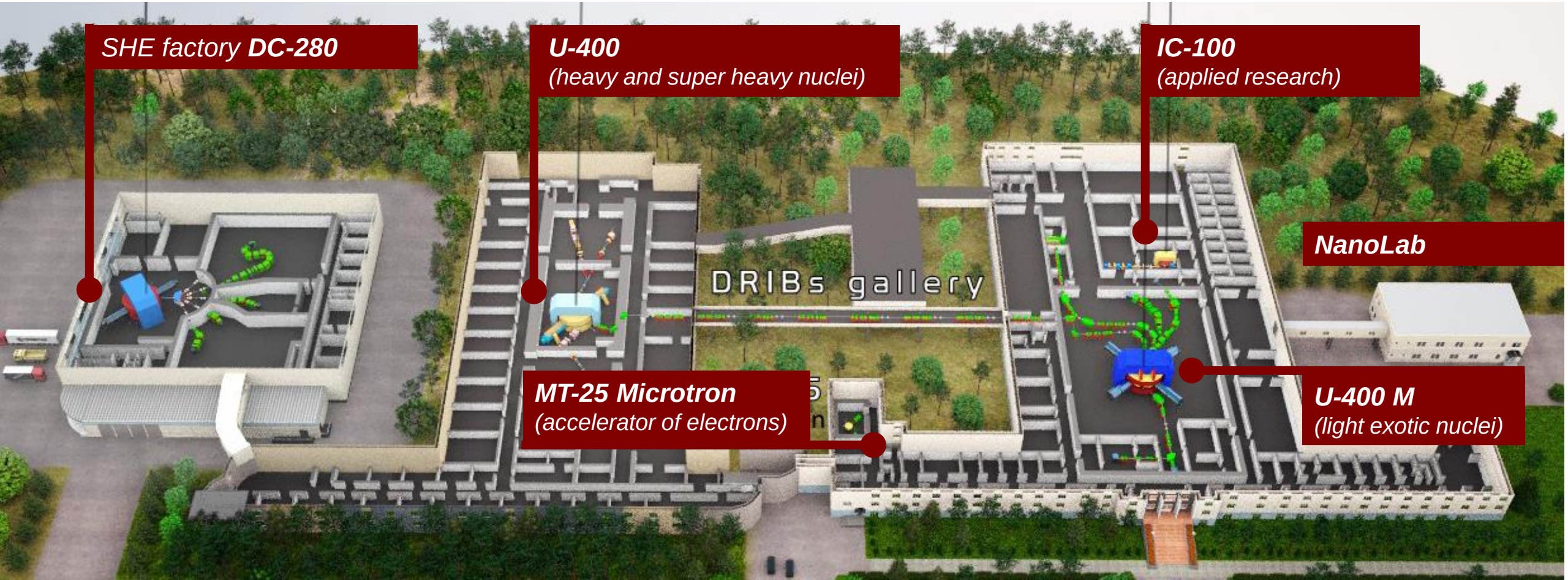
Superheavy Elements Factory



25 March 2019
Opening ceremony of the SHE Factory

Specialized high-current cyclotron **DC280**

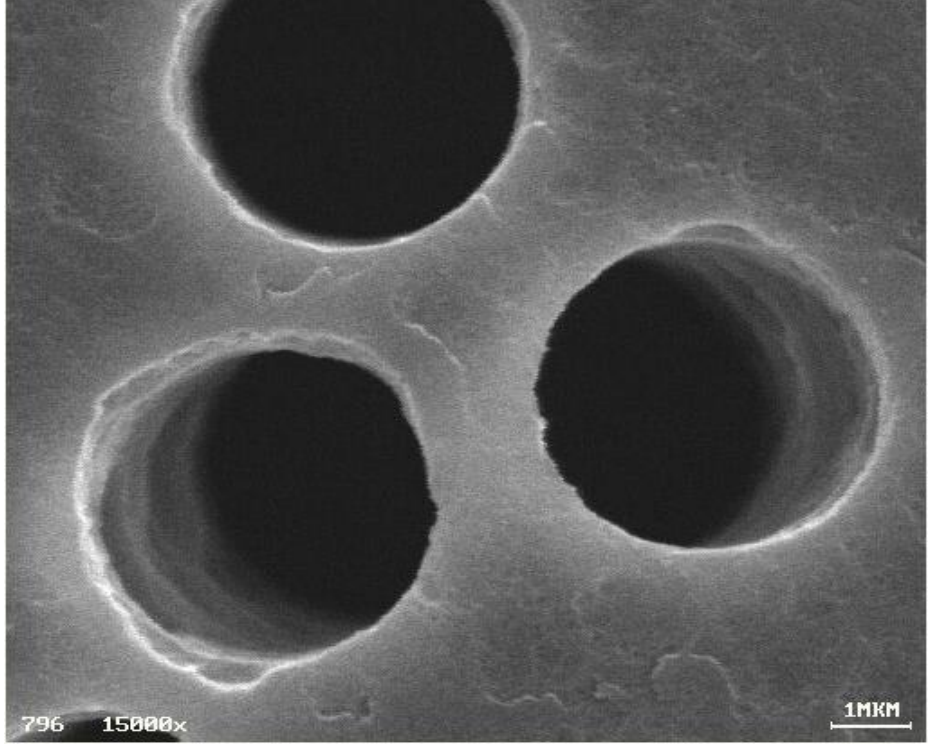
FLNR accelerators



Applied research at FLNR

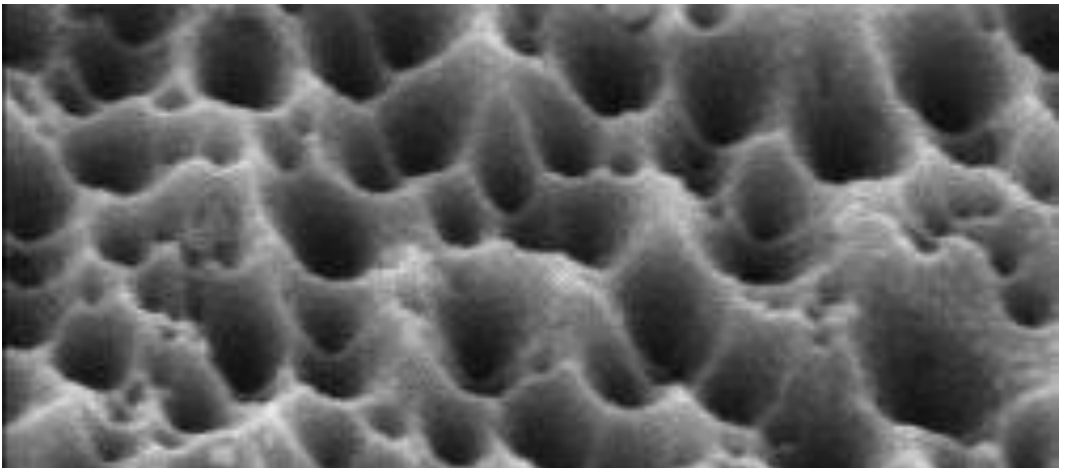
Production of track membranes with precise shape of pores

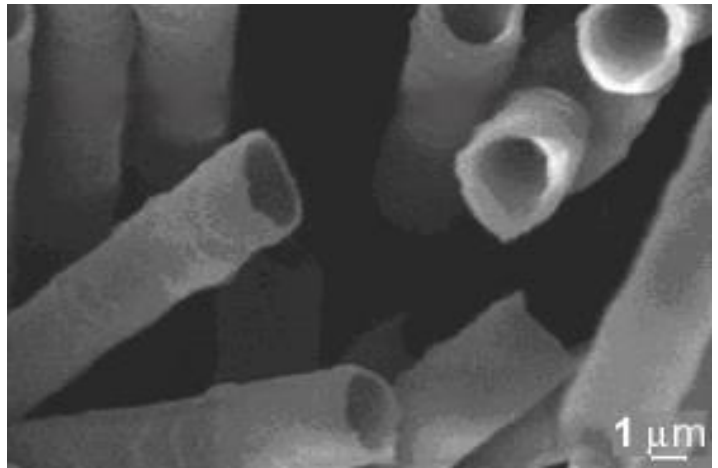
- Purification of pharmaceuticals
- Water filters
- Plasmapheresis
- Molecule sensors

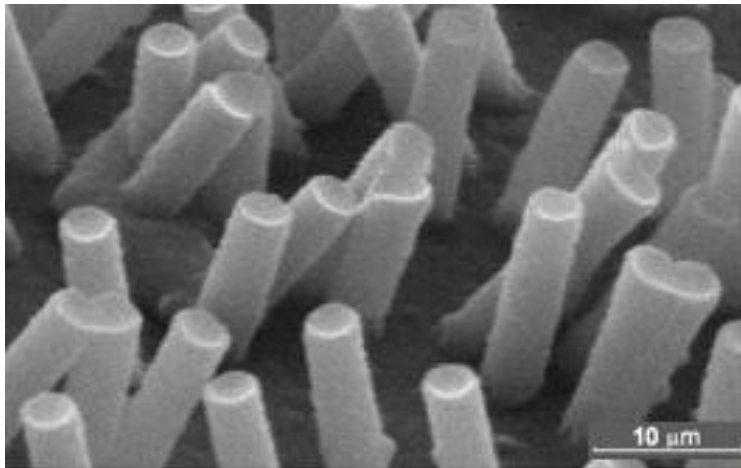


New composite materials

Surface modification, flexible printed board, nanotubes, nanowires



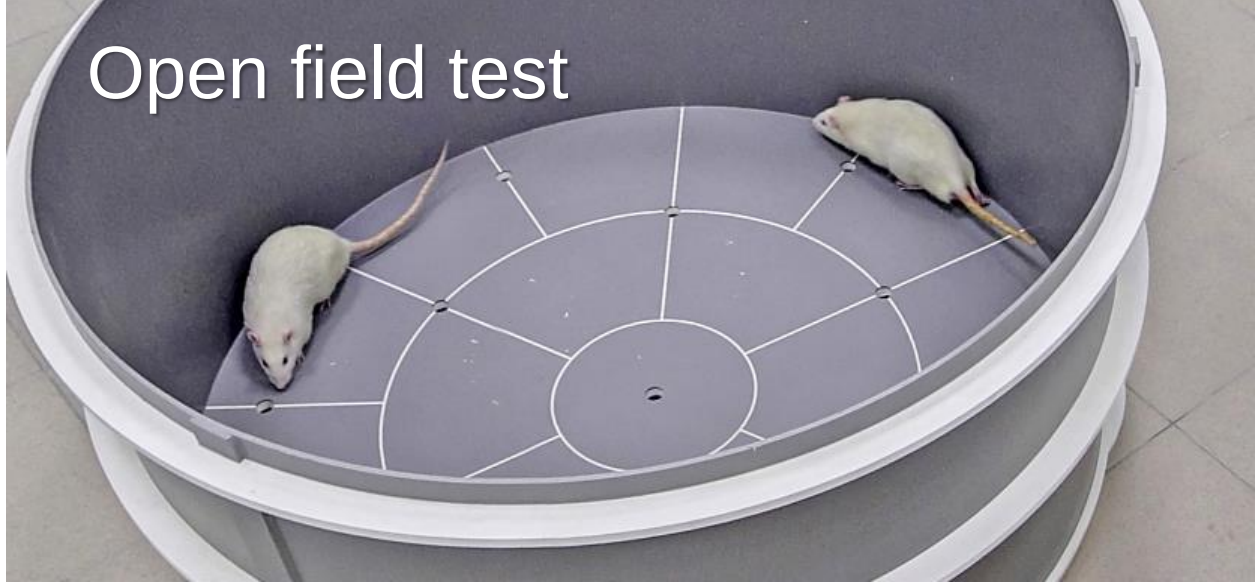




Laboratory of Radiation Biology

- Radiation genetics and radiobiology
- Radiation physiology and neurochemistry
- Mathematical modeling of biophysical systems
- Astrobiology
- Radiation protection physics and radiation research at the Institute facilities

Behavioral room at LRB



Laboratory
of Information Technologies

Multifunctional Information and Computing Complex

Presentation of the new **Supercomputer**

- GRID infrastructure, Tier1 and Tier2 levels
- Multipurpose computer cluster
- Cloud technologies
- Network infrastructure
- Heterogeneous computer cluster HybriLIT + supercomputer GOVORUN
- Off-line cluster and storage system for BM@N, MPD,
- SPD Storage and computing facilities for local users
- Educational and research infrastructure for distributed and parallel computing

From HybriLIT cluster to Supercomputer GOVORUN

2017

Total peak performance:
140 TFlops for single precision;
50 TFlops for double precision

2018

Total peak performance:
1000 TFlops for single precision;
500 TFlops for double precision

GOVORUN
is a joint project of the **Bogoliubov Laboratory of Theoretical Physics** & the **Laboratory of Information Technologies**

Complex theoretical and experimental studies, including the NICA complex

Bogoliubov Laboratory of Theoretical Physics

World leading centre of Theoretical Physics

Multidisciplinary research:

- Theory of Fundamental Interactions
- Theory of Nuclear Structure and Nuclear Reactions
- Theory of Condensed Matter
- Modern Mathematical Physics: Strings and Gravity, Supersymmetry, Integrability
- Research and Educational Project “Dubna International Advanced School of Theoretical Physics”

Science brings nations together

Welcome to our international scientific community!

THANK YOU

for your attention