

**INTERNATIONAL INTERGOVERNMENTAL ORGANIZATION  
МЕЖДУНАРОДНАЯ МЕЖПРАВИТЕЛЬСТВЕННАЯ ОРГАНИЗАЦИЯ  
JOINT INSTITUTE FOR NUCLEAR RESEARCH  
ОБЪЕДИНЕННЫЙ ИНСТИТУТ ЯДЕРНЫХ ИССЛЕДОВАНИЙ**



[www.jinr.ru](http://www.jinr.ru)

**THE JOINT INSTITUTE FOR NUCLEAR RESEARCH**  
**Short introduction**  
*D. Kamanin, JINR*

2<sup>nd</sup> training programme “JINR Expertise for Member States and Partner Countries”  
JINR Visit Center 19/06/2017

# 60 years: Mission of JINR

Science  
Bringing  
Nations  
Together



## 5 Major Pillars:

### □ Research

Basic studies at the frontiers of knowledge

### □ International cooperation

Combining world intellect and material resources

### □ Innovation

Multi-disciplinary studies

New instruments and technologies

### □ Education

Training students, young scientists and engineers

### □ Outreach

Promoting science in society worldwide

Basic  
Research

International cooperation

Innovations

Education

Outreach

# Establishment of the Joint Institute for Nuclear Research

The Joint Institute for Nuclear Research (JINR) is an international intergovernmental scientific research organization established through the Convention signed on 26 March 1956 in Moscow to unite scientific and material potential of its member states in order to study fundamental properties of matter



Albania



Bulgaria



China



Czechoslovakia



GDR



Hungary



D.P.R.Korea



Mongolia



Poland



Romania



USSR

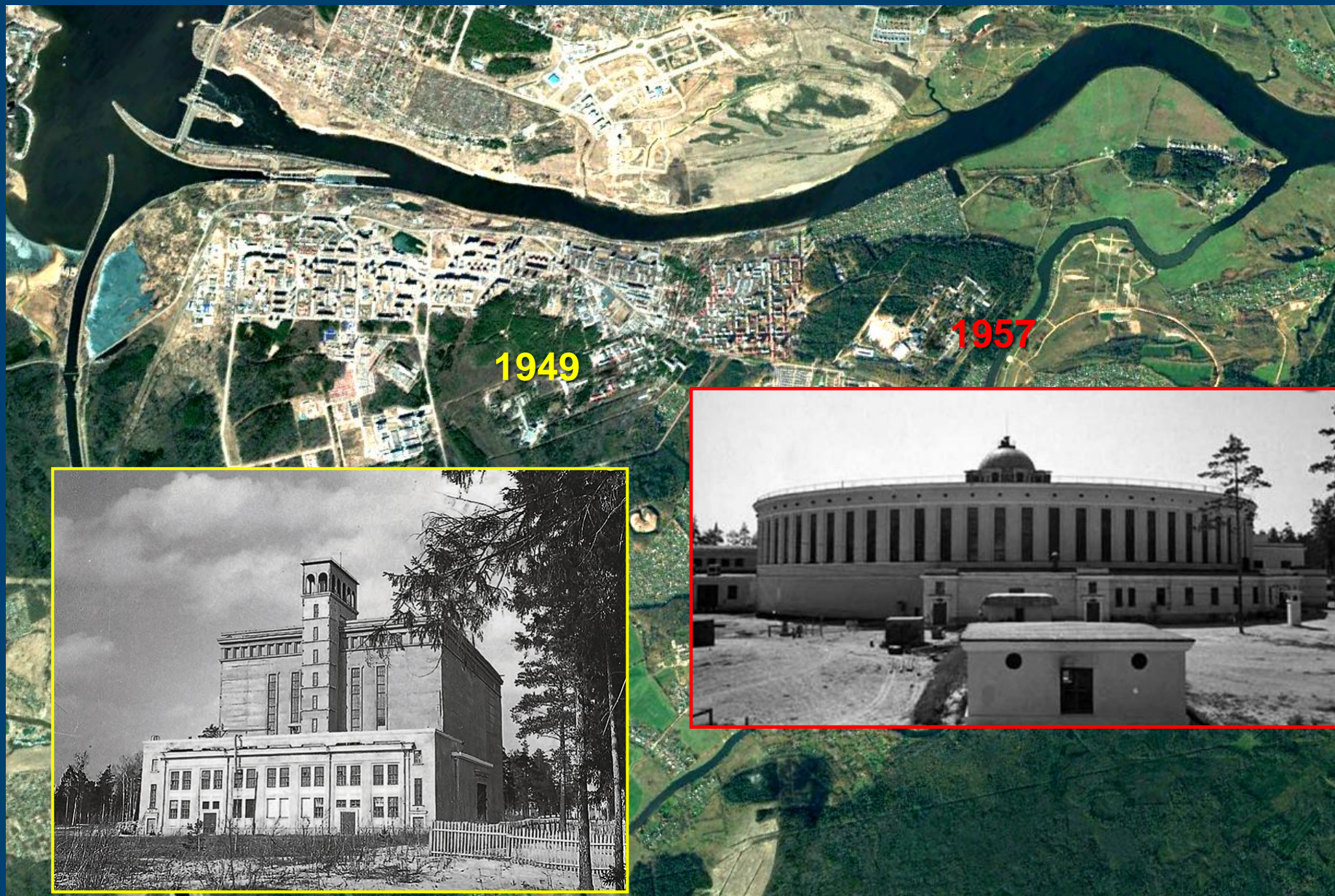


Vietnam

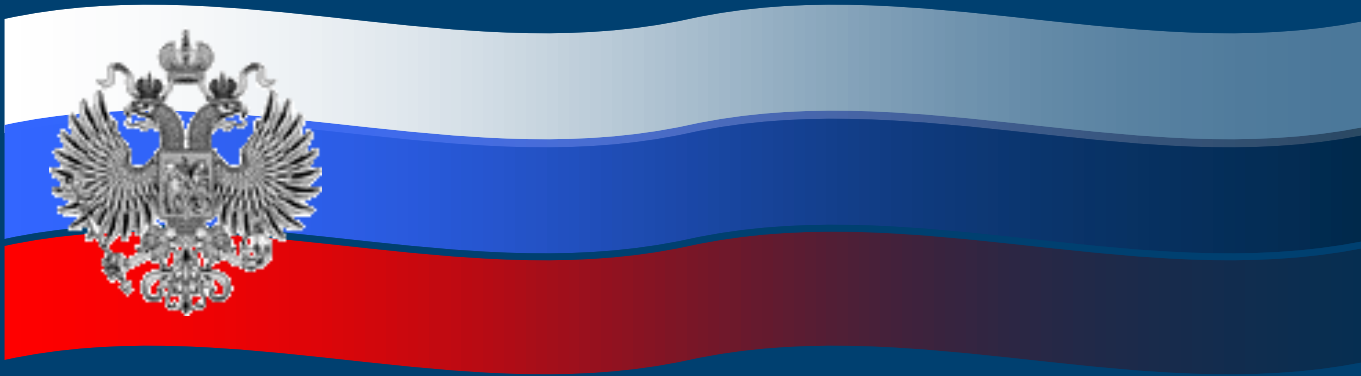


The results of research carried out at the Institute can be used solely for peaceful purposes for the benefit of mankind.

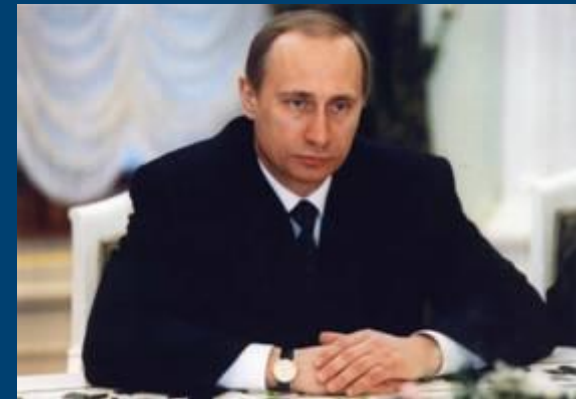
# Dubna – Island of Stability



# JINR – Russia Agreement



A very important for JINR Russian Federal law was signed by President V.Putin in 2000. This is ***“The Agreement between the Government of the Russian Federation and JINR on the Location and Terms of Activity of JINR in the Russian Federation”***. This Agreement grants privileges and immunities in accordance with established practice for international intergovernmental organizations.



# JINR has at present 18 Member States



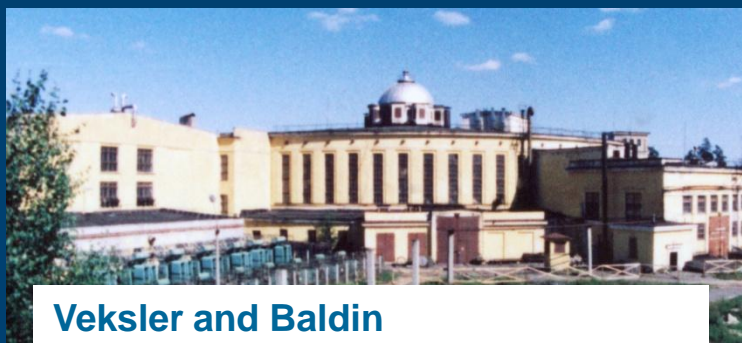
Armenia  
Azerbaijan  
Belarus  
Bulgaria  
Cuba  
Czech Republic  
Georgia  
Kazakhstan  
D. P. Republic of Korea  
Moldova  
Mongolia  
Poland  
Romania  
Russian Federation  
Slovakia  
Ukraine  
Uzbekistan  
Vietnam

Participation of **Egypt**, **Germany**, **Hungary**, **Italy**, **Republic of South Africa**, **Serbia** in JINR activities is based on bilateral agreements signed on the governmental level.

# JINR comprises 7 Laboratories, each being comparable with a large institute in the scale and scope of investigations performed



**Dzhelepov  
Laboratory of Nuclear Problems**



**Veksler and Baldin  
Laboratory of High Energy Physics**



**Bogoliubov  
Laboratory of Theoretical Physics**



**Flerov  
Laboratory of Nuclear Reactions**



**Frank Laboratory of Neutron Physics**



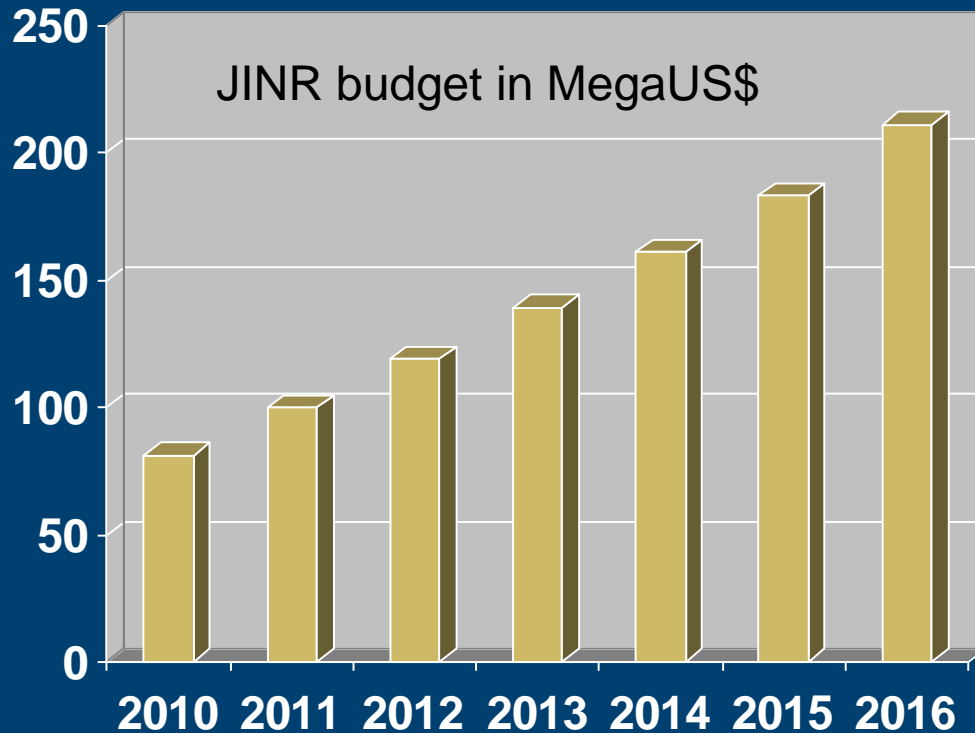
**Laboratory of Radiation Biology**




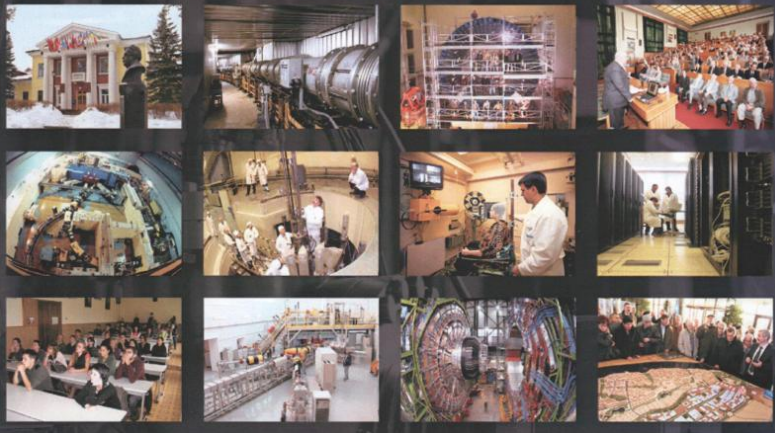
**Laboratory of  
Information Technologies**

# JINR in some figures

- ▣ JINR's staff members ~ 4500
- ▣ **researchers ~ 1200**  
**including from the Member States**  
**(but Russia) ~ 400**
- ▣ **Doctors and PhD ~ 1000**



 **JOINT INSTITUTE FOR NUCLEAR RESEARCH**



**SEVEN-YEAR PLAN  
FOR THE DEVELOPMENT OF JINR  
2010–2016**

(Approved by the Committee of Plenipotentiaries of the Governments of the JINR Member States at its session held on 19–21 November 2009)

Dubna 2009



# Cooperation with CERN

CERN is JINR's main partner in Particle Physics over more than 50 years.  
Dubna physicists are widely involved in more than  
20 CERN projects, including 3 LHC experiments & LHC itself



1963, JINR, Dubna  
CERN Director-General  
Prof. V.Weisskopf,  
Prof. V.Dzhelepov and  
Prof. B.Pontecorvo



2004, JINR Dubna  
CERN Director-General Dr R.Aymar  
meeting with  
JINR director acad. V. Kadyshovsky



1971, Dubna  
CERN Director-General Prof. W.Jentschke  
and JINR Director Prof. N.Bogoliubov

**2010:** CERN – JINR mutual participation in their projects

**2014:** CERN – JINR reciprocal Observer status



## Web of Science®

### JINR publication statistics

<b>2011 - 2015</b>	<b>2015</b>
Total number of publications: 5116 Total number of citations: 70 059 Excluding self-citations: 60 019 Average citations per article: 13.69 h-index: 91	Total number of publications: 1176 Total number of citations: 5258 Excluding self-citations: 5054 Average citations per article: 4.47 h-index: 29

### **2016: JINR in comparison with CERN**

<b>JINR</b>	<b>CERN</b>
Total number of publications: 1147 Total number of citations: 1164 Excluding self-citations: 948 Average citations per article: 1.01 h-index: 14	Total number of publications: 1186 Total number of citations: 2241 Excluding self-citations: 1829 Average citations per article: 1.89 h-index: 17

# FLNR accelerator complex





**May 2012:**

Official approval of the name *Flerovium* for element 114  
and the name *Livermorium* for element 116

**30<sup>th</sup> December 2015:**

Approval of the discovery of new elements 113, 115, 117, and 118

**I U P A C**  
International Union of Pure  
and Applied Chemistry

- element 113: RIKEN (Japan)
- elements 115 and 117: JINR (Dubna) - LLNL (USA) – ORNL (USA) collaboration
- element 118: JINR (Dubna) – LLNL collaboration.

**28<sup>th</sup> November 2016:**

IUPAC formally approved names and symbols of new elements:

**Nihonium** (Nh) for element 113,  
**Moscovium** (Mc) for element 115,  
**Tennesse** (Ts) for element 117, and  
**Oganesson** (Og) for element 118.

Флеровий 114

**Fl**

Flerovium

Московский 115

**Mc**

Moscovium

Ливерморий 116

**Lv**

Livermorium

Теннессин 117

**Ts**

Tennesse

Оганесон 118

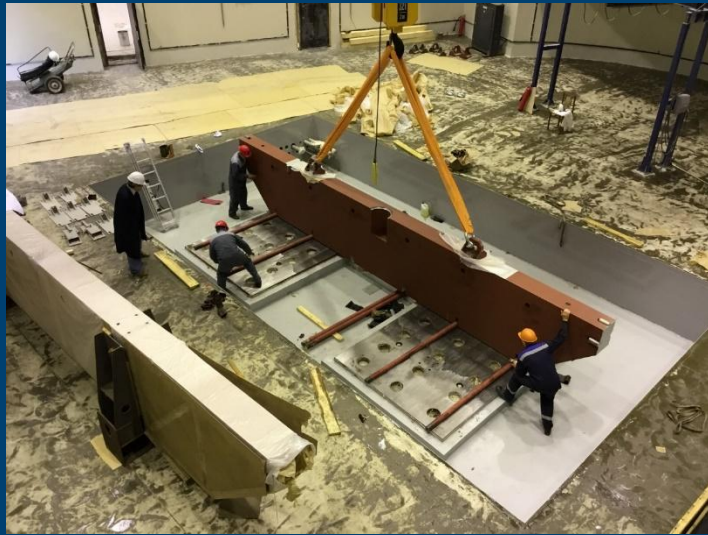
**Og**

Oganesson

**All these elements were synthesized for the first time at the U-400  
accelerator complex of the Flerov Laboratory of Nuclear Reactions of JINR.**

# DC-280 cyclotron: main magnet assembling

15 September 2016: started



18 October 2016

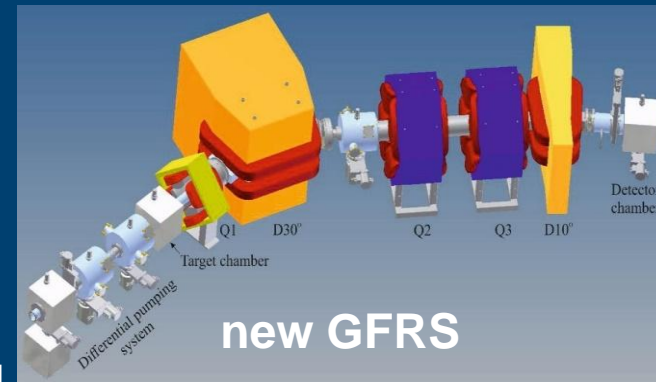


18 January 2017



**Magnet of DC280 cyclotron is assembled and ready for testing!**

# SHE Factory. Time-schedule.



- Completion of the **SHE Factory building** and its **engineering systems** (*2016 – June 2017*)
- Assembling the **DC-280 cyclotron**. Installation of new **Gas-Filled Recoil Separator**. (*September 2016 – December 2017*)
- **First experiments** (*2018*)

# Technology transfer to Member States



CYCLOTRON CENTRE IN ASTANA (KZ)  
LAUNCHED IN 2006

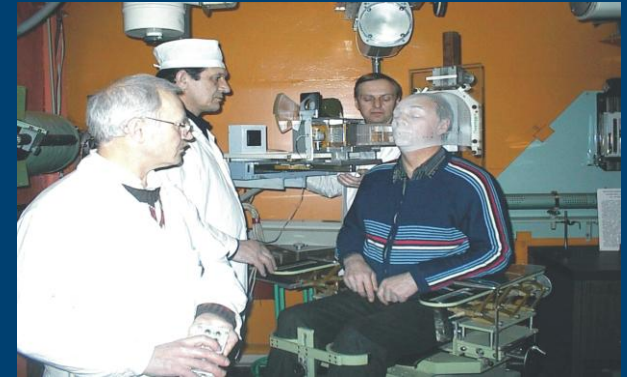


DC-60  
CYCLOTRON

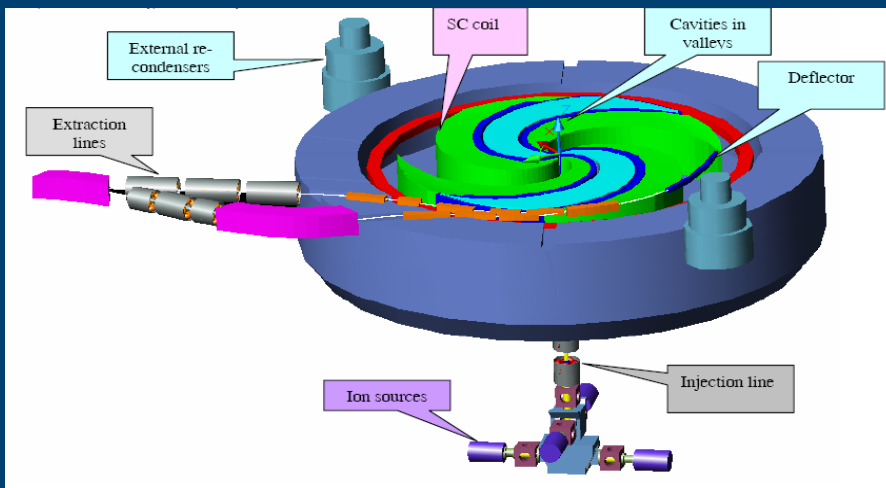
# Applied Research: proton therapy and medical accelerators development

## Proton Therapy at DLNP Phasotron

- Unique in Russia experience of application of conformal 3D therapy method
- About 100 patients per year since 2000
- Development of the project of PT Center



## C400 SC Cyclotron Project for p & C Therapy together with IBA company & ASIPP (Hefei, China)





# IBR-2: Pulsed reactor with fast neutrons

mean power **2 MW**

pulse frequency **5 Hz**

pulse width for fast neutrons **200  $\mu$ s**

thermal neutrons flux density on the moderator surface:  **$10^{13}$  n/cm<sup>2</sup>/s**

maximum in pulse:  **$10^{16}$  n/cm<sup>2</sup>/s**

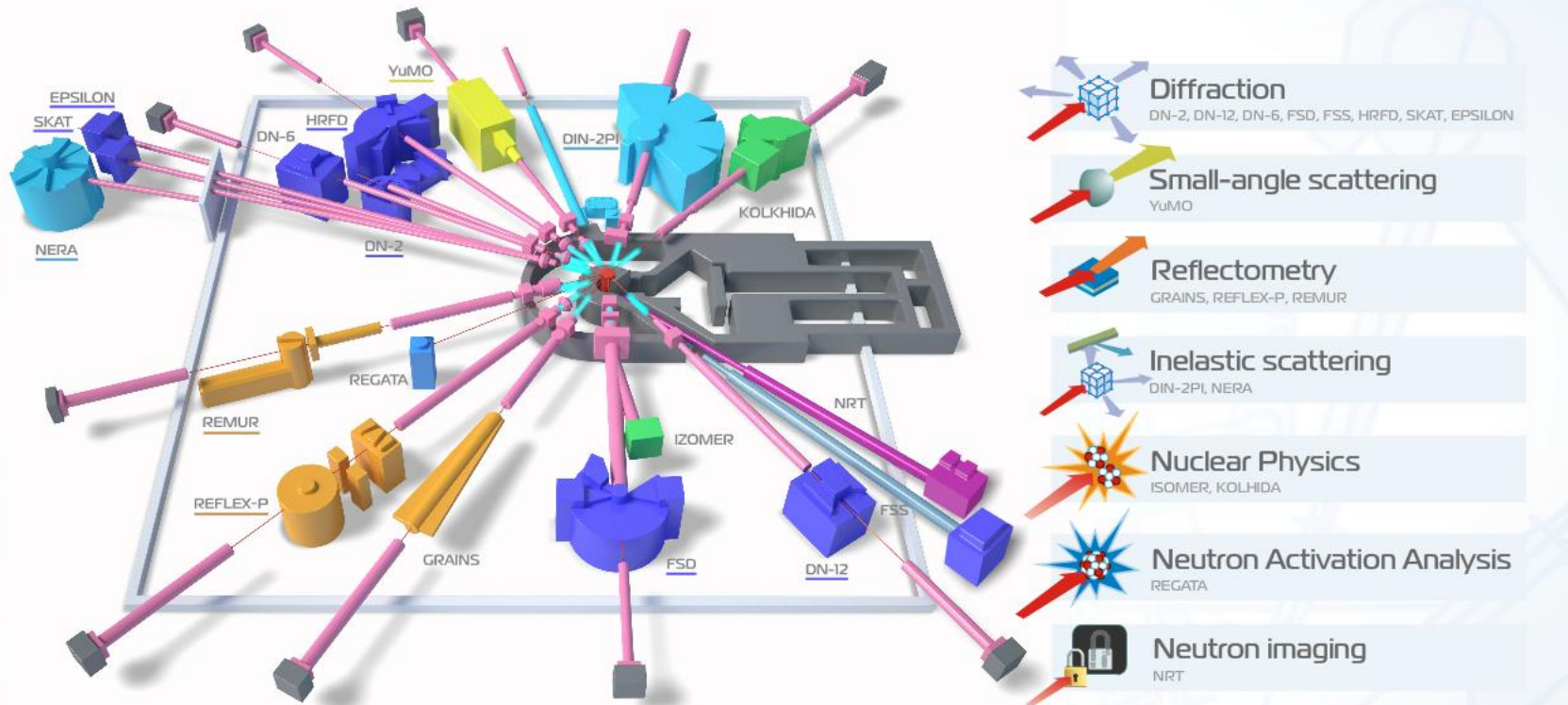


IBR-2 is included in the 20-year European strategic research program in the field of neutron scattering



# Facilities at IBR-2 reactor

15 instruments are in operation at the Spectrometer Complex of the IBR-2M Reactor



The user policy of the IBR-2 is world friendly.  
197 proposals from 19 countries were selected in 2015.

# Assembling of the First Cluster of the GVD at the Baikal lake, Start at March 2015

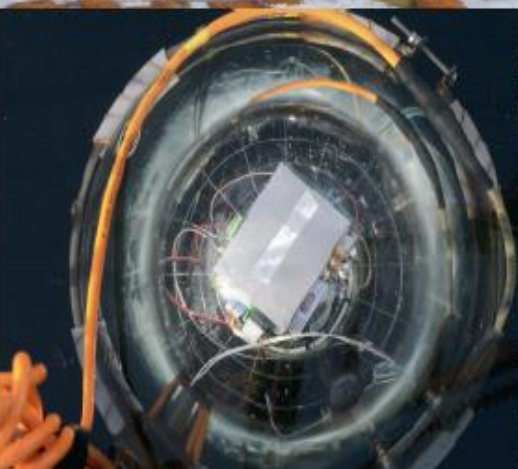


Бруно Понтекорво

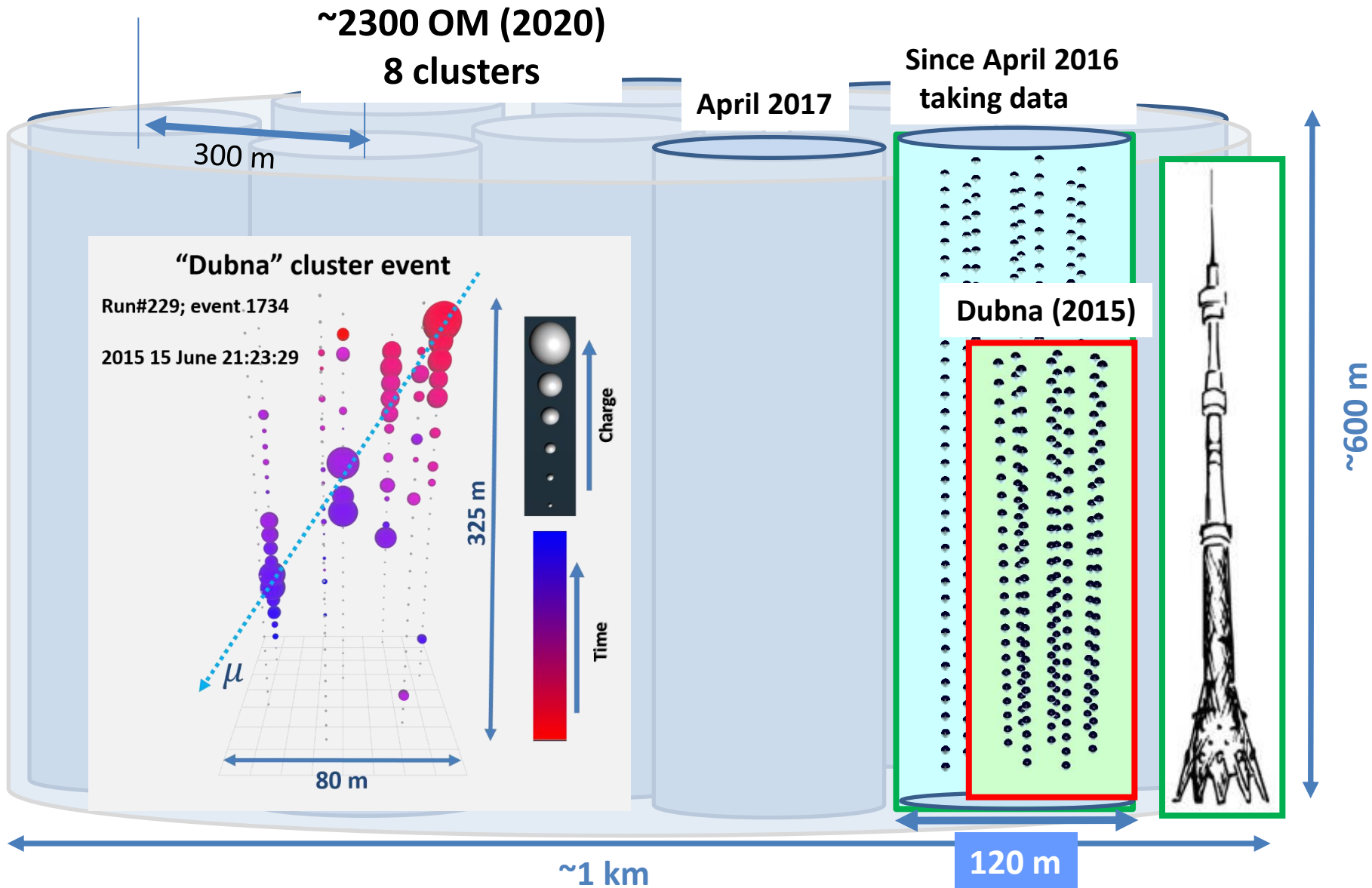
**JINR**  
Dzheleпов  
Laboratory  
for Nuclear  
Problems  
**INR of RAS**  
Institute for  
Nuclear  
Research of  
the Russian  
Academy of  
Sciences



M.A. Markov



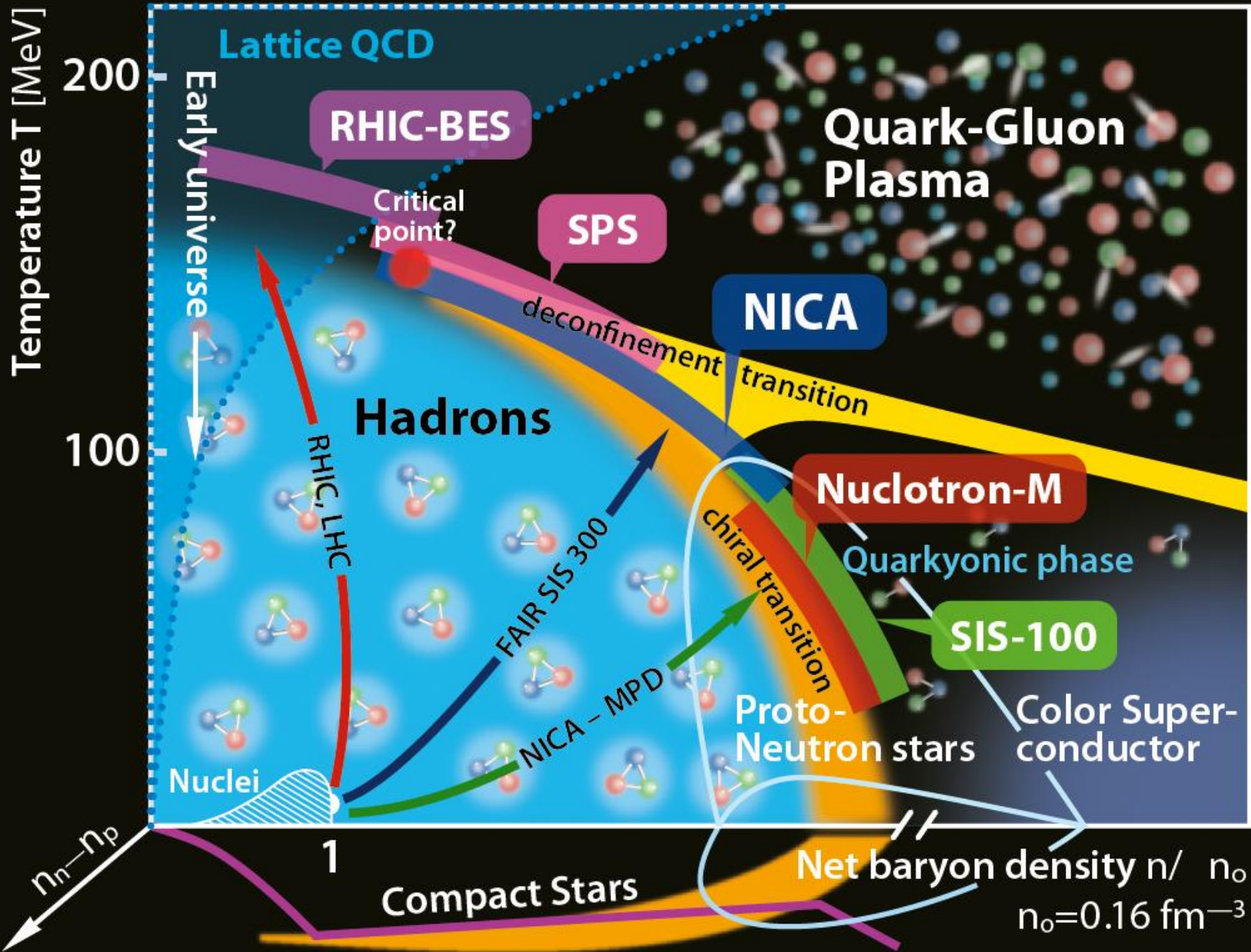
# Present and future of the BAIKAL-GVD



# NICA Layout



**25 March 2016. NICA "corner stone"  
ceremony at LHEP JINR**



# Infrastructure (SC magnets)

~ 450 SC magnets will be assembled & tested in the workshop for NICA & SIS-100 FAIR



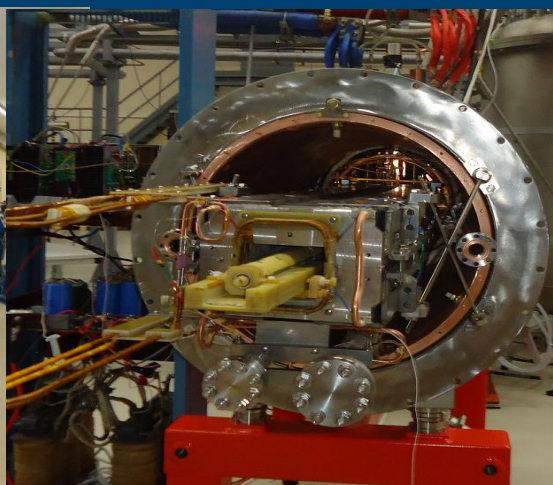
workshop ifor coil production



The technological line for SC magnet assembly and tests



SC cable production workshop



Tests of the pre-serial dipole magnet: magnetic field measurements

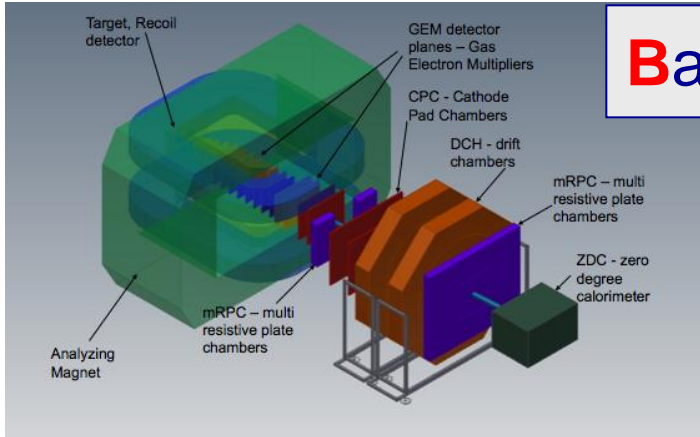
# 3 detectors

## Baryonic Matter at Nuclotron (BM@N)

*the fixed target experiment at the Nuclotron*

Stage I

2017

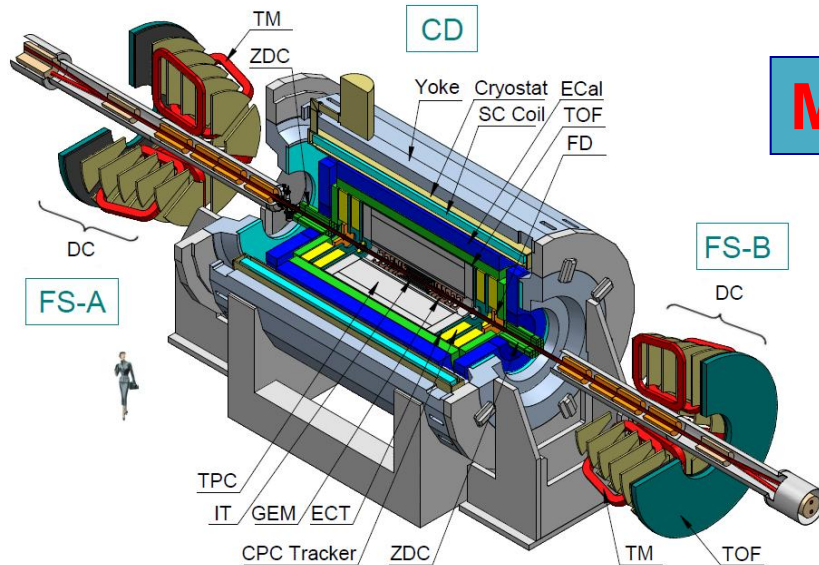


## MultiPurpose Detector (MPD)

*at the Collider*

Stage I

2019



## SPD (Spin Physics Detector) at the Collider

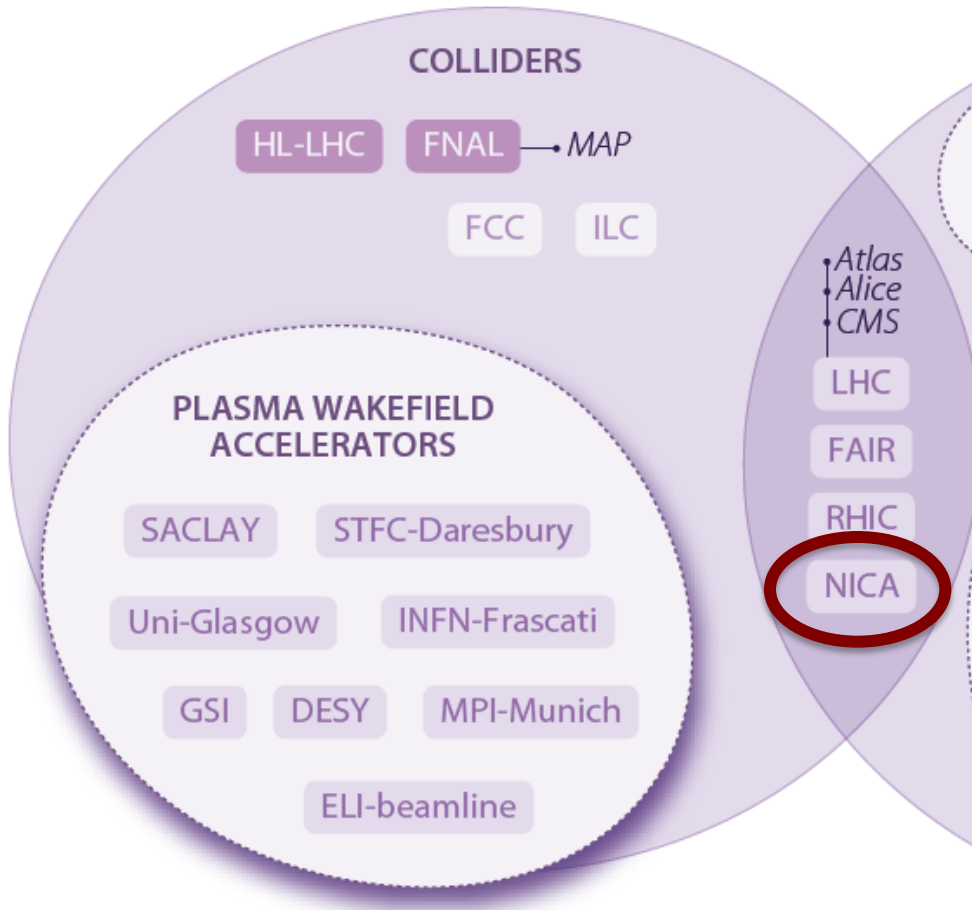
*the project - in preparation*



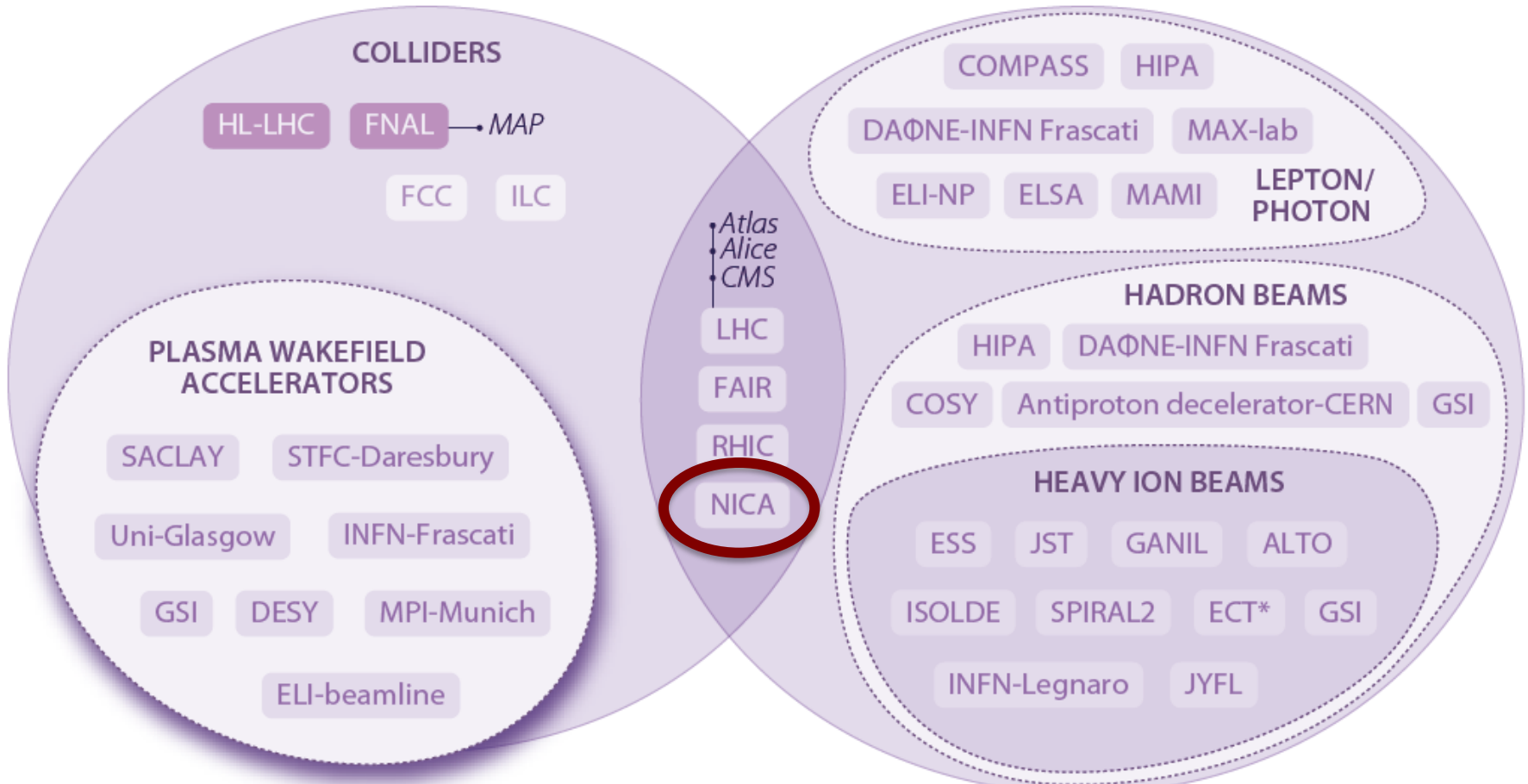
# New issue of the ESFRI Roadmap

## Main Research Infrastructure in Particle and Nuclear Physics

### PARTICLE PHYSICS



### NUCLEAR PHYSICS

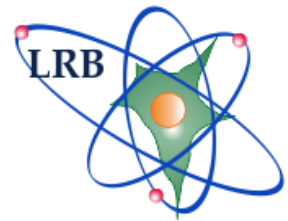


**NICA – Complementary Project**

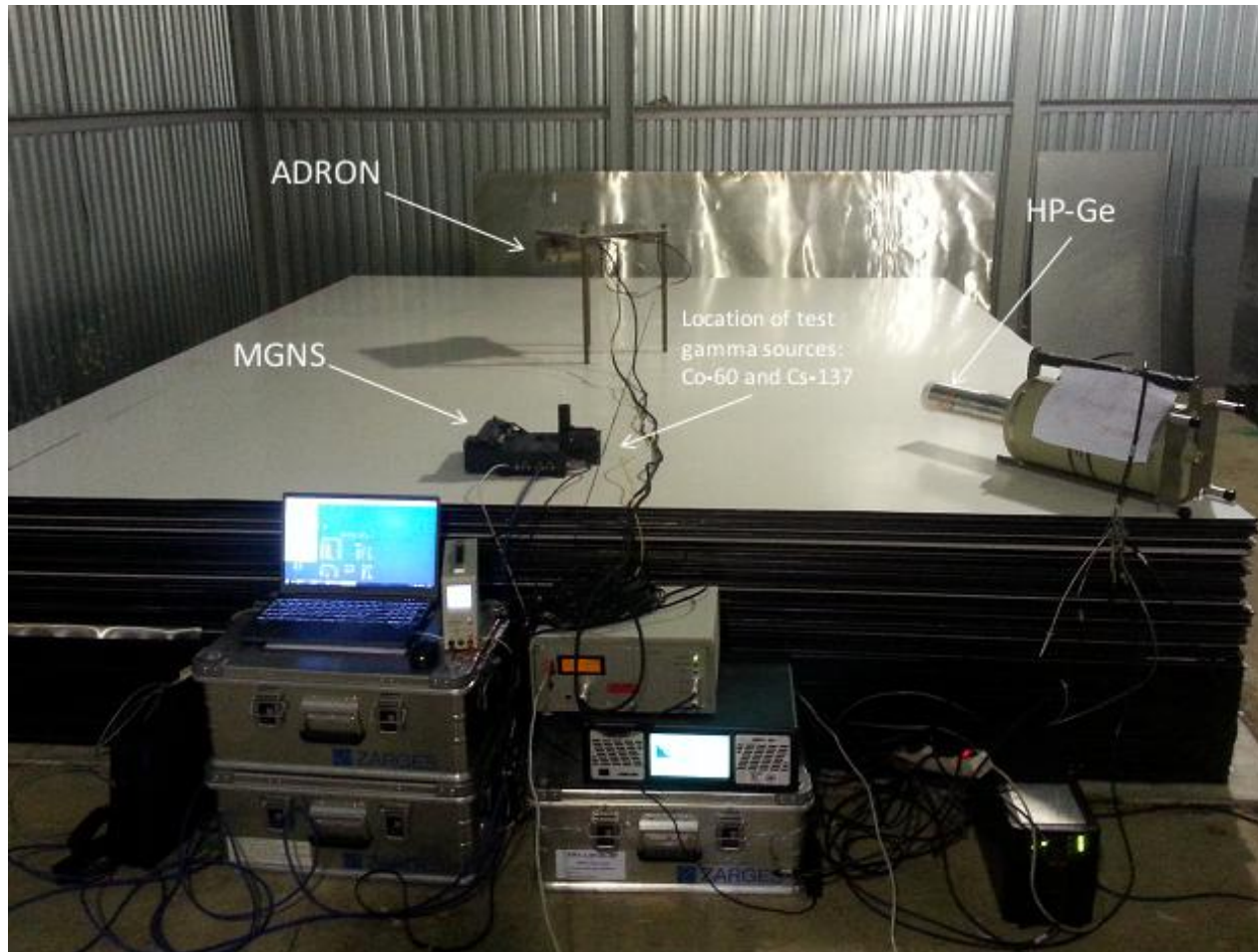
# NICA construction site



27/05/2017



# Nuclear planetary science



In collaboration between the Space Research Institute (RAS) and FLNP (JINR), a *special facility has been constructed at the LRB that can model planetary soil and allows testing prototypes of active neutron and gamma spectrometers.*

*The facility can use a neutron generator for soil model exposure. Inside the facility, a silicate glass-based soil model has been assembled.*



SAINT PETERSBURG  
STATE UNIVERSITY



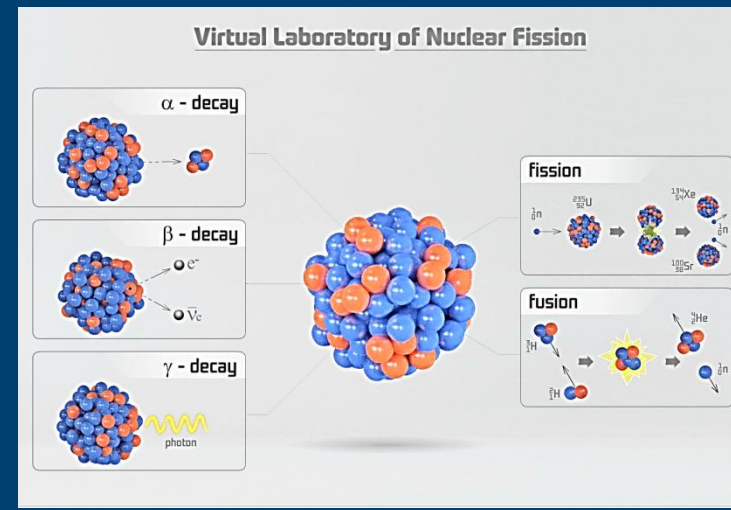
Казанский  
федеральный  
УНИВЕРСИТЕТ



- Attachment of students (955 students and PhDs since 2013)
- International Student Practice (1267 participants since 2004)
- Summer Student Programs (80 participants since 2014)
- Engineering and Physics Training

# JINR UC Educational Programmes Outreach activities

- International Scientific Schools for physics teachers at JINR and CERN (**647 participants from 8 countries since 2009**)
- Festivals of Science (**Since 2014**)
- Interschool Physics and Mathematics Open Classroom
- Popular lectures, videoconferences and visits to JINR
- Department of Development of Modern Education Programmes



# Bringing people together

The Institute annually organizes up to 10 large conferences and more than 30 international workshops, as well as schools for young scientists, practice courses and schools for teachers – in total more than 70 international events per year, including 10 regular sessions of the JINR governing bodies.



Geography of JINR meetings in 2016



Science  
Bringing  
Nations  
Together

# Welcome to JINR!



On 30 May the JINR Visit Center has celebrated its 1<sup>st</sup> birthday!