The CREMLIN Project

Achievements, status and perspectives

Cremlin Connecting Russian and European Measures for Large-scale Research Infrastructures

Martin Sandhop

The CREMLIN Project:
Achievements, status and perspectives

www.cremlin.eu

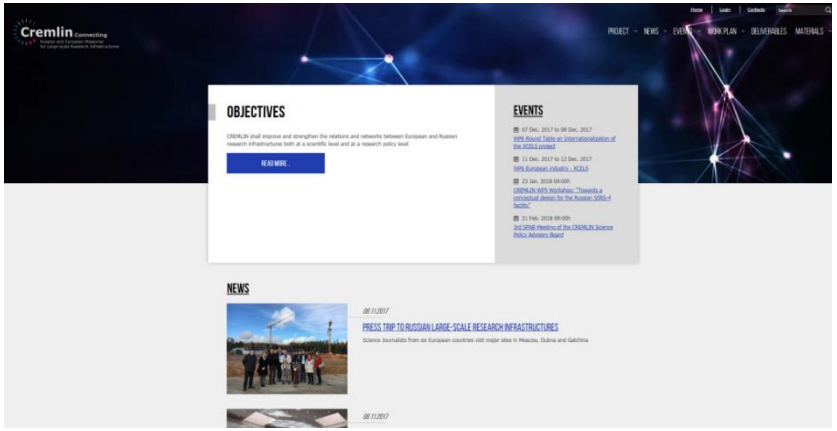
Moscow, 19.12.2017

HELMHOLTZ ASSOCIATION

DESY

CREMLIN: Facts

- CREMLIN: www.cremlin.eu
  - *Connecting Russian and European Measures for Large-scale Research Infrastructures*
  - Horizon 2020 project
  - European-Russian project on collaboration in RU mega science projects



- Budget: ~1.7 M€
- Coordinator: DESY
- Key Partner: NRC “Kurchatov Institute”
- Beneficiaries: 19 European and Russian RIs
- Duration: September 2015 - August 2018

Consortium: 19 partners

13 European beneficiaries	6 Russian beneficiaries
DESY (Coordinator)	NRC KI
Jülich	PNPI
FAIR	JINR
HZG	IAP RAS
TUM	BINP
European XFEL	FSRC "Crystallography and Photonics" RAS (IC RAS)
ILL	
ESS	
ESRF	
ELI-DC	
CEA LIDyL	
CERN	
MAX IV Lab	

CREMLIN: a coordination and support action

Most valuable achievements:

- TRUST BUILDING
- CREMLIN has provided numerous platforms, round tables and workshops for European and Russian RI stakeholders
- All these dialogue formats have led to a remarkable step forward in joint planning and in mutual understanding
- CREMLIN result: no research product, but: much clearer ideas and recommendations for the EU-Russian Mega Science Project collaborations

Key objectives

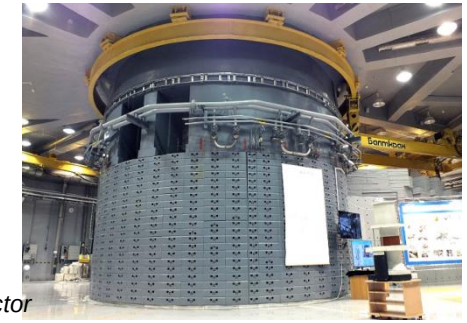
- CREMLIN is a truly **pathfinding** project
- Aims at fostering the collaboration between Russian and European RI
- At better integrating European and Russian research areas
- Key objectives:

1. **Enhance European-Russian science cooperation** along the megascience facilities
2. **Develop recommendations, strategies and perspectives** for an enhanced European-Russian cooperation
3. Establish an exchange platform for **mutual learning** across the various science disciplines and communities

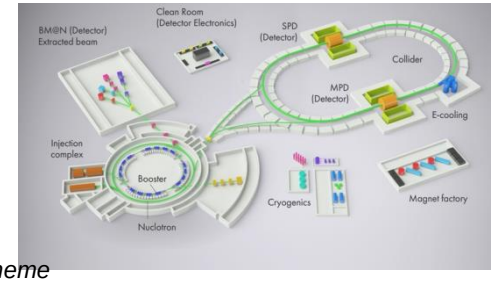
Focus: 6 Russian Projects

- CREMLIN targets at **all 6 Russian Mega Science Projects**:
  - Powerful Research Reactor **PIK,** PNPI Gatchina
  - Ion Collider Facility **NICA,** JINR Dubna
  - Fourth Generation SR Source **SSRS-4,** NRC KI Moscow
  - High power laser **XCELS**, IAP Nizhniy Novgorod
  - Lepton collider **STC**, BINP Novosibirsk

  And also, in a slightly less prominent way:
  - Fusion project **IGNITOR**, NRC KI Moscow
- different status of implementation, collaboration and funding



PIK reactor



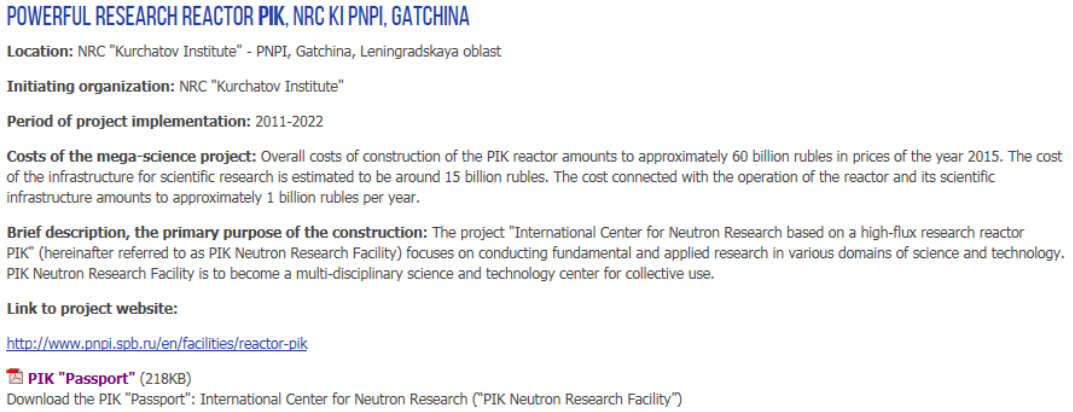
NICA scheme

XCELS

6 Russian Projects: Dissemination

- Not sufficiently noted in Europe, therefore:
- CREMLIN dissemination activities, such as Russia press trip (October 2017) with European science journalists
- providing project passports on the CREMLIN website https://www.cremlin.eu/materials/

Credits: A. Schmidli ESS;



POWERFUL RESEARCH REACTOR **PIK**, NRC KI PNPI, GATCHINA

Location: NRC "Kurchatov Institute" - PNPI, Gatchina, Leningradskaya oblast

Initiating organization: NRC "Kurchatov Institute"

Period of project implementation: 2011-2022

Costs of the mega-science project: Overall costs of construction of the PIK reactor amounts to approximately 60 billion rubles in prices of the year 2015. The cost of the infrastructure for scientific research is estimated to be around 15 billion rubles. The cost connected with the operation of the reactor and its scientific infrastructure amounts to approximately 1 billion rubles per year.

Brief description, the primary purpose of the construction: The project "International Center for Neutron Research based on a high-flux research reactor PIK" (hereinafter referred to as PIK Neutron Research Facility) focuses on conducting fundamental and applied research in various domains of science and technology. PIK Neutron Research Facility is to become a multi-disciplinary science and technology center for collective use.

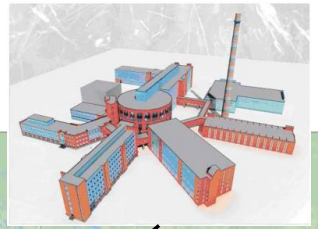
Link to project website:

http://www.pnpi.spb.ru/en/facilities/reactor-pik

PIK "Passport" (218KB)
Download the PIK "Passport": International Center for Neutron Research ("PIK Neutron Research Facility")

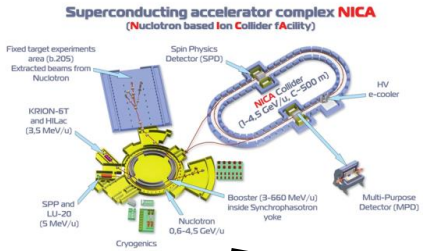
6 Russian Projects: Geography

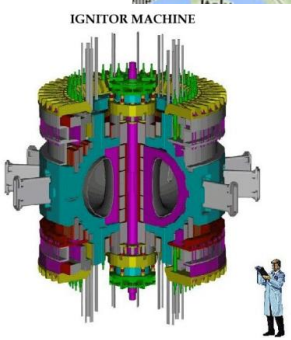
PIK: Gatchina



SSRS-4: Protvino?
Gatchina?

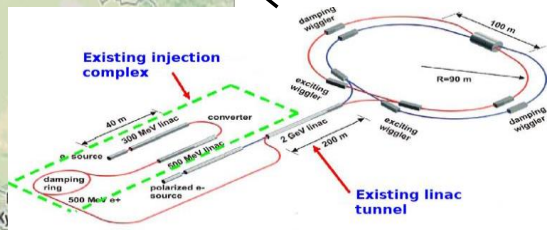
NICA: Dubna





Fusion IGNITOR: Troitsk, Moscow

Hi-Power Laser XCELS: Nizhniy Novgorod



STC: Novosibirsk

SPAB Recommendations

- External advisory board SPAB (Jean Moulin, Günter Kaindl, John Womersley, Sergey Mazurenko, Vladislav Panchenko)
- SPAB recommends CREMLIN CB for instance on:
  - Basic concept of complementarity and synergies between Russian RI and ESFRI RI should be further developed
  - Promote high-level discussion „the European neutron landscape in the next decade“ (PIK)
  - Encourages to clarify major design choices for SSRS-4 within a joint international design, promoting links with the user communities
  - Address the topic of joint funding schemes for the utilisation of RI
  - Provide training measures for young scientists and RI managers

Picture: Helmholtz Brussels. SPAB2 Brussels.

Findings & Recommendations

- For collaboration at research policy level
  - path towards closer collaboration between RU mega projects and EU RIs (ESFRI projects and ESFRI landmarks) goes via ESFRI
  - closer cooperation with the ESFRI forum with regard to the Russian mega projects is needed and intended
  - NICA´s mentioning as a complementary facility to FAIR in the ESFRI Roadmap Update 2016 Landmark: a great success, but can´t be copied 1:1
  - Initiate an interface that will facilitate to set up a dialogue between ESFRI (SWG PSE) and RU megascience stakeholders
  - Position PIK in the ESFRI Roadmap Update

Findings & Recommendations

> For Internationalisation:

- Internationalisation of RI at 3 levels: (1) utilisation of the facility; (2) governance level; (3) science policy framework level
- access policies are necessary; EU Charter on Access; Russian charter needed
- point out science case for complementarities of Mega-projects and ESFRI-RIs
- international SACs for Mega-projects needed

Picture ESS Roger Eriksson; WP2 WS Lund 30/06/2016 Lund

> For Innovation

- Awareness raising, strengthening Industrial Liaison Officers Networks, establishing “innovation portals”
- Improving industrial access to facilities
- Encourage innovation-oriented activities at RI
- Install TT offices
- Introduce RI-Industry oriented training and mobility policies
- Pay attention to relevance of legal and regulatory environments (procurement policies, IPR,..)

Picture: ESS; Innovation WS

Findings & Recommendations

For Big data:

- joint EU-Russian software development and joint work on meta data; Long term data preservation
- European XFEL upcoming operational phase 2017: connectivity to Russia via high speed data links needs to be enlarged in order to federate compute and storage resources for a seamless analysis environment
- For EU-Russian collaboration along PIK: urgent need for data analysis services in order to provide a consistent ecosystem for EU-Russian users of neutron sources
- Russia invited to participate in the GO FAIR initiative (FAIR: “Findable; Accessible; Interoperable; Reusable”)
- Introduce EOSC to the Russian community

Picture 6: NRC “Kurchatov Institute“. WP2 Workshop on big data management, 15-16/02/2017, at NRC KI

Findings and Recommendations from the thematic WPs

> For PIK:

- becomes now relevant to prepare user operation of the facility
- Need to set up User office: training of staff, preparing IT tools, providing guest services
- Further strengthen neutron User community in Russia, arrange more User workshops
- Elaborate a clever way to set up an „International Centre for Neutron Research“ as a platform to allow international partners to contribute
- Proposed: R&D joint work for e.g. developing a second cold source for PIK; Training and development of for the next generation of neutron detector experts
- Include more partners, for instance LLB

Participants of Diffraction WS at PNPI 19.02.2016

Findings and Recommendations from the thematic WPs

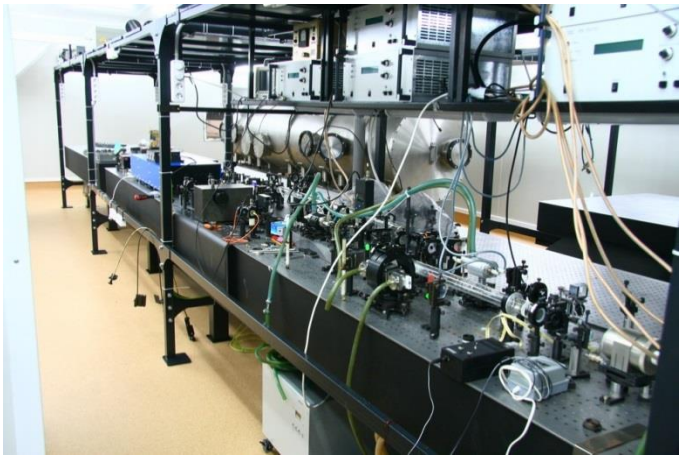
> For NICA:

- Recommended: extending of joint R&D collaboration scheme for detector constructing
- including e.g. feasibility studies, software development, physics performance studies for experiments at NICA
- Joint developments with CBM@FAIR
- Joint development of calorimeter for BM@N and MPD-Dectector
- Including more European and Russian partners, for instance Nuclear Physics Institute in Rez, Academy of Sciences of Czech Republic

Pictures: GSI/FAIR.
WP3 WS on STS module assembly, 16-20/03/2015 at GSI (uppermost, left), 23-27/11/2015 at GSI (uppermost, right), 2-4/9/2015 at LTU Ltd. Kharkiv, Ukraine (bottom left and right)

Findings and Recommendations from the thematic WPs

- For XCELS:
  - Extend the collaboration network, for instance Laserlab Europe
  - Ensure Russian project funding as internaional megascience project
  - ultimate goals of XCELS: to become a key partner for collaborative research in high-field physics, and its further development into a research infrastructure open for global co-operation



Picture: IAP RAS

- For SCT:
  - Prepare the international SAC for the SCT project
  - Update of the conceptual design for SCT as a joint undertaking
  - Prepare the e-infrastructure necessary to (internationally) utilise the facility
  - Joint R&D detector work

Picture: CERN. CERN-BINP WS 08-2016

Findings and Recommendations from the thematic WPs

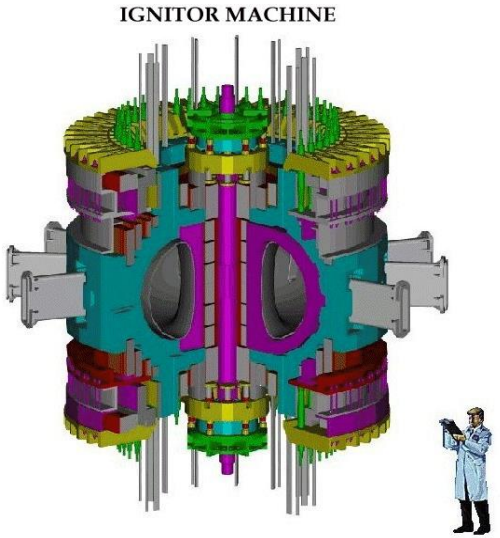
> For SSRS-4:

- Start joint work on the conceptual design for the facility
- Set up an international governance / SAC for SSRS-4
- Joint European-Russian R&D for state-of-the-art accelerator components for this 4th generation light source
- Strengthen SR / FEL User community
- Clearly point out the comperlementarity to the X-ray sources in ESFRI

Picture: DESY; WP5 meeting 11/07/2016 at DESY

> (For IGNITOR):

- CDR for IGNITOR finalized during May 2015; executive summary to be published
- next step: joint work on the technical design (TDR)
- Russian scientific community highly welcomes if IGNITOR will receive a broader European audience and the possibility for scientific exchange
- European-Russian scientific collaboration on physics related to the IGNITOR-project is very welcome, including collaborative projects at a smaller level



Looking ahead

- To take all Recommendations and fit them together

⇨ CREMLIN Final Conference 5-6 June 2018 at DESY Hamburg

- To engage in the next level European-Russian megascience RI collaboration
- A new consortium for preparing a proposal for the INFRASUPP 01-2018-2019 Call

Please join
the informal afternoon session
for discussion on the future!
14:30 – 16:00
MISIS, Room No. 636

Thank you for your attention!

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Back up files

5 Thematic WPs

WP#	Title	Beneficiaries
WP3	Science cooperation with the **NICA** collider facility in the field of ion beams and heavy ion physics	**FAIR + JINR**
WP4	Science Cooperation with the **PIK** research reactor in the field of neutron sources	**Jülich + PNPI** HZG TUM ILL ESS
WP5	Science cooperation with the **SSRS-4** synchrotron radiation source in the field of photon science	**ESRF + NRC KI** DESY European XFEL IC RAS Lund MAX IV
WP6	Science cooperation with **XCELS** in the field of high power laser research	**CEA + IAP RAS** ELI-DC
WP7	Science cooperation with the Super tau-charm factory **STC** in the field of lepton colliders	**CERN + BINP**

2 Horizontal WPs

WP#	Title	Beneficiaries
WP2	• Provide a **mutual learning** platform and exchange of **best practice** lessons, for instance on Big data management • Support **science-to-policy** interface • Invite IGNITOR to benefit from findings	**DESY + NRC KI**
WP8	• Maintain a project website • Organise Journalists´ trip to NICA and PIK facilities • Explore potentials for innovation, industrial use and technology transfer around the Russian projects • Organise training measures and thematic summer schools such as RACIRI	**NRC KI + DESY** ESS

Key achievements WP8: Russia press trip

WP8 cross topics: Innovation; Training; Dissemination

Journalists´ trip 8-12 October 2017:

7 European science journalists visiting NICA, PIK and Kurchatov facilities:

- Linked to 10th GSO meeting in Russia
- Also good opportunity to illustrate progress at megascience facilities to ESFRI representatives
- For dissemination not only on CREMLIN but on progress in Russian megascience
- already published articles in
  - *El Pais (Spain)*
  - *Der Standard (Vienna)*
  - *Sputnik mundo* (Spain)
  - *Daily Science* (Belgium)
  - ..

Credits: A. Schmidli ESS;

WP8: RACIRI Summer Schools

- RACIRI 2016, RACIRI 2017, RACIRI 2018: all supported by CREMLIN
- *Advanced Materials Design at X-ray and Neutron Facilities*
- Dedicated CREMLIN slots in the summer schools, on:
  - R2016: *Optimizing training and education in the context of large-scale research infrastructure*
  - R2017: *Data Challenges in the European Science Landscape*
  - R2018 proposal: *Lessons learned in Science Diplomacy*

RACIRI SUMMER SCHOOL 2016
Advanced Materials Design at X-ray and Neutron Facilities

RACIRI SUMMER SCHOOL 2017
Advanced Materials Design at X-ray and Neutron Facilities

RACIRI SUMMER SCHOOL 2018
Advanced Materials Design at X-ray and Neutron Facilities