## CREMLIN Kick-off meeting

### Catalin MIRON – ELI-DC AISBL

WP6 - Science cooperation with XCELS in the field of high power laser research

WP Leader – ELI-DC (BE)

Participants: IAP – RAS (RU), CEA (FR)

### ELI: FROM INITIAL VISION UNTIL TODAY

- The Extreme Light Infrastructure (ELI) was proposed by the scientific community as the world's first international user facility for laser-based research and applications
- It has been selected by ESFRI (European Strategy Forum on Research Infrastructures) to be part of Europe's Roadmap of new research infrastructures of pan-European interest since 2006
- Less than ten years later, while construction is nearly completed, ELI was proposed to be one of the **ESFRI Landmarks** "for its role as reference project of scientific excellence and of competitiveness of the European Research Area (ERA)"

### What is ELI?





# INITIAL ELI "CONCEPT"

Developed during the EU-funded "Preparatory Phase" 2006-2010:

- Not one, but three (later: four) ELI research pillars
- Use "EU Structural Funds" for construction
- Operate as a single international organization after 2018: "ELI-ERIC" (European Research Infrastructure Consortium)
- Become the first international laser user facility
- Science case: the "ELI White Book"







## IMPLEMENTING UNIQUE RESEARCH OPPORTUNITIES

- \*\*Attosecond Laser Science: ultrafast dynamics studies based on new regimes of time resolution at high repetition rates (ELI-ALPS, Szeged, HU)
- **High-Energy Beam Facility:** development and application of ultra-short pulses of high-energy photons and charged particles (**ELI-Beamlines**, Prague, CZ)
- Nuclear Physics Facility: ultra-intense laser (2x10 PW) and brilliant gamma sources (up to 19.5 MeV) enabling novel photonuclear studies (ELI-NP, Bucharest-Măgurele, RO)
- **We Ultrahigh Field Science:** focused on the direct physics of the unprecedented laser field strength (ELI 4, to be decided in the future)













## WP6 - Science cooperation with XCELS in the field of high power laser research

- Which are the concrete objectives of your WP? (Including intermediate steps; mentioning of possible obstacles or special challenges and how to tackle them)
- 2. Who will be responsible for the milestones and deliverables, where and when to carry out workshops and meetings?
- 3. What is the current status of the EU-Russian cooperation in the scientific field of the respective WP?

## **WP6 -** Which are the concrete objectives of your WP? (Including intermediate steps; mentioning of possible obstacles or special challenges and how to tackle them)

- Identify and map the research interests and needs of EU and Russian partners for scientific cooperation in the XCELS project;
- Work out measures and action plans to foster joint research projects towards the implementation of the project
- Jointly develop and refine international standards for access, user policy, and governance of future large laser facilities;
- Undertake, from a combined EU and Russian perspective, foresight activities to identify the scientific and technological opportunities, user needs and political support for future laser facilities of the 100PW class. This includes the identification of synergies and complementarity between XCELS and international laser facilities in order to sharpen their respective scientific profiles and uniqueness.
- Explore legal and practical models for the future operation of XCELS as an integral part of the fabric of large European laser infrastructures.

## **WP6 -** Who will be responsible for the milestones and deliverables, where and when to carry out workshops and meetings?

- T6.1a&T6.2 A workshop organized in Russia as a satellite of the conference Frontiers of Nonlinear Physics **end of July 2016** will explore both the new scientific opportunities (6.2) and identify key technological issues (6.1) on the construction and operation 100PW facilities (IAP). D6.1: Report T0+18, D6.2: Report T0+22
- T6.1b A workshop organized in France end of 2016 will focus on key HP laser technologies (CEA). D6.1: Report T0+18
- T6.3 Specialized workshop organized in a laser user facility on internationalization, access and user policy, governance summer 2017 (ELI-DC). D6.3: Foresight document T0+24
- T6.4 Round table in 2018 with key experts stakeholders and scientific policy makers (EU+RU) to discuss how XCELS could be considered in the ERA and the fabric of national and European laser RIs (ELI-DC). D6.4: foresight document T0+33
- T6.5 A workshop will be organized end of 2017 in France to explore further cooperation between XCELS and European companies (CEA). D6.6: Analysis for the EC & MoU: T0+29

### **WP6 -** What is the current status of the EU-Russian cooperation in the scientific field of the respective WP?

### MoU with ELI-DC to be (re)signed

### Memorandum of Understanding

### between

THE ELI DELIVERY CONSORTIUM INTERNATIONAL ASSOCIATION, an international non-profit association founded and existing under Belgian law (AISBL), having its registered office at 23, rue Montoyer, 1000 Brussels, Belgium, represented by Wolfgang Sandner, acting in his capacity of Director General and CEO of ELI Delivery Consortium International Association (hereinafter referred to as "ELI-DC").

and

THE FEDERAL AGENCY FOR SCIENTIFIC ORGANIZATIONS, a federal executive body founded and existing under the laws of the Russian Federation, having its registered office at 32a Leninsky Prospect, 119334 Moscow, Russia, represented by Alexey Medwedev, acting in his capacity of First Vice-Head of Federal Agency for Scientific Organizations (hereinafter referred to as "FANO")

### Background

EUI is a new research infrestructure of pan-European interest and a part of the European ESFRI Roadmap. It is a laser facility that aims to host some of the most intense lasers worldwide, develop new intendisciplinary research opportunities with light from these lasers and secondary radiation derived from them, and make them available to an international scientific user community. The facility will be based on four sites. Three of them are presently being implemented in the Czech Republic, Hungary and Romania. Their scientific profile will be complementary, while the operation, starting in 2018, will be unified under one single legal umbrella of a European Research Infrastructure Consortium ELI-ERIC. The present implementation phase is coordinated by the ELI-DC.

FANO is responsible at the federal level for operation of academic scientific organizations, for implementation of the State program of fundamental studies, for development of new research programs and research infrastructures. FANO promotes the sustainable development of Exewatt Center for Extreme Light Studies (XCELS) as a research infrastructure selected by the Government of Russian Federation among six Russian mega-science projects. The XCELS project aims at creating a laser system with the sub-Exawatt peak power and at using it by the international scientific user community to study new physical phenomena at the interface of strong-field physics and high-energy physics. The XCELS laser parameters are similar to those planned for the forth site of ELI which makes two infrastructures complementary. The XCELS project will be implemented by a consortium of Russian scientific organizations within the intrisdiction of FANO and headed by the Institute of Applied Physics in Nilshny Novgorod.

### MoU with THALES Optronique signed

### MEMORANDUM OF UNDERSTANDING

(hereinafter referred to as the "MOU")

THALES OPTRONIQUE S.A.S., a company organized and existing under the laws of France, having its registered office at 2, avenue Gay Lussac, 78990 Elancourt – France, represented by Jean-Pascal ARROU-VIGNOD, acting in his capacity of President of THALES (bereinafter referred to as "TOSA").

On the first part,

AND,

FEDERAL RESEARCH CENTER INSTITUTE OF APPLIED PHYSICS OF THE RUSSIAN ACADEMY OF SCIENCES, a company organized and existing under the laws of the Russian Federation, having its registered office at 46 Uljanov street, 603950 Nizhny Novgorod, Russia, represented by Alexander SERGEEV, acting as Director (hereinafter referred to as "IAP"),

On the second part,

TOSA and IAP being hereafter individually or collectively referred to as "Party" or "Parties".

### WHEREAS:

- (A) TOSA is engaged in the business of manufacturing and supplying for sale, on a world-wide basis, ultra high peak power (Petawatt-dass) solid-state lasers (hereinafter referred to as the "Product"); and
- IAP has significant experience in research, development and construction of ultra high peak power (Petawatt-class) lasers; and
- (C) The Parties entered into a memorandum of understanding dated 22<sup>nd</sup> October 2012, renewed annually since then , under which they started exploratory discussions related to a potential cooperation related to the development of ultra-high peak power laser technology for infrastructures dedicated to scientific applications, including the Russian mega-science project XCELS, the Exawatt Centre for Extreme Light Studies, (hereinafter referred to as the "Project"); and
- (D) The current memorandum is due to expire on the 20<sup>th</sup> of November 2015; and
- (E) The Parties intend to expand their discussions to possible coordination regarding international programs, and modify the scope of the Project accordingly. The Parties are willing to carry on their exploratory discussions related to the Project according to the conditions set forth in