



EUROPEAN UNION



Structural Instruments
2014-2020

Project co-financed by the European Regional Development Fund through the Competitiveness Operational Programme
“Investing in Sustainable Development”



**Extreme Light Infrastructure-Nuclear Physics
(ELI-NP) - Phase II**



Extreme Light Infrastructure-Nuclear Physics ELI-NP

**Nicolae-Victor Zamfir
Director Project**

An aerial photograph of a university campus, likely Cornell University, showing various academic buildings, a large green lawn, and parking lots. The trees are in autumn colors. A yellow speech bubble with a blue outline points to a specific building in the center of the campus. The text 'ELI-NP' is written in red inside the bubble. In the foreground, parts of a white crane or lift structure are visible, suggesting the photo was taken from an elevated position.

ELI-NP

ELI-NP Project

2013-2019: 136+175=311 M €

Large equipment:

- High power laser system, 2 x 10PW maximum power
- High intensity gamma beam system

Experiments:

- 8 experimental areas, for gamma, laser, and gamma+laser
- Laboratories

Buildings (2013-2016) : 33000sqm total

ELI-NP Buildings

- **Land area: 10 ha, total built area: 33000 m²**

HPLS

GBS

Workshops and Laboratories

Experiments

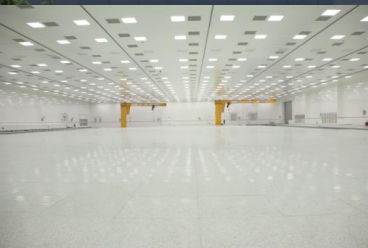
Office Building

Guest House

Canteen



2X10 PW
Lasers



ELI–NP Buildings - status

- **May 2016:** construction finished
- **May – September 2016:** testing and commissioning: all parameters and technical requirements have been fulfilled (stability, temperature, humidity etc.)
- **September 2016 – starting of the installation of the HPLS and exp. equip.**
- The technical parameters: confirmed during the 1 yr functioning of the building
- Additional constructions to the initial approved construction (according to the EC Decision) – ongoing:
 - Extension of the Gamma Building – enlargement of the experimental area
 - Access road to Bucharest ring

High Power Laser System - status

Public Procurement Procedure: Thales Consortium Contract: duration 67m

Stage I: Construction, installation, testing and delivery on ELI-NP site of the HPLS at intermediate parameters (first 10 PW arm)

Technical bottlenecks (design, construction): successfully overpassed

Deadline: August 2015 – completion on time

Stage II: Delivery and commissioning of the complete operational HPLS on the ELI- NP site, with the final technical parameters.

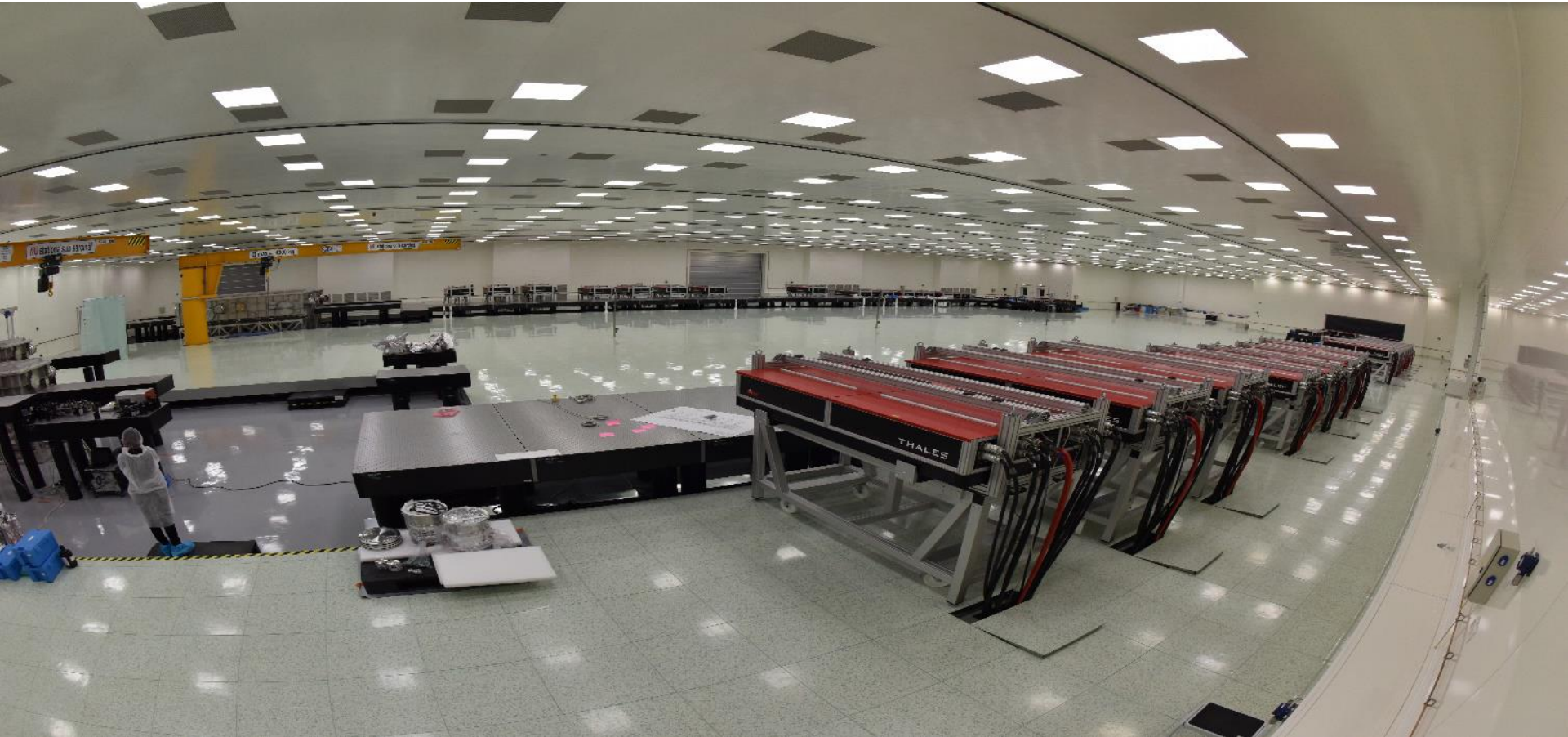
Deadline: March 2019 - Completion – estimated to get finished on time

Tests ongoing

Diagnostics methods to be decided

ELI-NP High Power Laser System

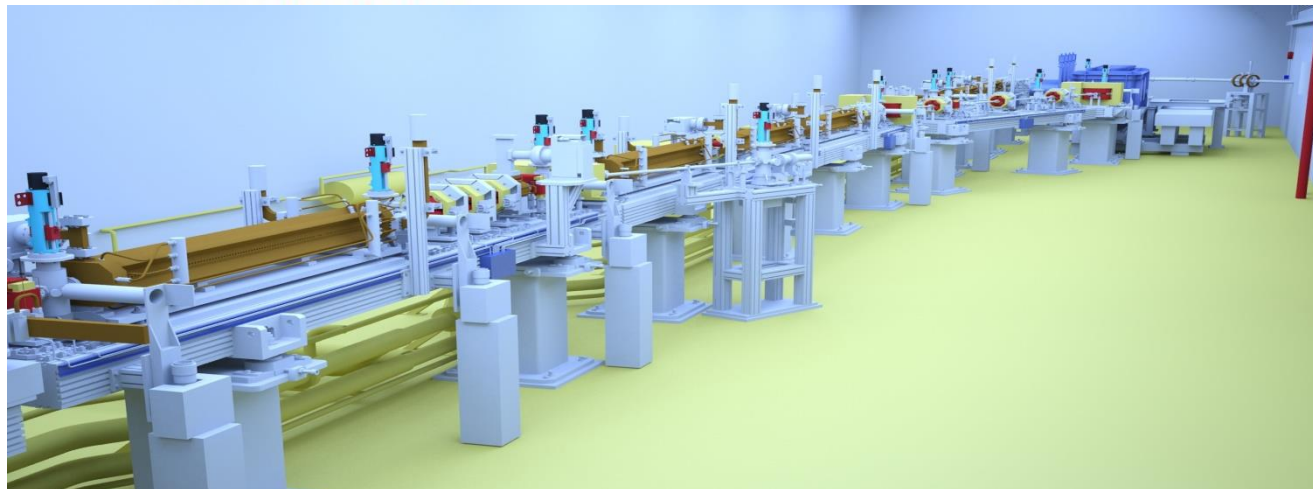
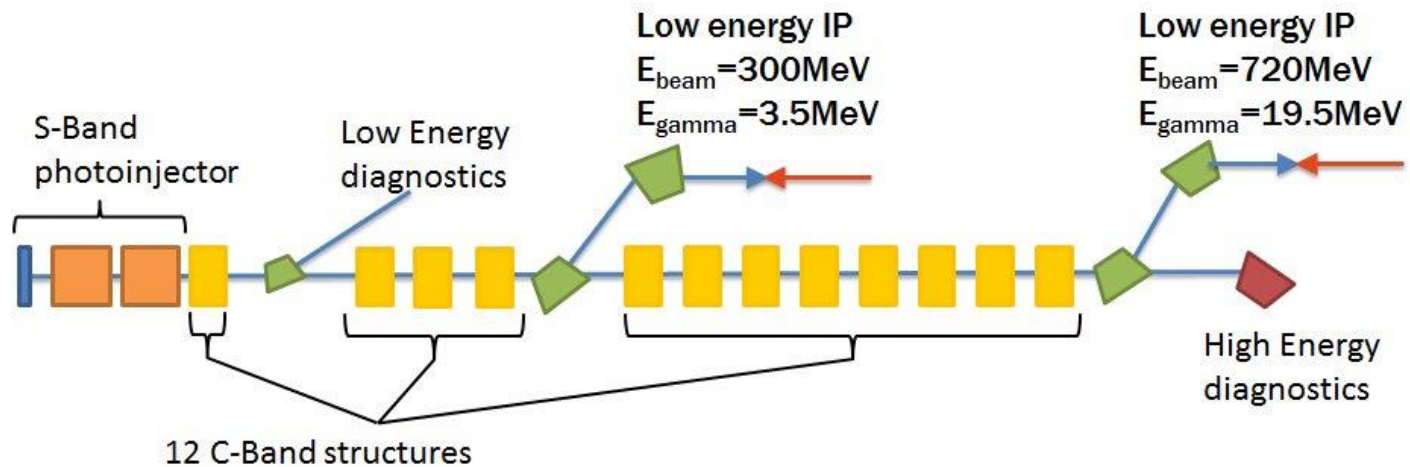
THALES – France
THALES - Romania



2 x 0.1 PW 10Hz
2 x 1 PW 1 Hz
2 x 10 PW 0.1 Hz

Gamma Beam System (GBS)

Public Procurement Procedure: EuroGammaS Consortium Contract 2014-2019



GBS Provider

EuroGammaS Consortium

- Istituto Nazionale di Fisica Nucleare (INFN) – Italy, Consortium’s Representative
- Universita degli Studi di Roma “LA SAPIENZA” – Italy
- ACP Systems – France
- Centre National de la Recherche Scientifique (CNRS) – France
- ALSYOM S.A.S – France
- SCANDINOVA SYSTEMS AB – Sweden
- COMEB Srl – Italy

Subcontractors:

- MENLO SYSTEMS GmbH – Germany
- DANFYSIK – Denmark
- Science & Technology Facilities Council (STFC) – UK
- Instrumentation Technology – Slovenia
- Cosylab D.D. – Slovenia
- M+W Italy Srl – Italy
- ALBA Synchrotron Light Laboratory (CELLS) – Spain
- RI Research Instruments GMBH - Germany
- Amplitude Technologies – France
- Amplitude Systems – France

Gamma Beam System - status

Public Procurement Procedure: EuroGammaS Consortium Contract: duration 65 months

Stage I: delivery and testing of system components corresponding to a gamma beam energy of at least 1 MeV: *31 October 2015*

Technical bottlenecks (design, construction): R&D, overpassed

Stage II: delivery on ELI-NP site and testing a complete system able to produce a gamma beam with energy of at least 3MeV: *31 October 2017* - **risk of delay, no technical bottlenecks**

Stage III: installation, assembling on the ELI-NP site and GBS commissioning with intermediary parameters: *31 May 2018*

Stage IV: parameters compliant with the Technical Specification: *31 July 2019*.

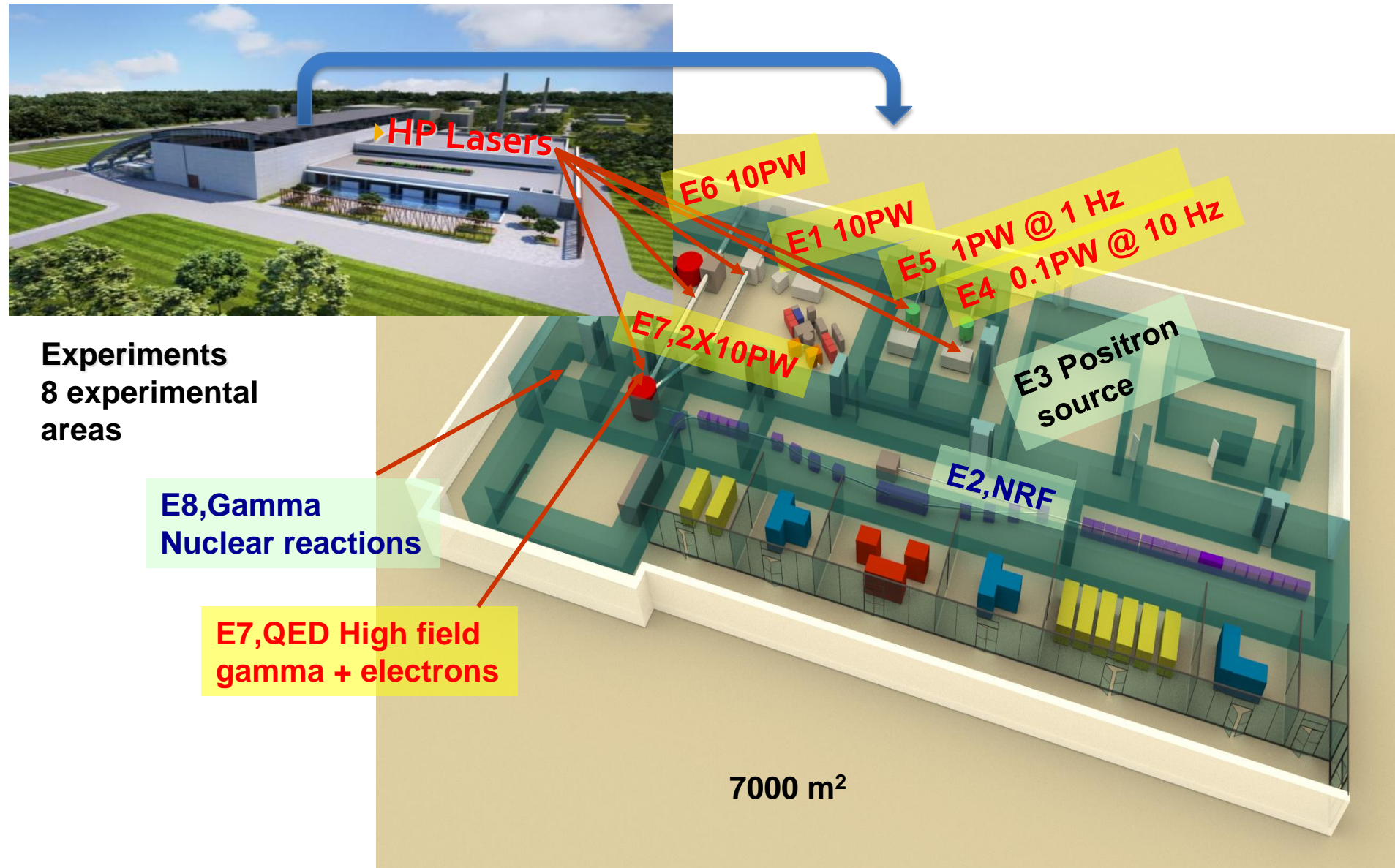
Provider has the technical capability and resources to perform the Contract within the assumed timeline!

Scientific program

- *Nuclear Physics experiments to characterize laser – target int.*
- *Photonuclear reactions*
- *Exotic Nuclear Physics and astrophysics*
- *QED and fundamental physics*
- *Applied Research*



ELI-NP Experimental Set-ups



HP Lasers

E6 10PW

E1 10PW

E5 1PW @ 1 Hz

E4 0.1PW @ 10 Hz

E7,2X10PW

E3 Positron source

E2,NRF

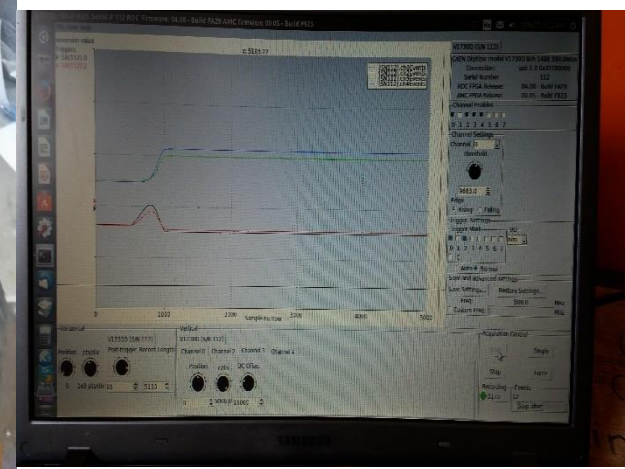
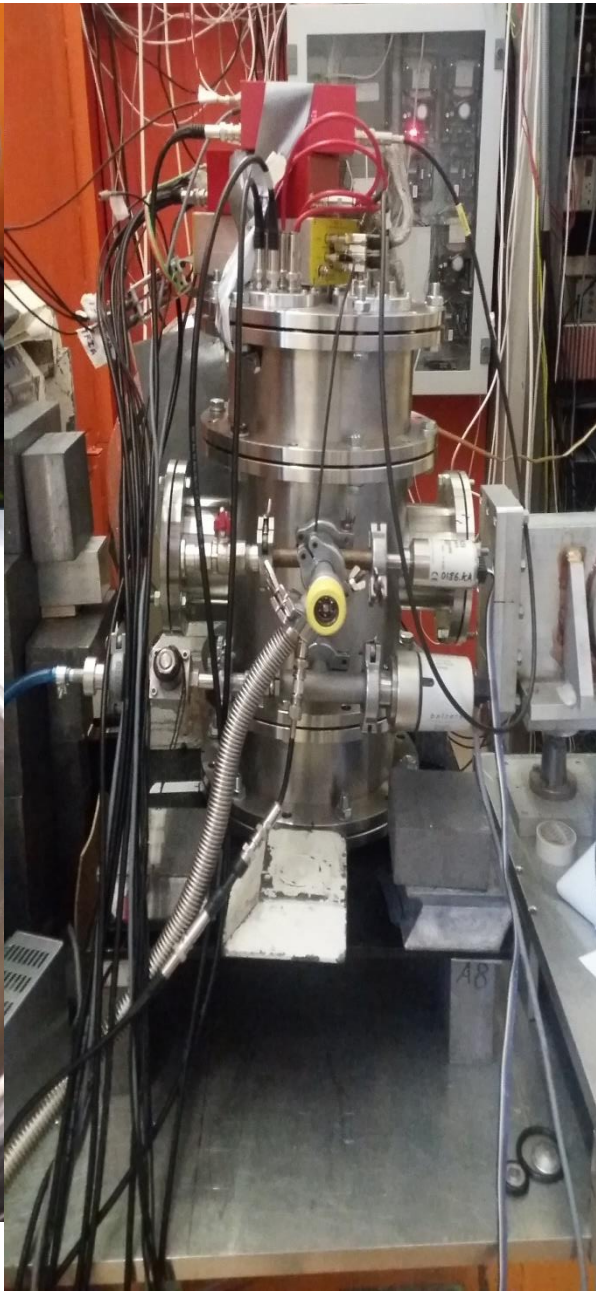
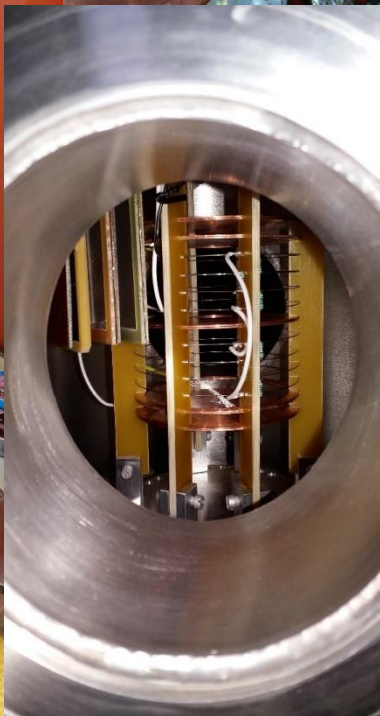
E8,Gamma Nuclear reactions

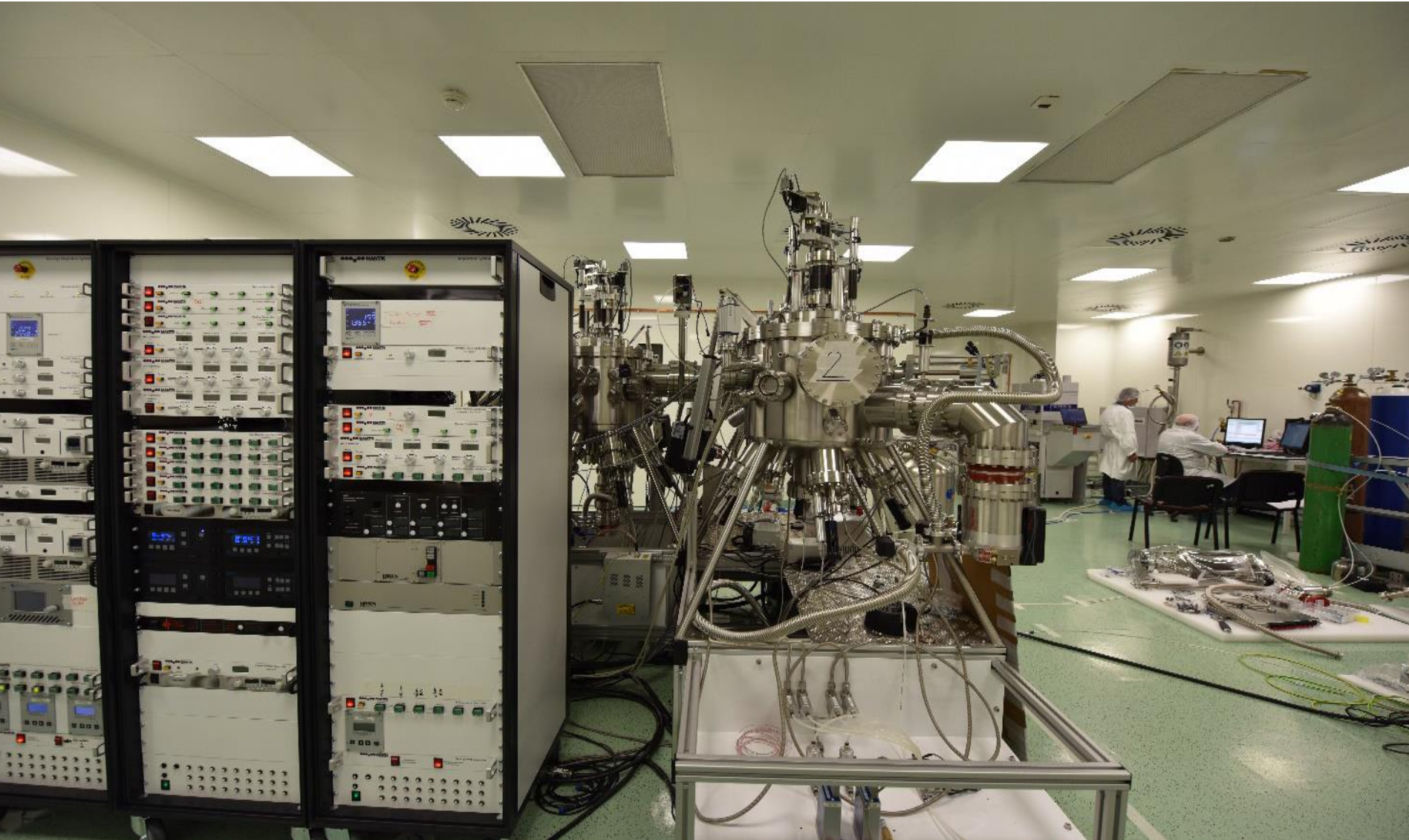
E7,QED High field gamma + electrons

Experiments
8 experimental areas

7000 m²

ELI-BIC: Double Bragg TPCs + Si DSSD $\Delta E-E$





- Collaboration with international scientific community
 - ✓ MoUs and collaborative contracts: more than 60
 - ✓ Equipment design and construction: collaboration and public procurement contracts
- Equipment installation and testing – ongoing
- Laser Beam Transport and Large Focus Mirrors systems – public procurement procedures ongoing

Purchased & installed ~ 30% (208 procurement procedures so far, estimate additional 130)

No delays foreseen

Additional project under submission:

extending ELI-NP experiments with photofission- isotopic separation

to be hosted by the rehabilitated Nuclear Reactor Building (decommissioned in 2018)

Human Resources - status

- R&D personnel: 275 planned, 130 employed
- Employment status: 180 (total employees 324)
- Foreign citizens: 52 (Algeria, Bulgaria, Canada, China, France, Germany, Greece, India, Indonesia, Israel, Italy, Japan, Malaysia, Poland, Russia, USA, Taiwan, Turkey, Vietnam, Venezuela)
- Romanian citizens from abroad – 30
- Implementation (more or less) on the planned track
- Difficulties: hiring formalities (various constraints and excessive formalities relative to the recognition of the diplomas, work permits, visas, obtaining the scientific title for senior researcher)
- Challenges: lack of laser experts, lack of engineering and technician staff, need to increase the in-house training

ELI-NP status - Conclusions

- **Implementation: more or less on time**
 - Building finished as planned in compliance with the scientific and technical needs
 - HPLS – on time, installed and under testing
 - GBS – risk of delay, can be prevented by the Provider
 - Laboratories and set-ups: on time, ongoing
 - 73% of Phase 2 contracted
- **Implementation challenges and difficulties:**
 - Public procurement directive and national legislation: too many constraints and excessive formalities for allowing smooth acquisitions, especially considering the uniqueness and the innovative component of the equipment – EU to analyse
 - Un-justified corrections applied by the Managing authorities in relation with the criteria used in public procurement procedures without prior verification with the Beneficiary and despite the endorsement from the National Authority for Public Procurement – inconsistency in assessing the legality and the conformity
 - Prior and post audit, verification of the project implementation should be correlated
 - More support for the Beneficiary!

ELI-NP towards ELI-ERIC

- ELI-NP and Romanian authorities – very supportive for establishing ELI-ERIC, all documents approved, Romania is ready to host ERIC.
- a strong and coherent institutional framework should be in place when ELIs will operate
- standardization for operational costs is necessary
- EU non-host countries should find a way to be part of the future European infrastructure
- ELI-ERIC should be strongly supported at EU level in terms of sustainability and operation

...towards smart regional development

- ***ELI-NP Industrial Forum***

- *framework of dialogue between research and industry*
- *promotion of contractual research, technology transfer, innovation, etc.*
- *forming a cluster of high-tech companies in Magurele*

- ***“Magurele High Tech Cluster”***

- *89 members (including TownHall and County Council)*
- *advanced research – knowledge – new technology – technology transfer*

- ***“Magurele Science Park” – Feasibility Study***

- *hub for R&D activities and high-tech companies*

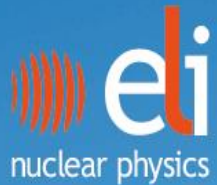
- ***“Laser Valley – Land of Lights”***

- *project to develop a smart regional development: science, education, technology, social*



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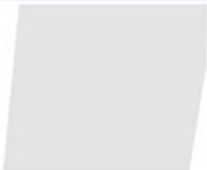


(ELI-NP) – Phase II



www.eli-np.ro

Thank you!



For info or further questions on this seminar and the activities of the JASPERS Networking Platform, please contact:

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