LEAPS League of European Accelerator-based Photon Sources

EUROPEAN STRATEGY ACCELERATOR-BASED PHOTON SOURCES

ESAPS 2022

European Parliament
Brussels
May 31, 2022

Helmut **Dosch**
DESY
Former LEAPS Chair

ESAPS 2022

charts a transformative route into the future
that features
environmentally friendly
technologies and research strategies

to critically support solving societal challenges

while making
a core contribution to keep Europe
at the international forefront of research and development.

supporting **ERA Priority Actions**

ESAPS 2022

ESAPS 2022

offers a novel pathway
for joining forces between
Europe´s advanced X-ray and X-ray laser facilities
and European partnerships/initiatives
to tackle the urgent challenges of our society.

- **Climate Change**
- **Energy Materials and Materials for the Circular Economy**
- **Bio Preparedness**
- **Digital Transformation and Quantum Technology**

ESAPS 2022

to achieve these goals

ESAPS 2022

has set out

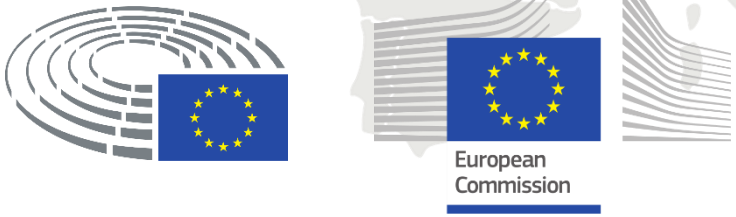
A) what **LEAPS** offers with national funding

countries hosting LEAPS facilities

member countries of the European facilities ESRF and XFEL

B) where **LEAPS** requests support

by the European Commission and the European Parliament,



https://leaps-initiative.eu/

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has devised a **coherent strategy plan**
for the
upgrades of LEAPS facilities
in the coming decade
in close coordination with their **national funding** bodies.

- to meet the new requirements of Europe's researchers from academia and industry
- to defend the Europe´s international leading role in advanced analytical technologies
- to assure technology sovereignty of Europe in a critical field
- ERA priority action 8 

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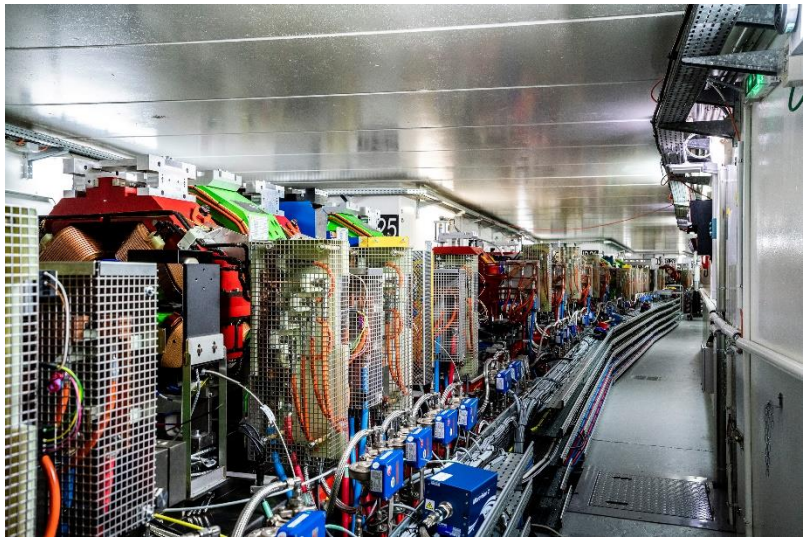
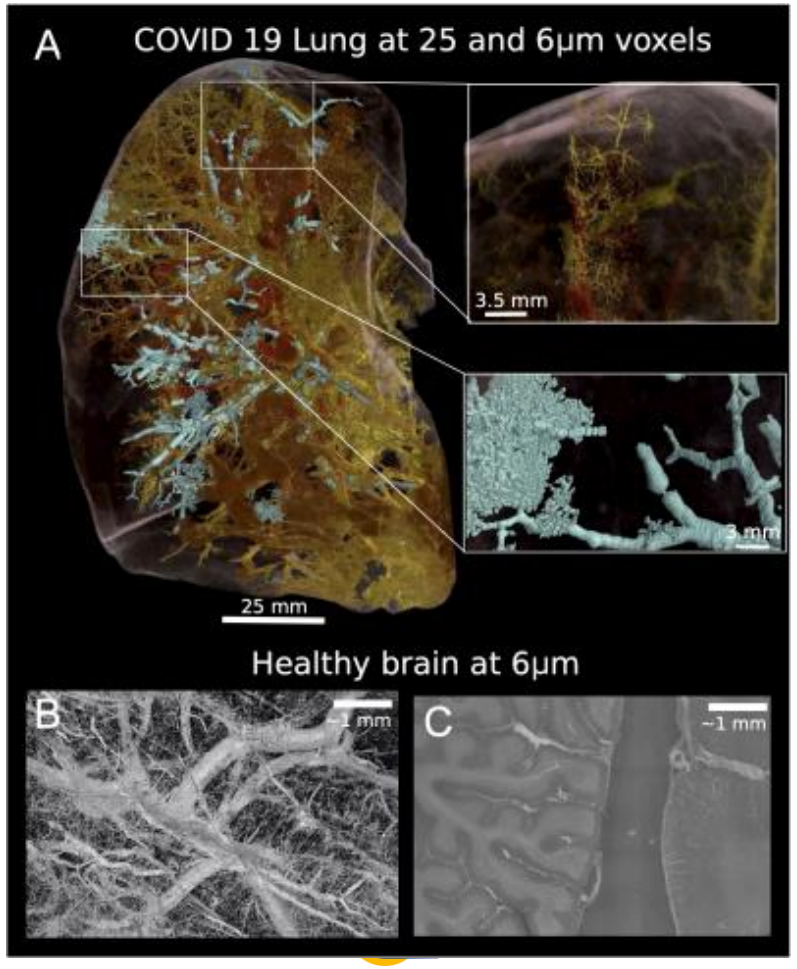
ESRF-EBS Upgrade

to the world´s most advanced X-ray facility

European Synchrotron Radiation Facility, Grenoble





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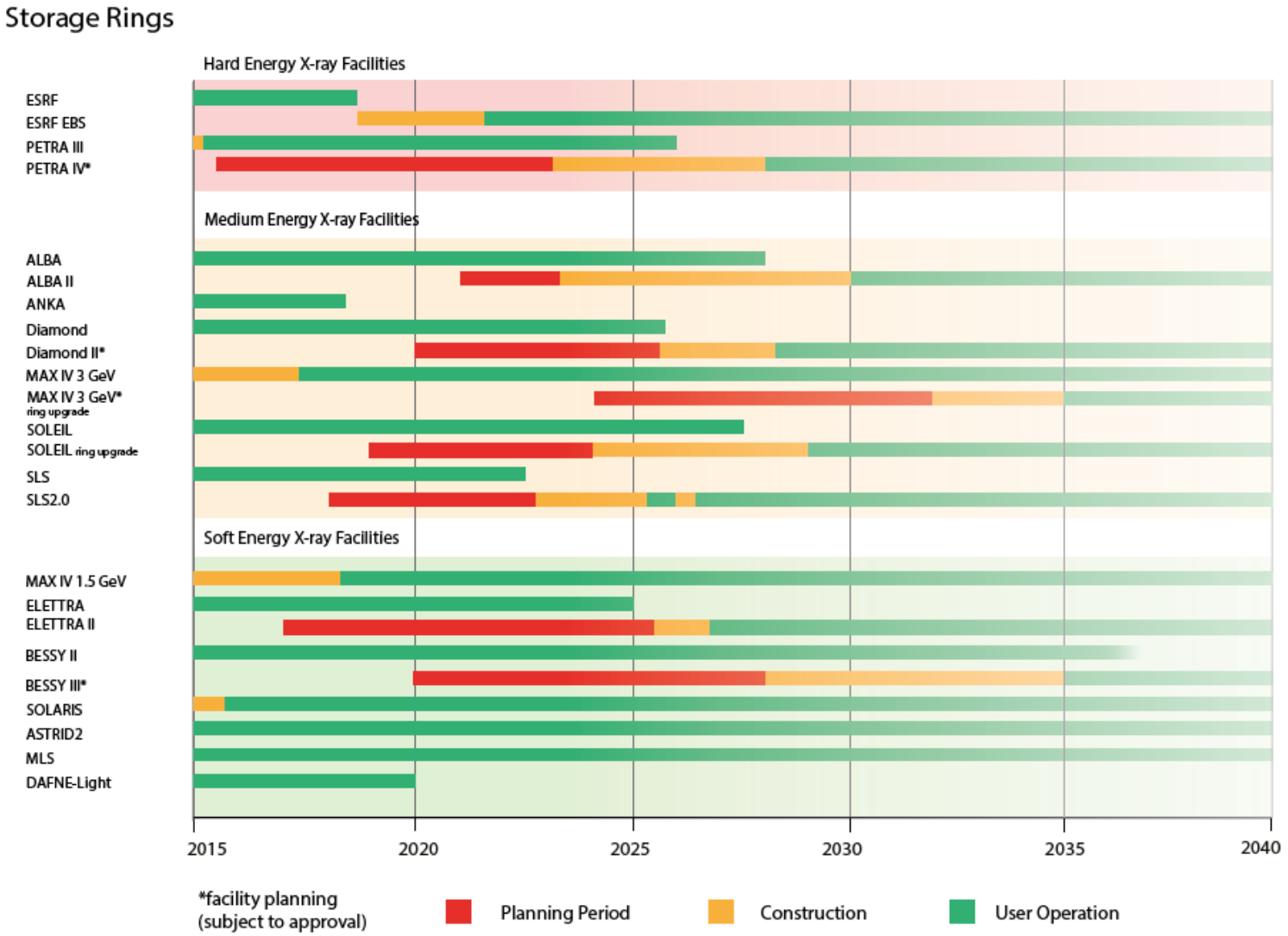
Facility upgrade roadmap Storage rings and Free electron lasers
National funding (multi-Bn € effort)

Further details in ESAPS 2022 doc



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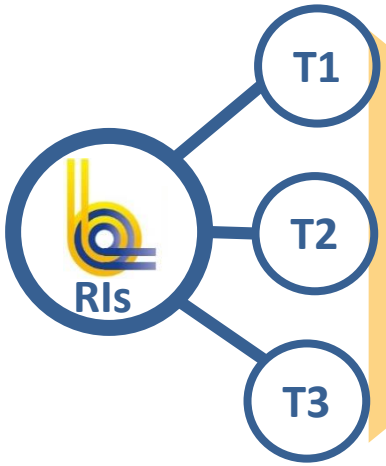
have devised a **coherent strategy plan**
how to exploit this analytic European powerhouse
for a new handshake with European partnerships



European partnerships
European initiatives

Public Health
Climate neutral technologies
Rational catalyst design
Energy storage and Green hydrogen (Edström)
Clean Water
Advanced and quantum technology (Calarco)

NEW: Targeted challenge-driven access model

→ **Longterm access to LEAPS facilities**
in cooperation with
- **European partnerships/initiatives**
- **ARIE facilities** (Wosnitza)

supporting ERA Priority Actions
3,4,8,9,10,16

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Two examples from strategy document

GREEN HYDROGEN

We aim at establishing a close relaitionship with the Clean Hydrogen Partnership in order to find solutions for the optimization of industrial processes and the development of materials for a clean hydrogen economy at all stages in the hydrogen value chain from production and storage to the efficient synthesis of hydrogenated compounds.

CLEAN WATER

Pilot projects on water-based technologies should include:

- Creation of sample environments and protocols for operando characterization of membranes for separation, purification, and strategic-element harvesting
- Development of procedures to characterize water properties in nanoconfinement at all relevant time and length scales

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This new cooperation between RIs and partnerships/missions

requires

A) common understanding on the need
to **bridge Pillar 1** (RIs) and **Pillar 2** (Challenges & Missions)

B) European funding for targeted access
to support
taylored operando technologies at LEAPS facilities
and
specific operation costs

→ **recommendation: European funding for targeted access & technology development**

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have devised roadmaps in

KEY ENABLING EUROPEAN TECHNOLOGIES

for the digital transformation of ERA

European Commission

- New **remote operation modalities** for all European Researchers and for European industry
  (contributing to technology resilience, reduction of CO_2 footprint)
- **AI-assisted** autonomous HTP **operation** (robotics, …)
- **Testbeds** for novel quantum technologies (q-sensing, QC, ….)
- Partnering with **EOSC**
- **Transformative technologies** in X-ray optics, sample delivery, accelerators, …. by early collaboration with industry (Quitmann)

supporting ERA Priority Actions 1,2,3,8,9,11,12,16

→ **Recommendation: European call for the development of key enabling technologies through innovation/with early collaboration with industry**

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ESAPS 2022

- supports **high quality research** in Europe,
- contributes to develop the skills of the **next generation of scientists and engineers** in Europe,
- subscribes to **diversity, gender balance, anti-discrimination** (“LEAPS-IDEA”),
- devises particle accelerators and associated **technologies of tomorrow** for a wide range of use in manufacturing and service industries in health, materials design, energy and security,
- supports European industry in **new product development** and market and by accelerating product design and development,
- devises **deeptech roadmaps** in close cooperation with European industries
- contributes to European **technology souvereignty**
- supports ERA Priority Actions. 

to make it happen, we need the support of the national funding bodies and ministries and of the European decision making bodies.

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Strengthen Europe's leading role in science and innovation