



# ELI-ALPS participation in IMPULSE

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ELI ALPS, Science Director

**IMPULSE**

**Kick-off meeting (virtual)**

**16th December, 2020**

**SZÉCHENYI** 2020



HUNGARIAN  
GOVERNMENT

European Union  
European Regional  
Development Fund



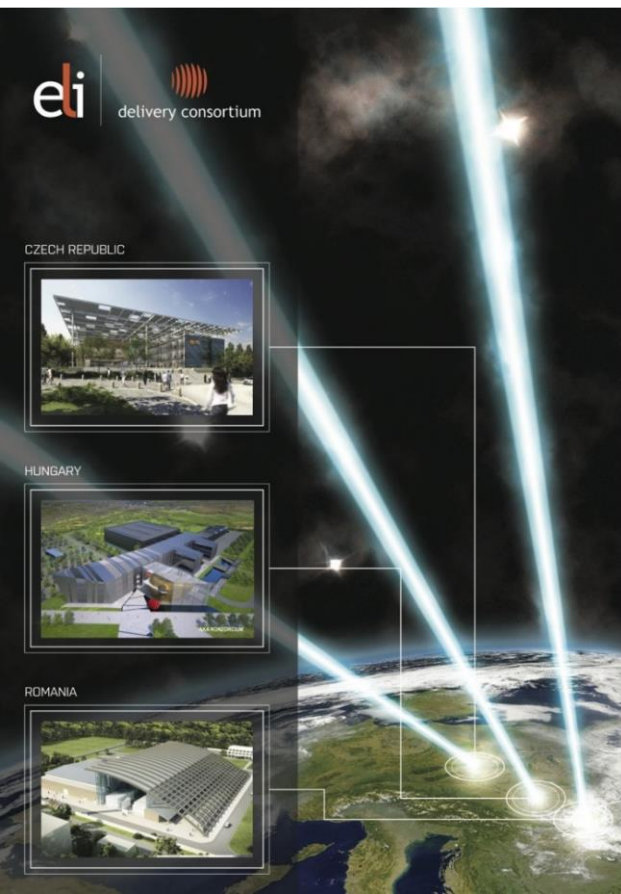
INVESTING IN YOUR FUTURE

# A distributed research infrastructure of the ESFRI roadmap

## ELI project:

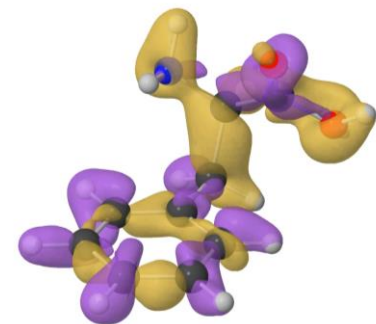
To strengthen Europe's leading role in laser physics.

User facility for researchers employing laser-driven experiments.



## ELI ALPS:

To generate few cycle pulses, for temporal investigations of electron dynamics.



0.00 fs

Calculation by F. Martin  
& A. Palacios

# ELI-ALPS

## Experiments based on laser drivers

Primary sources

Secondary sources

Experiments

High repetition rate (HR) lasers  
@ 100 kHz, 1mJ, 5mJ

Single cycle (SYLOS) lasers  
@ 1 kHz, 35 mJ, 120 mJ

High field (HF) laser  
@ 10 Hz, 34J

Mid-infrared (MIR) laser  
@ 100 kHz, 0.15 mJ / @ 1 kHz, 15 mJ

Terahertz pump lasers  
@ 50 Hz, 0.5 J / 1 kHz, 4 mJ

GHHG HR (cond)

GHHG HR (gas)

GHHG SYLOS (comp)

GHHG SYLOS (long)

MIR-GHHG

SHHG SYLOS

SHHG PW

e<sup>-</sup> PW

e<sup>-</sup> SYLOS

THz spectroscopy

THz high energy

Attosecond studies in atomic  
and molecular physics

Condensed matter physics

Nanophysics, materials  
science

THz spectroscopy

High resolution imaging

Source development

Plasma physics

Radiobiology



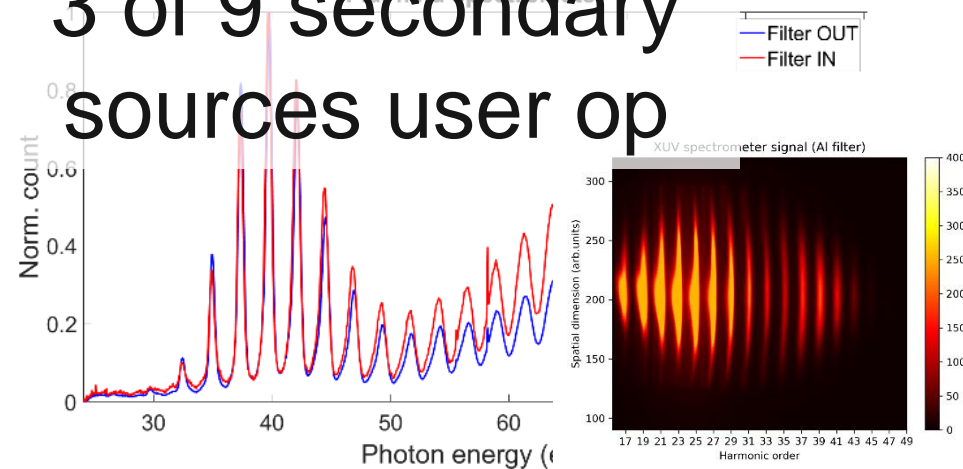
### 3 Laser systems commissioned

4 of 7 lasers  
user operational

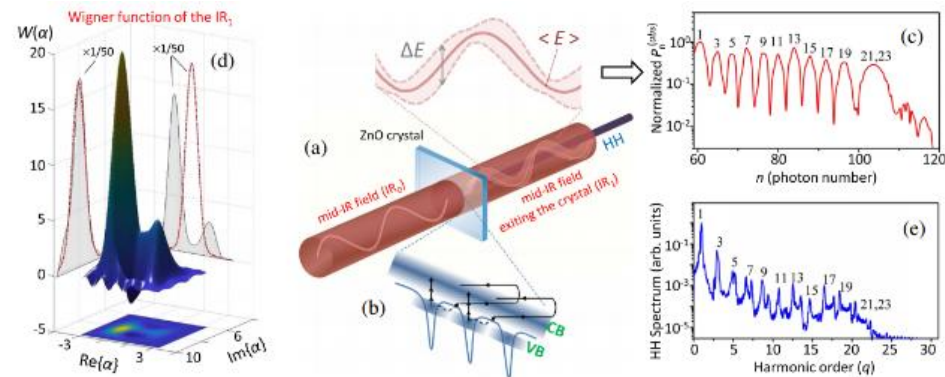


## 1<sup>st</sup> attosecond pulses

# 3 of 9 secondary sources user op



## 1<sup>st</sup> User paper from ELI-ALPS

PHYSICAL REVIEW LETTERS **122**, 193602 (2019)

## Quantum Optical Signatures in a Strong Laser Pulse after Interaction with Semiconductors

# 20 completed

<sup>†</sup>Foundation for Research and Technology-Hellas, Institute of Electronic Structure and Laser, PO Box 1527, GR-26504, Heraklion, Greece

## collaborative user

# collaborative user

# campaigns

# Campaigns

(Received 28 September 2018; published 14 May 2019)

2000+ user hours

# Workshops & Laboratories

## In house services + wide range of applications

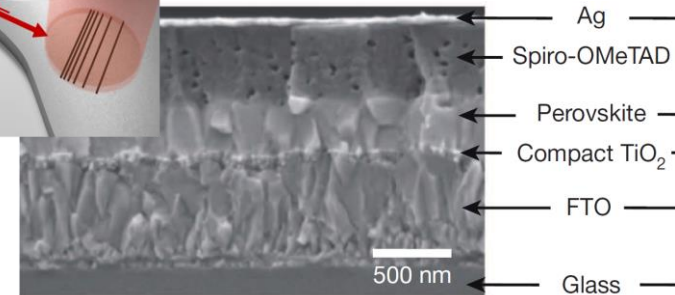
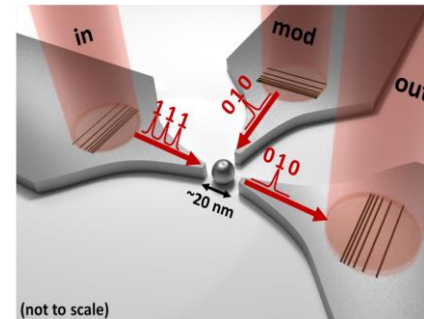
**Mechanical and electrical workshops (incl rapid prototyping)**



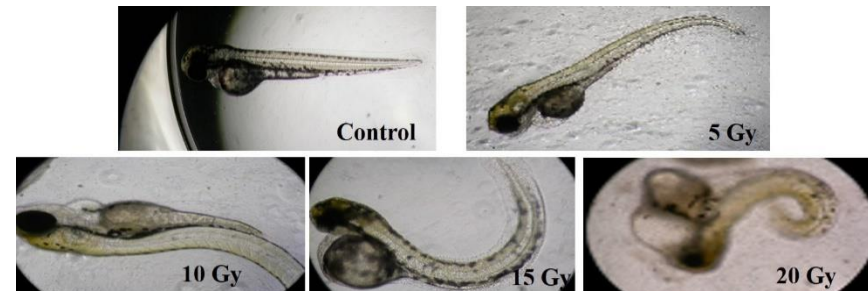
**Optical workshop for custom optics and coatings (incl advanced metrology)**



**Nanofabrication unit,  
optoelectrical sample preparation,  
nanooptics research,  
condensed matter  
analysis**



**(Radio)biology lab**





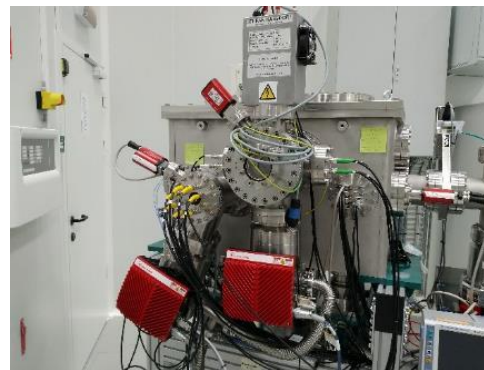
# Experiments at long last... commissioning user experiments

Users bring their own equipment

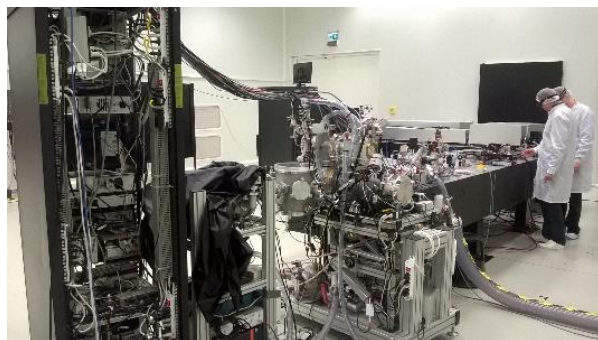


Stereo Photoelectron spectrometers - Jena

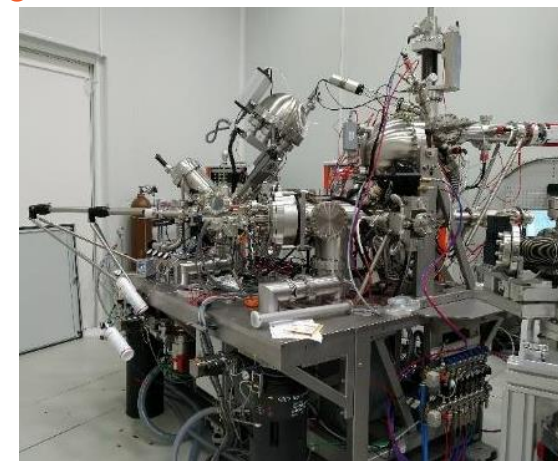
Users apply ELI in-house end stations



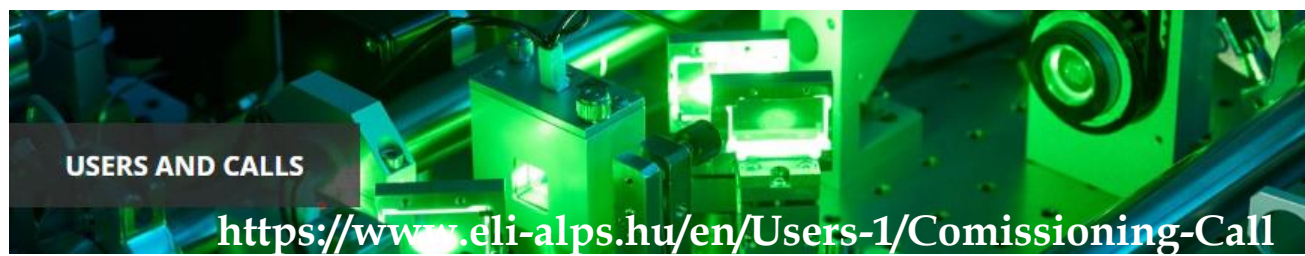
Ion microscope



High harmonic beam line,  
water target – ETH Zurich



NanoESCA



<https://www.eli-alps.hu/en/Users-1/Comissioning-Call>

**Last phase of implementation, transitioning to operations, requiring best practices to support user experience (= Impulse project).**

**Full participation (except WP8 (Ethics)).**

**Lead partner in WP3 (Ramping-up Towards Excellent Steady-State Operations)**

**Direct personnal cost 1 588 385 €**

**Travel 216,250 €**

**Equipment 482,400 €**

- In task 3.3 (Innovative metrology procedures for lasers and secondary sources), ELI-ALPS expects 100 k€ of equipment costs.
- In task 4.1 (Key optical components long-term sustainability: strategies to increase LIDT) ELI-ALPS plans 300 k€ in equipment costs related to the purchase of machinery for the optical workshop and components for building a LIDT test station.
- In task 5.3 (Implementation of access pilots), ELI-ALPS plans 82,400 € in equipment costs to improve the radiation protection equipment and to widen the experimental portfolio available at the facility

**Other goods and services 755,000 €**

**Indirect cost 760 509 €**

**Total 3 802 544 €**

**Governing Board member:** Prof Gábor Szabó (Legal Signatory of ALPS)

**Steering Board member:** László Jaloveczki

**Key personnel:**

**WP1:** David Bereczkei

**WP2:** László Jaloveczki

**WP3 (lead beneficiary):** Lajos Fülöp

**WP4:** Subhendu Kahaly

**WP5:** Zita Váradi

**WP6:** László Jaloveczki

**WP7:** multiple





**SEE YOU  
AT  
ELI ALPS!**

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