

# Spanish capabilities in relation with ELI



**II ELI-ERIC Iberian Information Day**  
**1st June 2022, Madrid**

**Luis Roso**  
**CLPU**

**Director**

**IMPULSE**





We are at  
Salamanca,  
Spain!





# Salamanca Pulsed Lasers Center, CLPU



Competitive Access Mechanism to apply for laser time

CLPU is a user facility  
open to domestic and  
international users

Up to now

1st, 2nd, and 3rd Call

**327 registered users**

**86 Spanish**

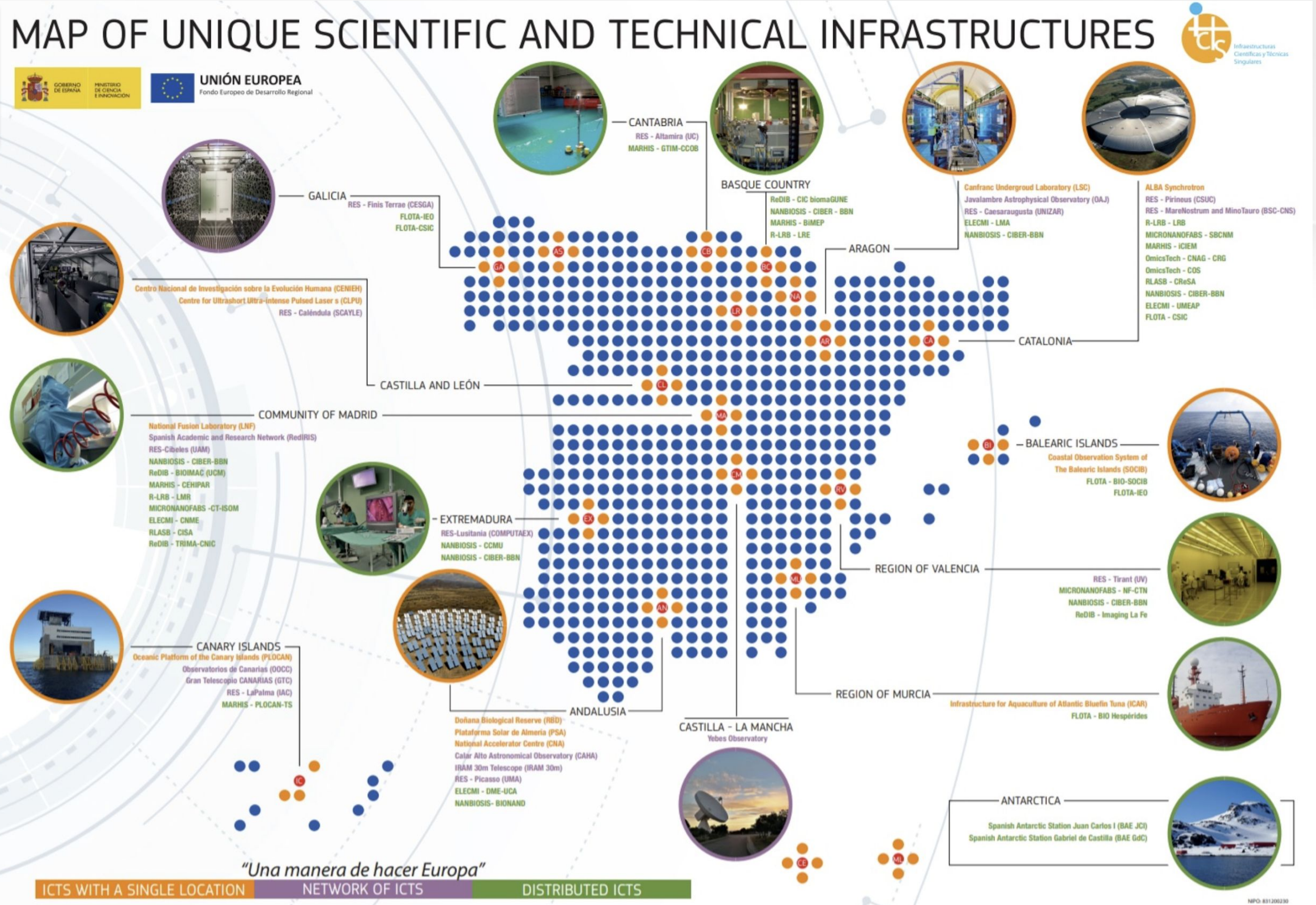
**241 other countries**

Iberian Information Day | 01/05/22 | [roso@clpu.es](mailto:roso@clpu.es)

MAP OF  
**UNIQUE  
SCIENTIFIC  
AND TECHNICAL  
INFRASTRUCTURES  
(ICTS)**



# MAP OF UNIQUE SCIENTIFIC AND TECHNICAL INFRASTRUCTURES (ICTS)





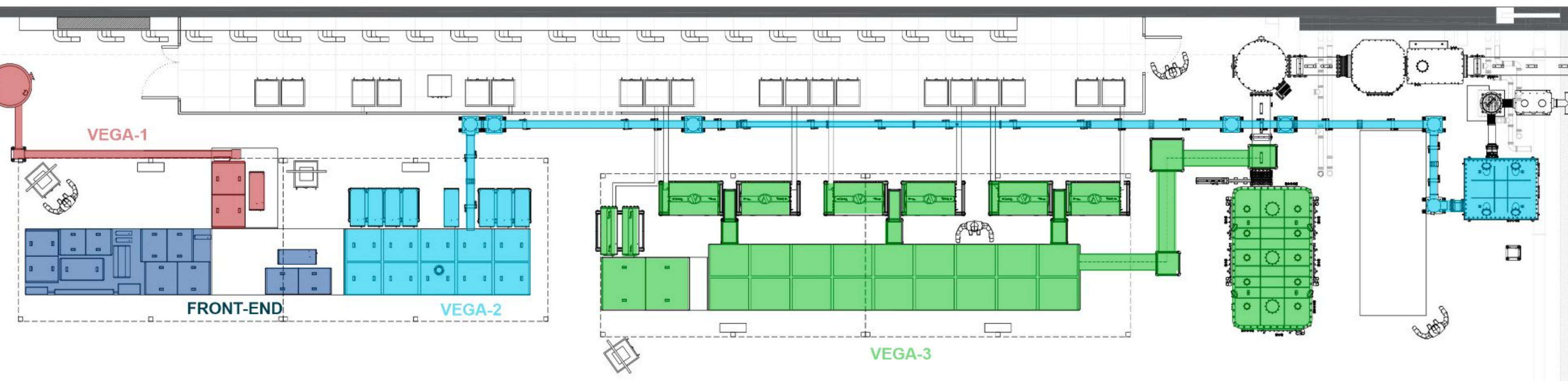


# VEGA laser system

Ti:sapphire 800 nm



30 m



**VEGA**

**peak power**

**energy**

**duration**

**rep rate**

**VEGA-1**

**20 TW**

**600 mJ**

**30 fs**

**10 / seg**

**VEGA-2**

**200 TW**

**6 J**

**30 fs**

**10 / seg**

**VEGA-3**

**1 PW**

**30 J**

**30 fs**

**1 /seg**



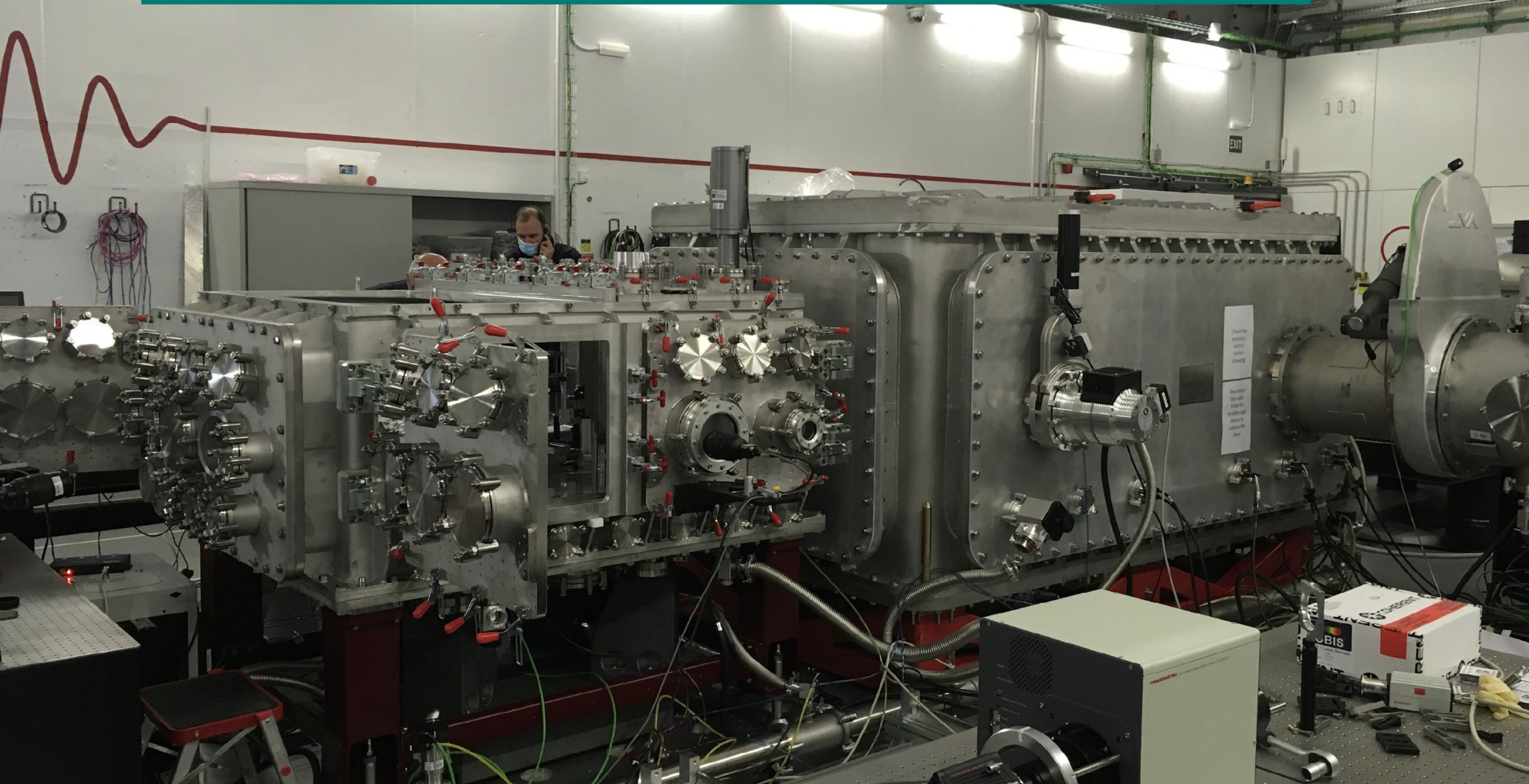




Compresores del sistema láser VEGA-2 y VEGA-3



And CLPU can be the natural bridge between  
the Spanish community and ELI-ERIC

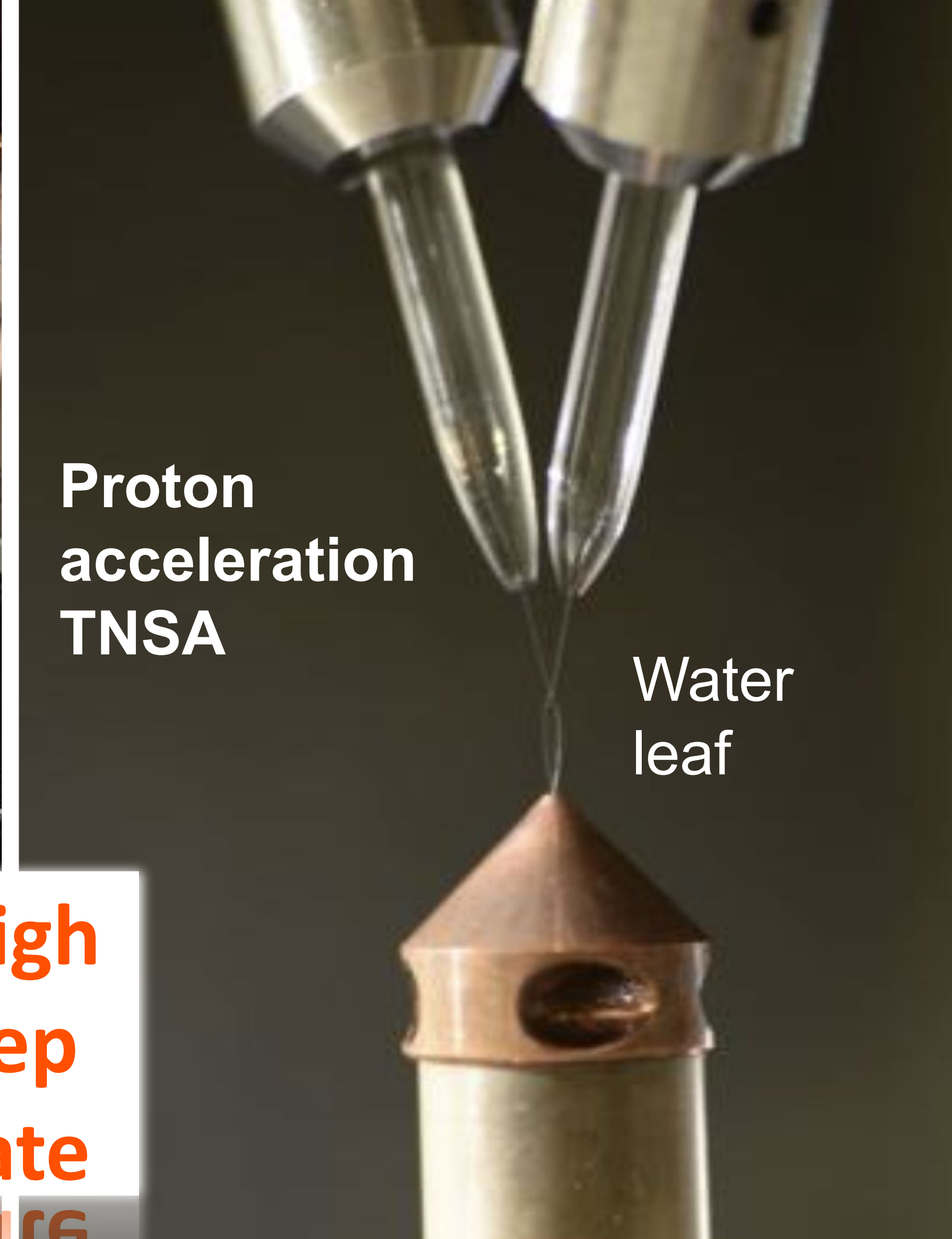




A photograph of a laser-wakefield acceleration (LWFA) setup. It features a large, rectangular, silver-colored metal chamber with a dark top surface. Various cables, hoses, and mechanical components are visible around the chamber. A gas jet nozzle is positioned to the left of the chamber.

**Electron  
acceleration  
LWFA**

**Gas jet**

A photograph of a target-normal sheath acceleration (TNSA) setup. Two brass-colored cylindrical electrodes are positioned vertically, pointing towards a small, thin, conical object labeled 'Water leaf'. Below the water leaf is a larger, copper-colored conical component.

**Proton  
acceleration  
TNSA**

**Water  
leaf**

**High  
rep  
rate**

**1966**



# Spanish potential community



# Femtosecond / attosecond community

## SPECIALIZED GROUP ON ULTRAFAST LASERS



Real  
Sociedad  
Española de  
Física

R.S.E.F.

GRUPO ESPECIALIZADO DE LÁSERES ULTRARRÁPIDOS (GELUR)

GELUR Board

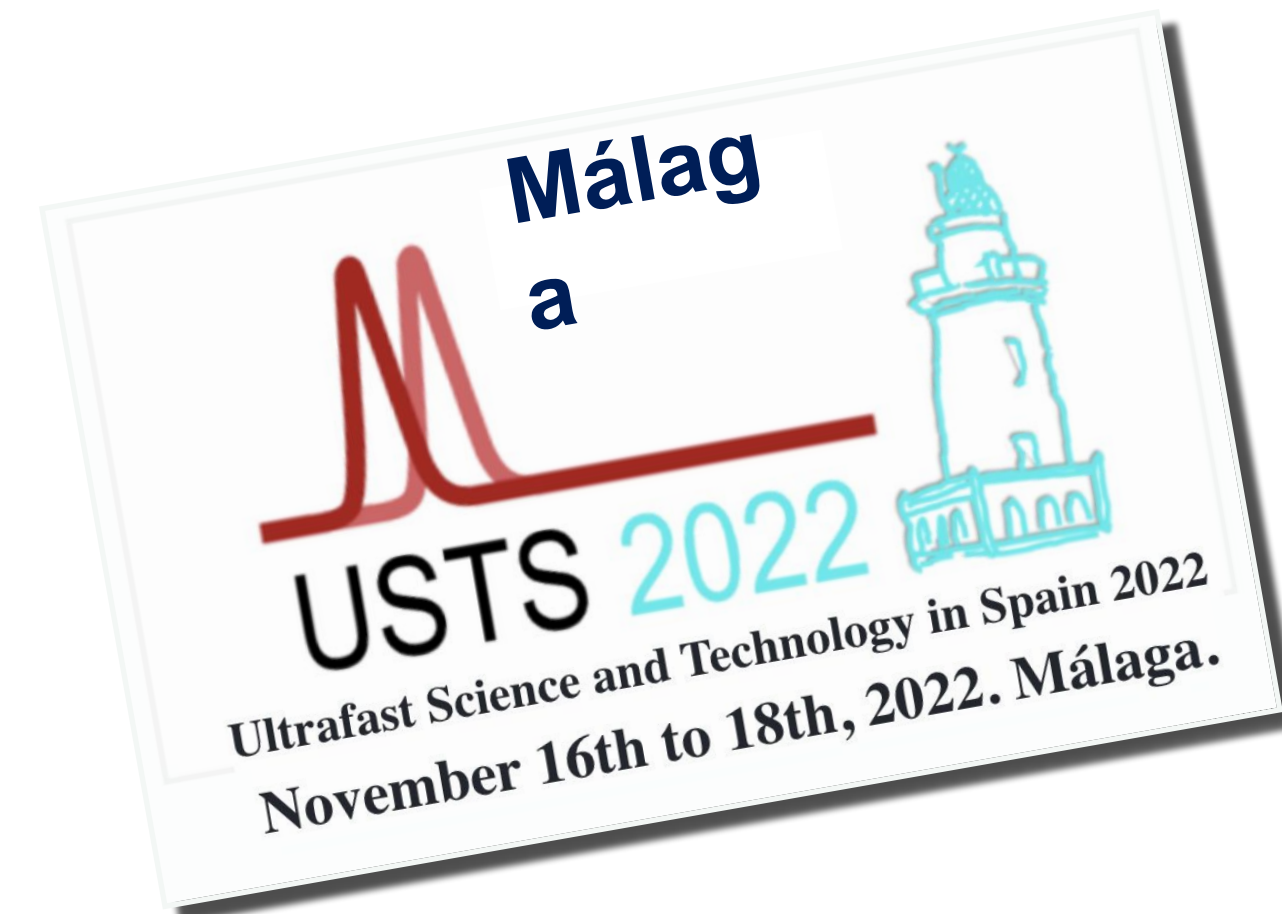
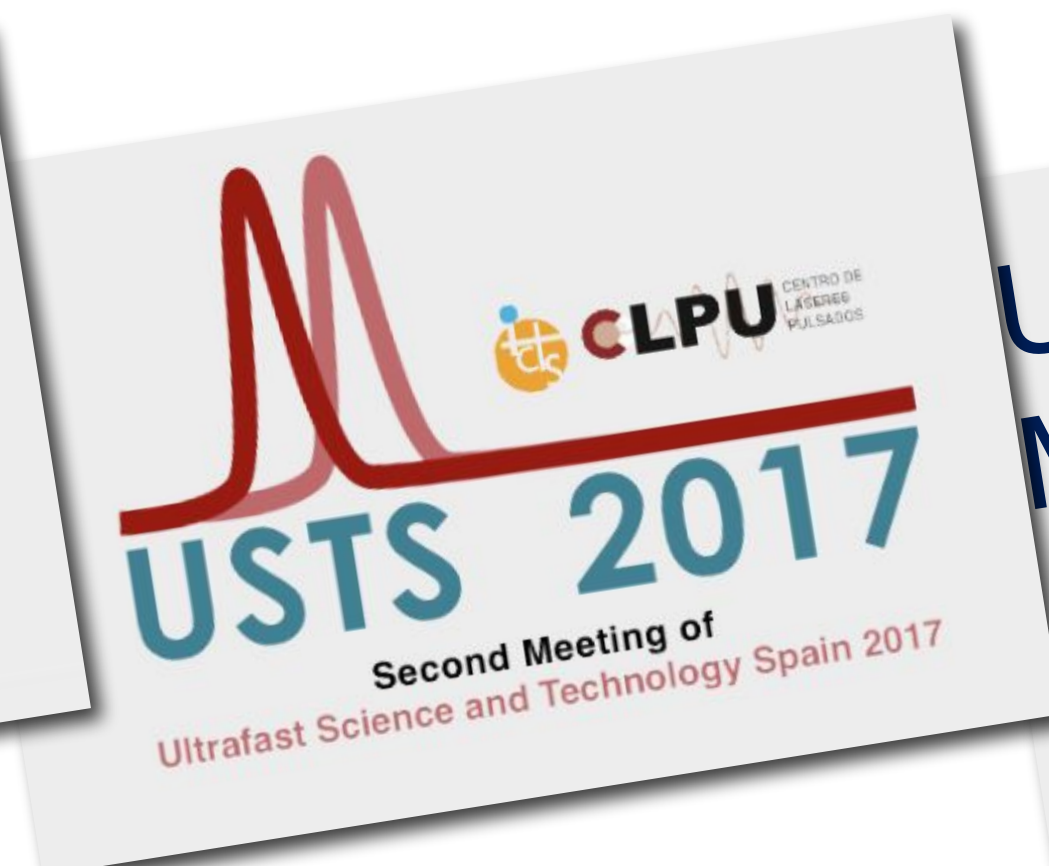
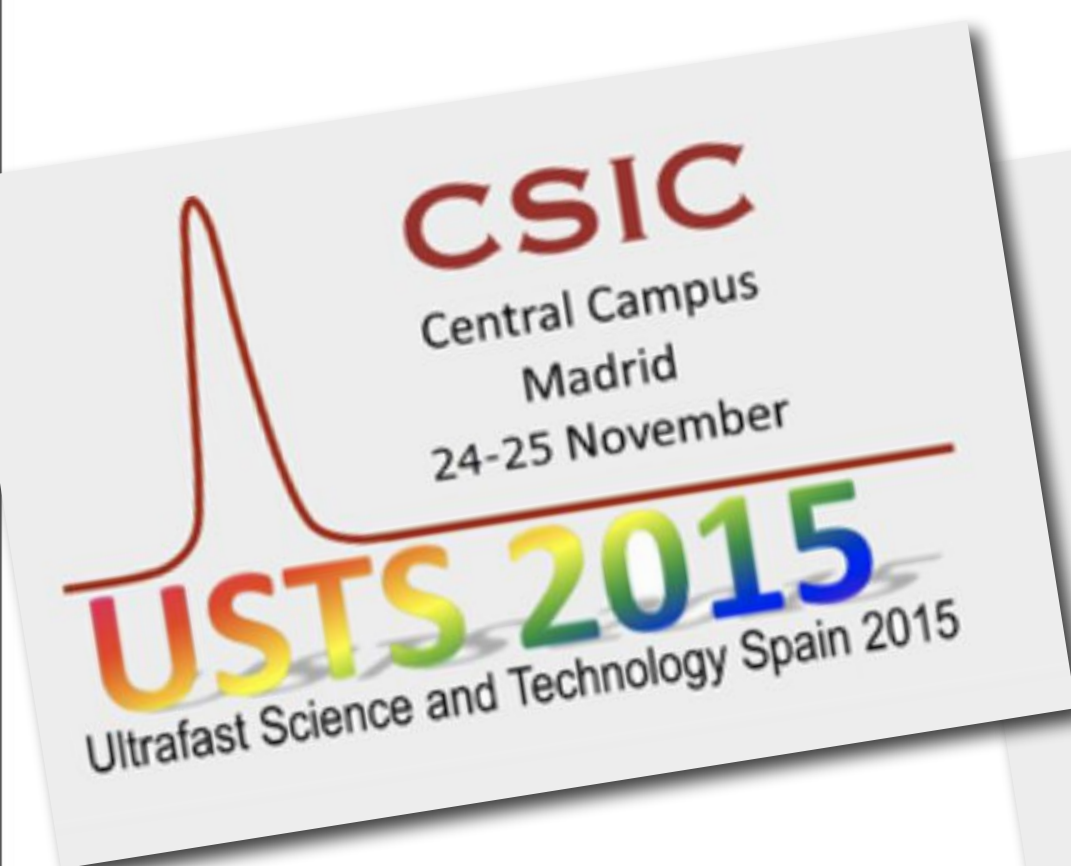
President Luis Bañares, Univ Comp Madrid

VicePresident Luis Roso, Univ Salamanca



Real  
Sociedad  
Española de  
Física

R.S.E.F.





# Accelerators

Centro Nacional de Aceleradores (calibration)



Centro de Micro-Análisis de Materiales (calibration)



Universidad de Sevilla (CLPU user)

CIEMAT (neutron dosimetry)



IFMIF-DONES (neutrons)

**Ciemat**

University of Salamanca (radiotherapy)

University of Navarra (radiotherapy)



Universidad de Navarra





# Fundamental physics

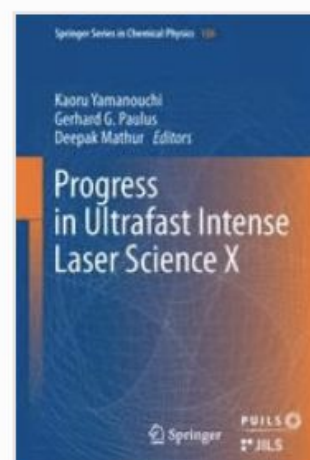
Article

## Electron dynamics and Thomson scattering for ultra intense lasers: elliptically polarized and OAM beams

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**Ciemat**

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## Quantum Vacuum Polarization Searches with High Power Lasers Below the Pair Production Regime

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# Laser Companies in Spain

Most of Spanish laser companies are related to laser hair removal or laser cut or laser import companies from main manufacturers

Need of investment in ultrafast laser companies

## Dual technology:

At CLPU we have build the first laser defector (proof of concept 40 KW) and **ELI know how**

Need to industrial investment

**Opportunity to create spin off based of CLPU**

**However quite complex projects, ~10 Meuro**

**New needs in:** vacuum, radiation shielding, large optics, control, big data, artificial intelligence, electronics, detectors, vibration analysis ...



# Interest to join ERIC for Spain

- Salamanca has been involved in ELI from the beginning
- Interest for Spanish scientists
- Interest for Spanish companies
- CLPU as satellite/partner facility of ELI
- In kind contribution



Brussels, February 2006



# Interest to join ERIC for Spain

- Salamanca has been involved in ELI from the beginning
- Interest for Spanish scientists
- Interest for Spanish companies
- CI DII as satellite/partner facility of ELI
- Further developments
- ELI 4 Spain





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# THANKS FOR YOUR ATTENTION!



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