

Salamanca Center for Pulsed Lasers

12 November 2021 - Online



ELI ERIC

Iberian Information Day

Iberian knowledge in service of the European laser community

Spanish Involvement and Research

Luis Roso

CLPU Director





We are at
Salamanca,
Spain!



CLPU is a user facility
opened to the domestic and international
community through competitive access





CLPU is a user facility open to domestic and international users

- 50% Spanish Central Government (Ministerio de Ciencia)
- 45% Regional Government (Junta de Castilla y León)
- 5% University of Salamanca

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



Competitive Access Mechanism to apply for laser time

Up to now 1st, 2nd, and 3rd access Call

327 registered users
86 Spanish
241 other countries

**CLPU is a user facility
open to domestic and
international users**

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



The VEGA laser

is CLPU unique equipment

The CLPU main laser: VEGA



Vacío

Centro de Láseres Pulsados, CLPU

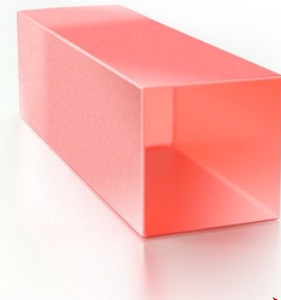
Compresores del sistema láser VEGA-2 y VEGA-3



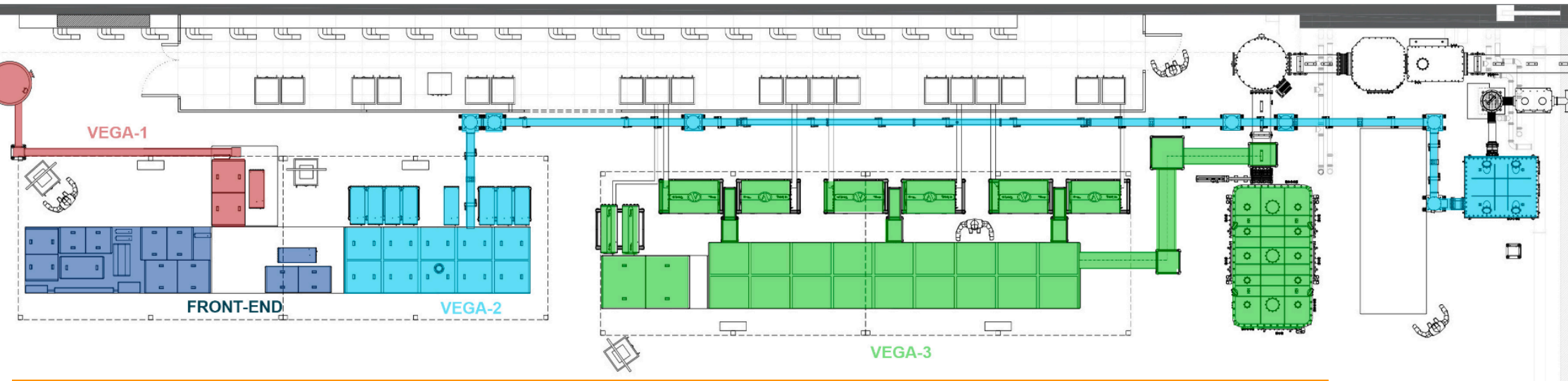


VEGA laser system

Ti:sapphire 800 nm



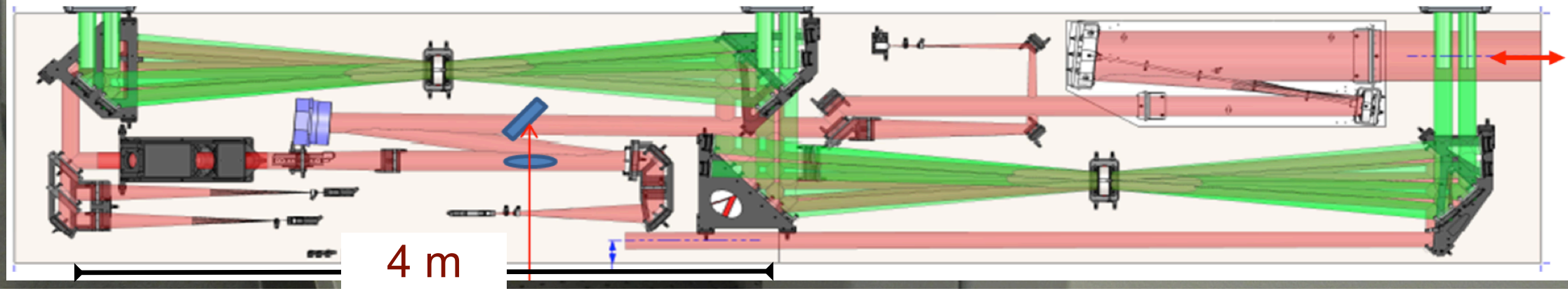
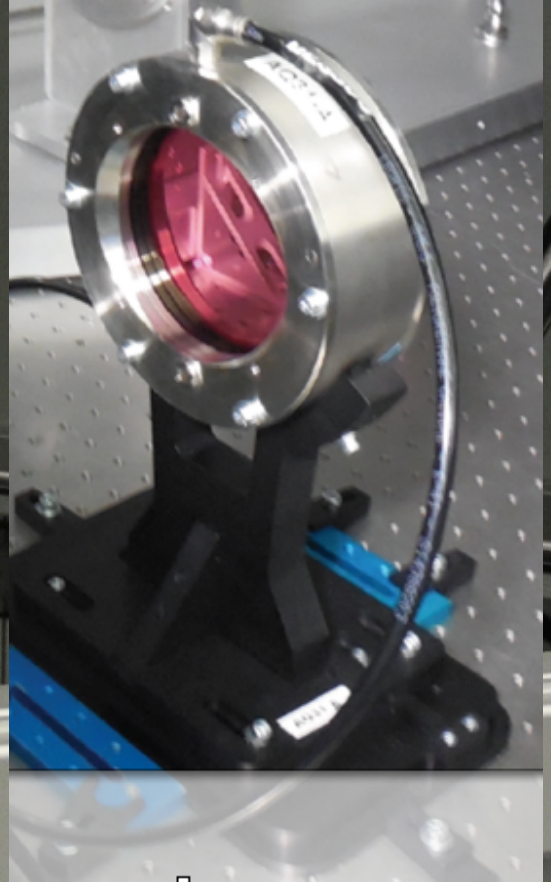
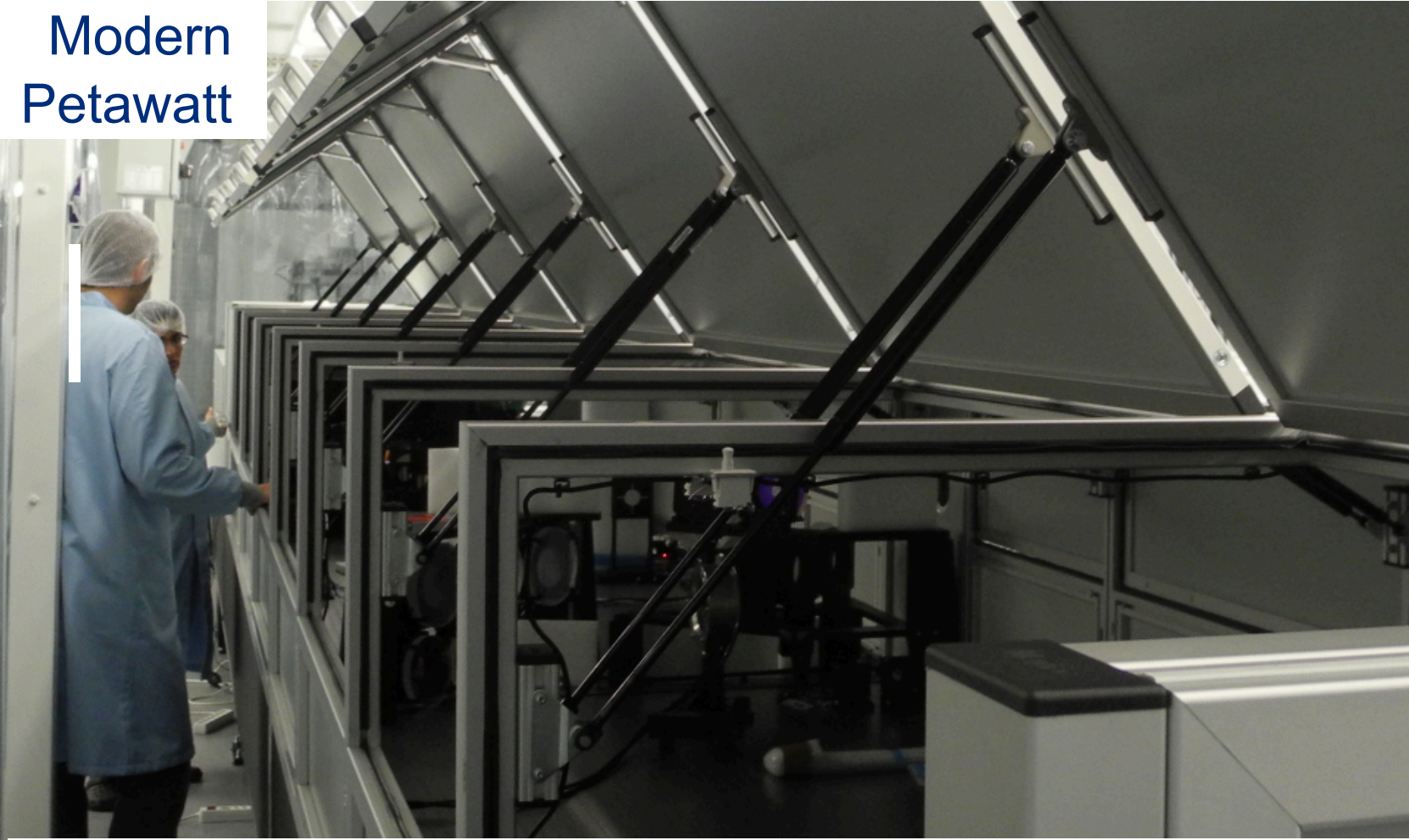
30 m



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



Modern Petawatt



Centro de Láseres Pulsados, CLPU



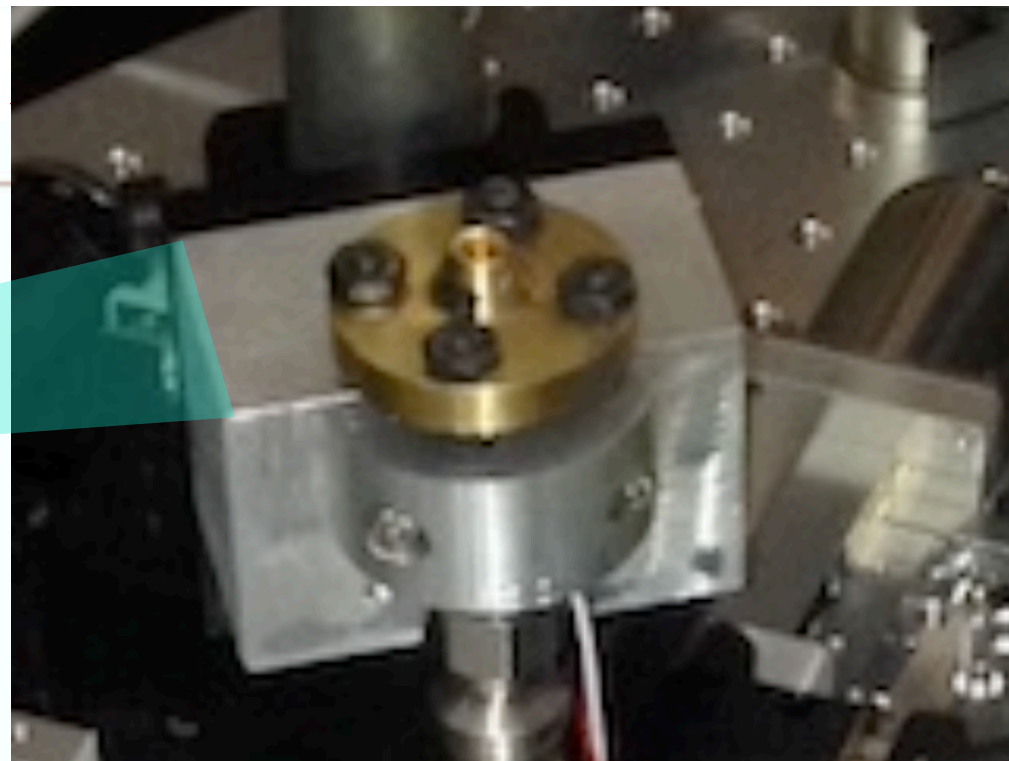
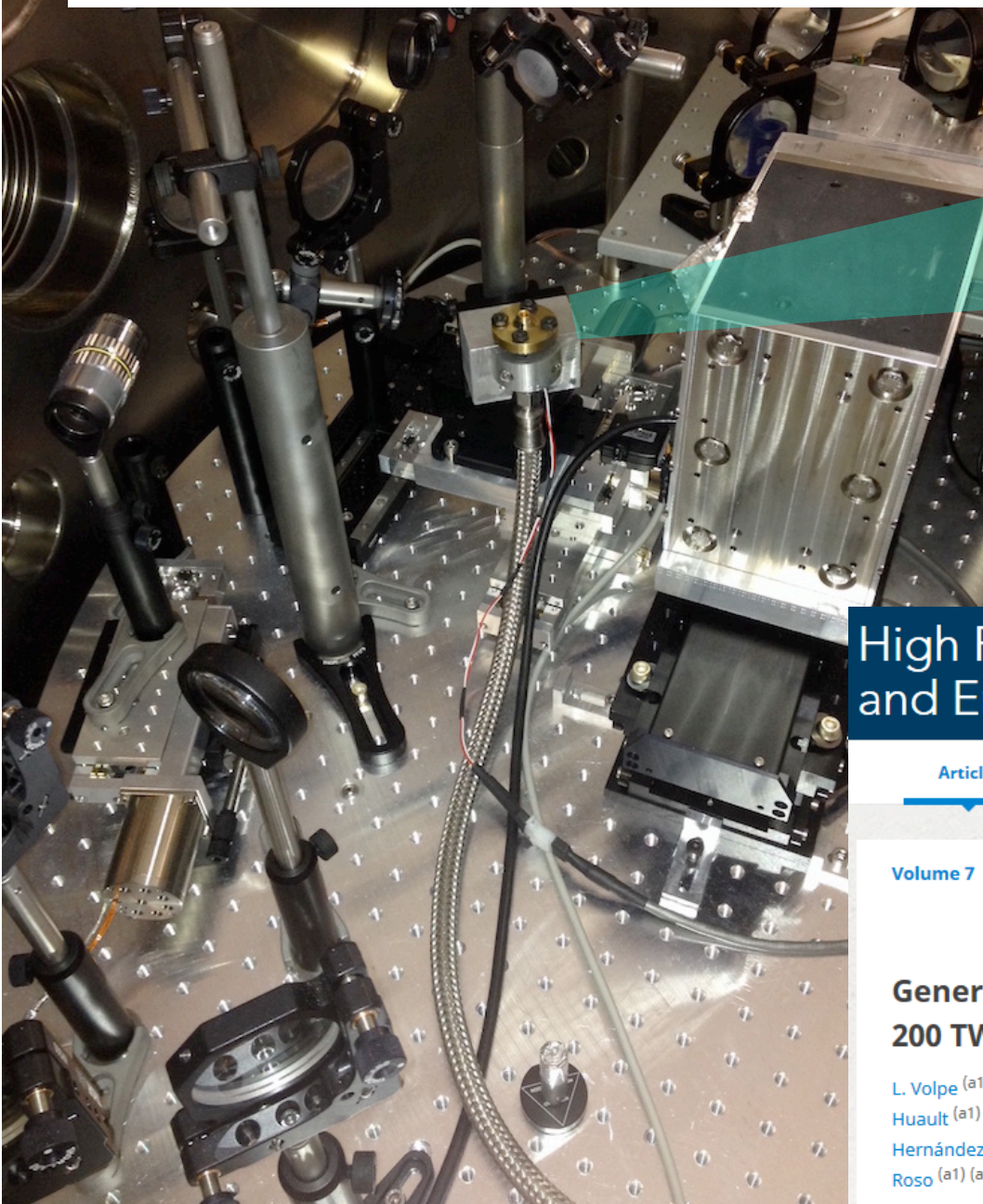
Compresores del sistema láser VEGA-2 y VEGA-3



High repetition experiments

1 PW @ 1 Hz VEGA-3

Electron accelerator LWFA



High Power Laser Science and Engineering



Article

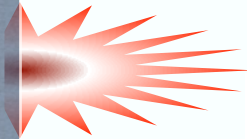
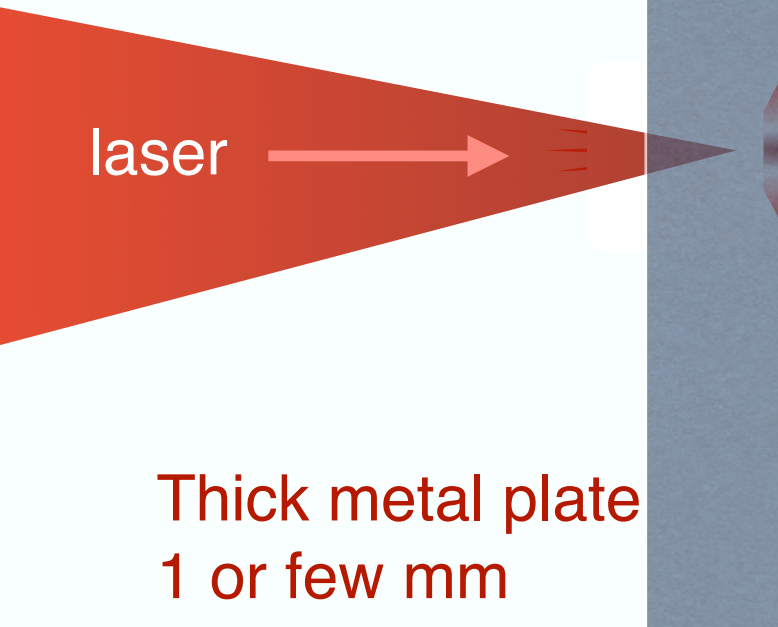
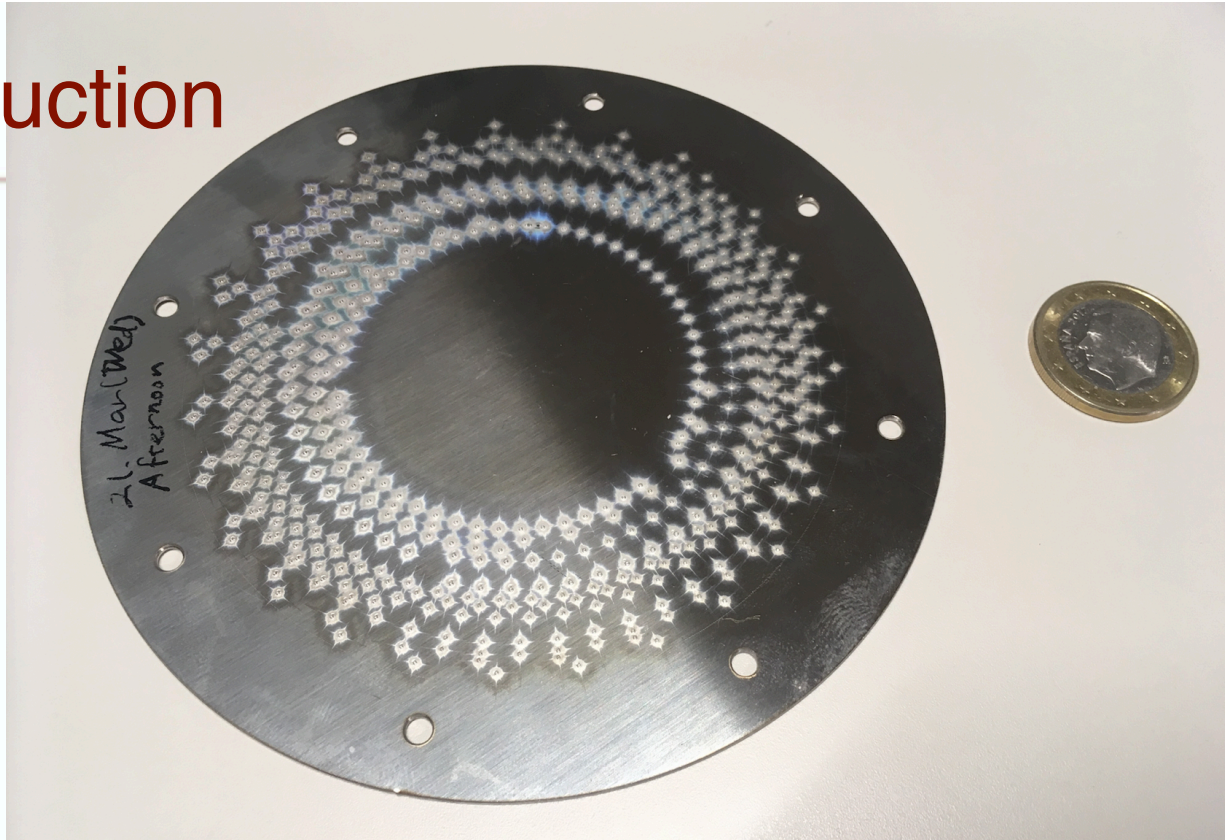
Metrics

Volume 7 2019, e25

Generation of high energy laser-driven electron and proton sources with the 200 TW system VEGA 2 at the Centro de Laseres Pulsados

L. Volpe ^{(a1) (a2)}, R. Fedosejevs ^(a3), G. Gatti ^(a1), J. A. Pérez-Hernández ^(a1), C. Méndez ^(a1), J. Apiñaniz ^(a1), X. Vaisseau ^(a1), C. Salgado ^{(a1) (a4)}, M. Huault ^{(a1) (a4)}, S. Malko ^{(a1) (a4)}, G. Zeraouli ^{(a1) (a4)}, V. Ospina ^{(a1) (a4)}, A. Longman ^(a3), D. De Luis ^(a1), K. Li ^(a1), O. Varela ^(a1), E. García ^(a1), I. Hernández ^(a1), J. D. Pisonero ^(a1), J. García Ajates ^(a1), J. M. Alvarez ^(a1), C. García ^(a1), M. Rico ^(a1), D. Arana ^(a1), J. Hernández-Toro ^(a1) and L. Roso ^{(a1) (a4)} 

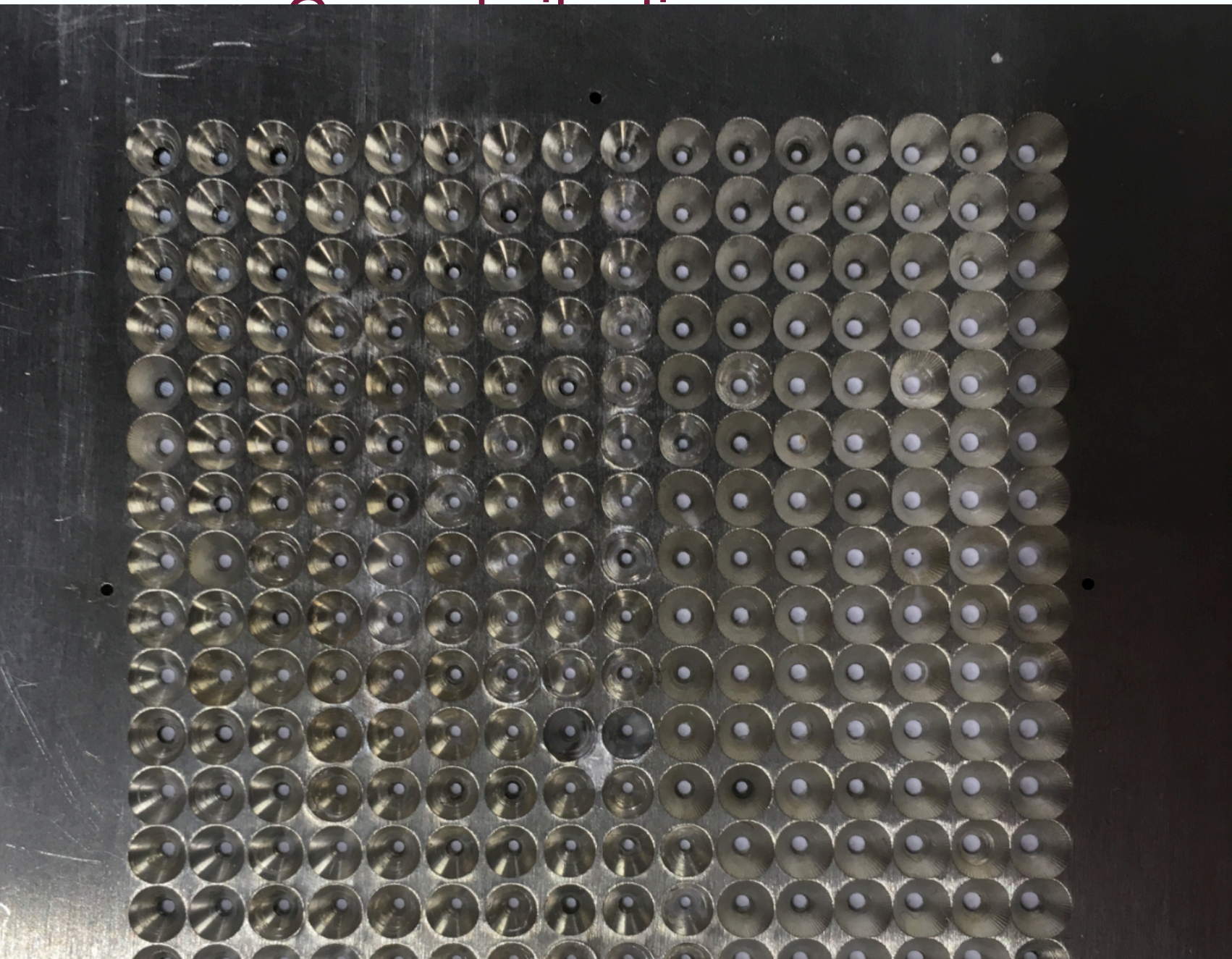
Gamma ray production

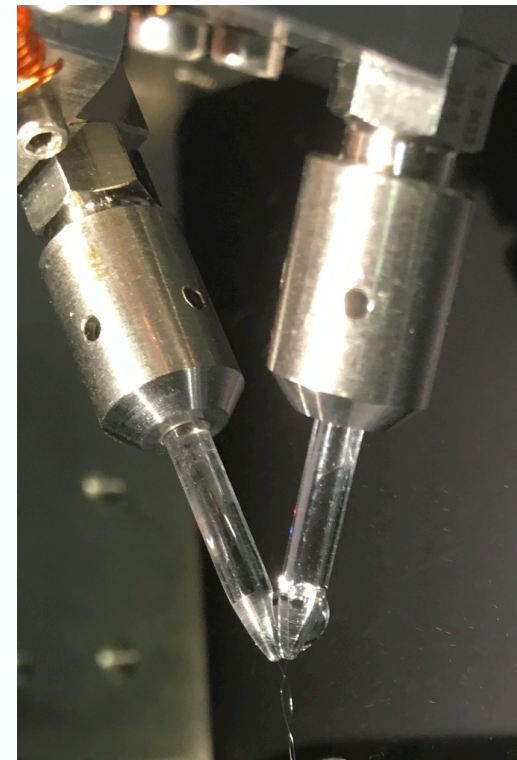


Gamma ray burst

A PW laser can easily generate
> 10 MeV photons (broad spectrum)

Thick metal plate
1 or few mm



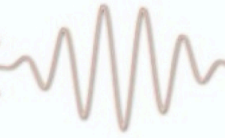




Spanish potential community



Ultrafast laser community in Spain



Femtosecond / attosecond community



Real
Sociedad
Española de
Física

R.S.E.F.

SPECIALIZED GROUP ON ULTRAFAST LASERS

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.

Ultrafast Science and Technology in Spain Bi-annual workshop





Spanish users of accelerators

Accelerators

Centro Nacional de Aceleradores



Centro de Micro-Análisis de Materiales



Universidad de Sevilla (CLPU user)



CIEMAT (neutron dosimetry)



IFMIF-DONES (neutrons)



University of Salamanca (radiotherapy)



University of Navarra (radiotherapy)






Fundamental physics



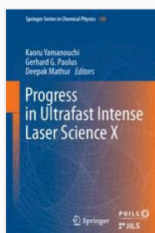
Article

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

Ignacio Pastor¹ , Ramón Fernández Álvarez-Estrada² Luis Roso^{3*}, José Guasp¹ and Francisco Castejón^{1,†}

Ciemat

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[Progress in Ultrafast Intense Laser Science](#) pp 137-153 | [Cite as](#)

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

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ISUILS Online VII

www.isuils.jp

ISUILS Online 7 - Luis Roso

Date: November 16 (Tue), 2021

Time: 13:00 - 14:30 CET

7:00 - 8:30 EST, 21:00 - 22:30 JST





Bunker IRA 3254



Facility I Instalación
Radioactive R Radiactiva
Authorized A Autorizada



... and the famous 4th Pillar



Brussels, February 2006.



Madrid 2011



Ten years ago it was a group to bring the 4-pillar to Spain

Conclusions

ELI offers access to an extraordinary technology.
Leads de accelerator technology revolution
Offers a fundamental tool as well

ELI can offer to Spanish to Scientific community
Access to world class lasers and laser accelerators
Ready for certain applications as biomed, attochem,

Fundamental Physics

Quantum vacuum, dark matter.
Ultraviolet accelerations
Plasmas of astrophysical interest and fusion reactions.

Tools

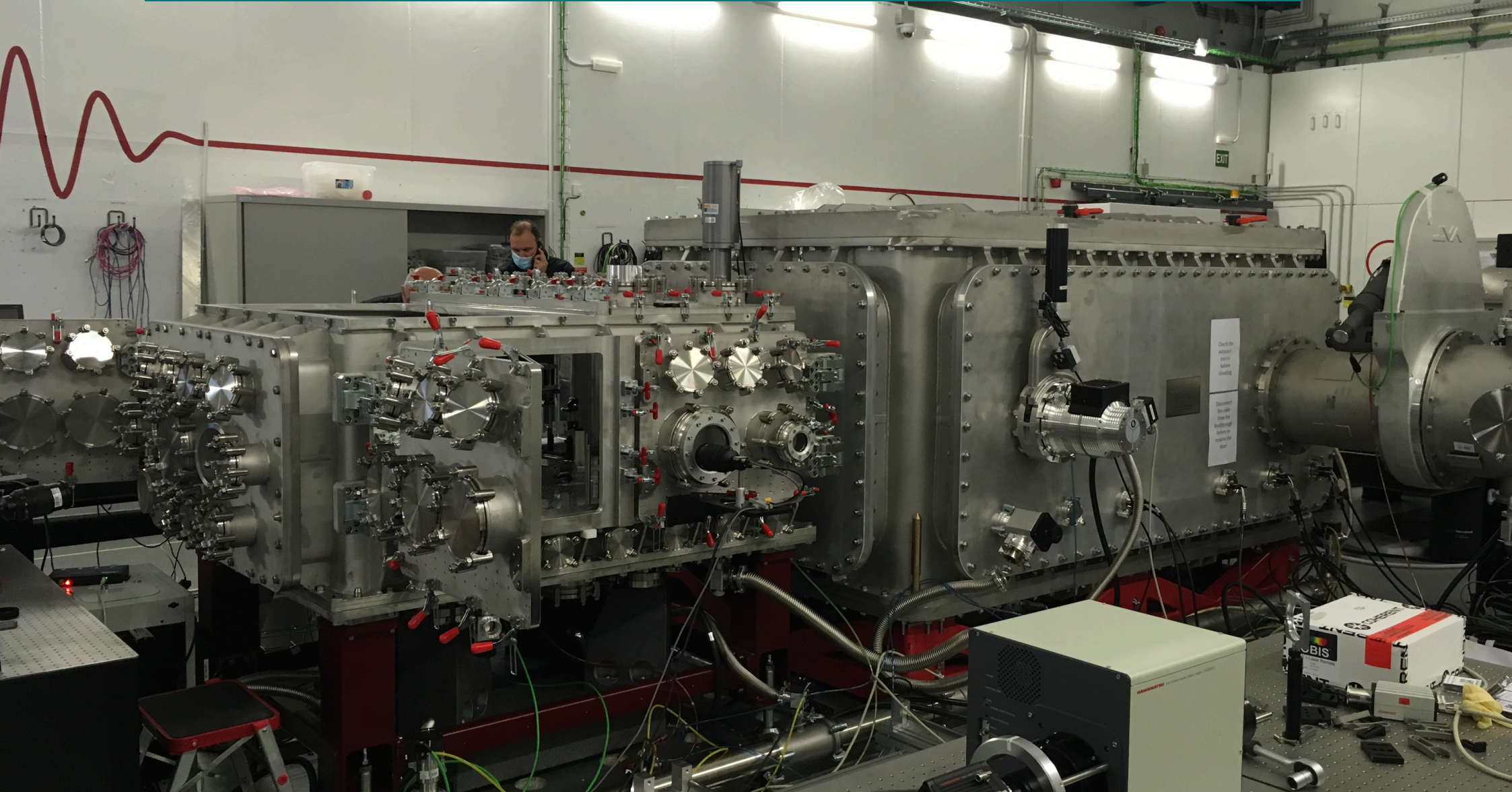
Laser metrology, particle diagnostics, control and data



Spanish community
under construction
Needs effort to attract
new communities
Emerging tools
with unexpected
performances.

IMPULSE

And CLPU can be the natural bridge between the Spanish community and the three pillars !!!



Thanks !!!

