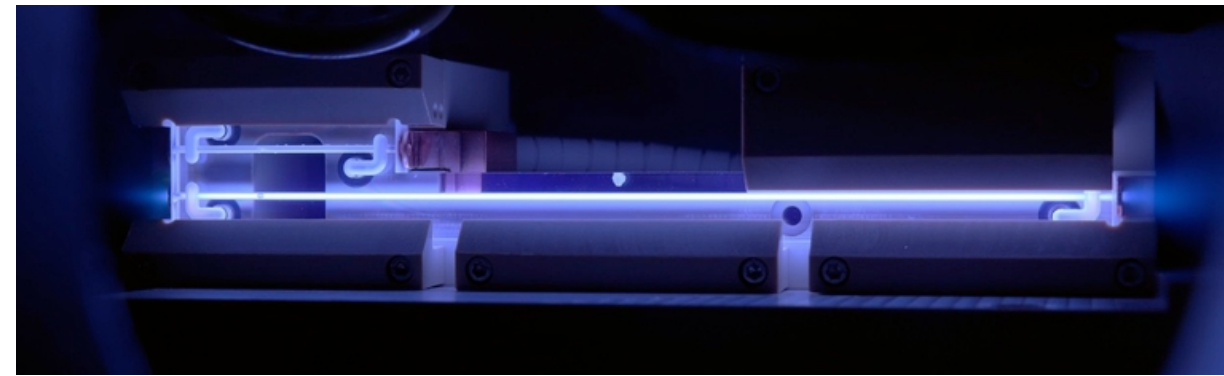


WP10 - Plasma Components & Systems

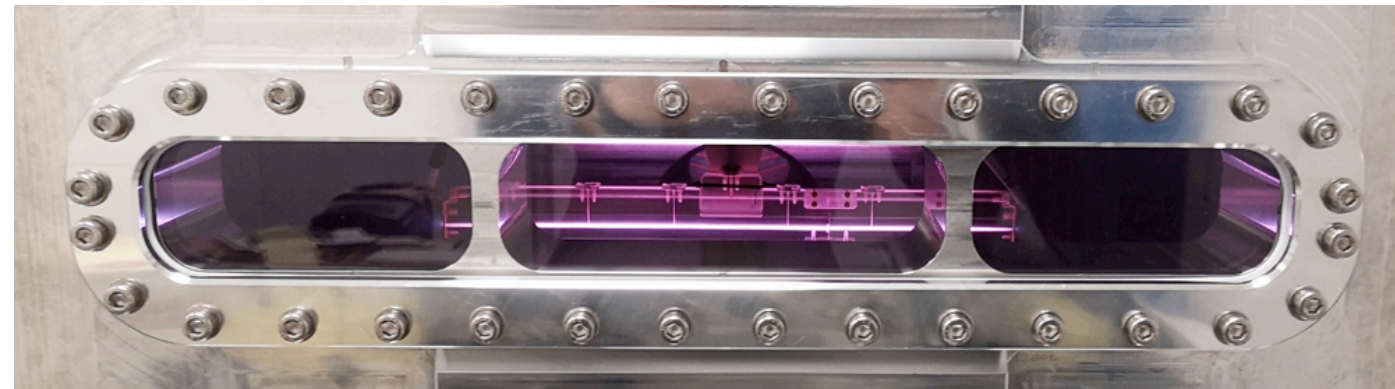
K. Cassou (CNRS/IJClab) J. Osterhoff (DESY)

WP10 - Plasma Components & Systems

Discharge-based plasma sources

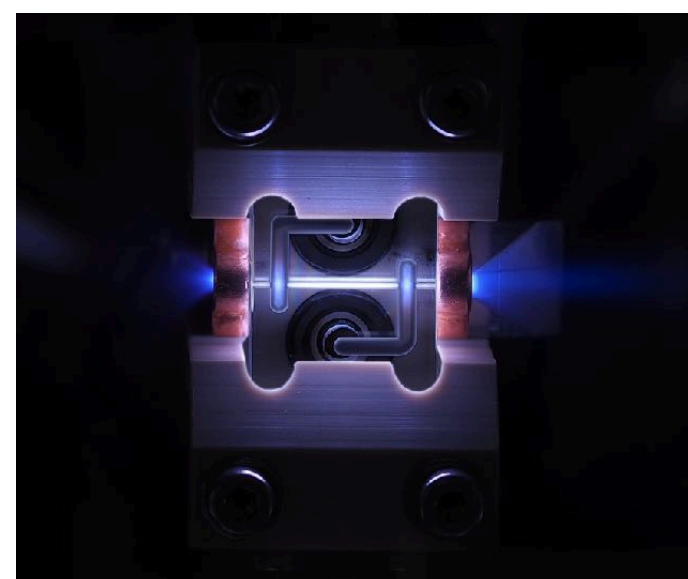


src: DESY, Flashforward

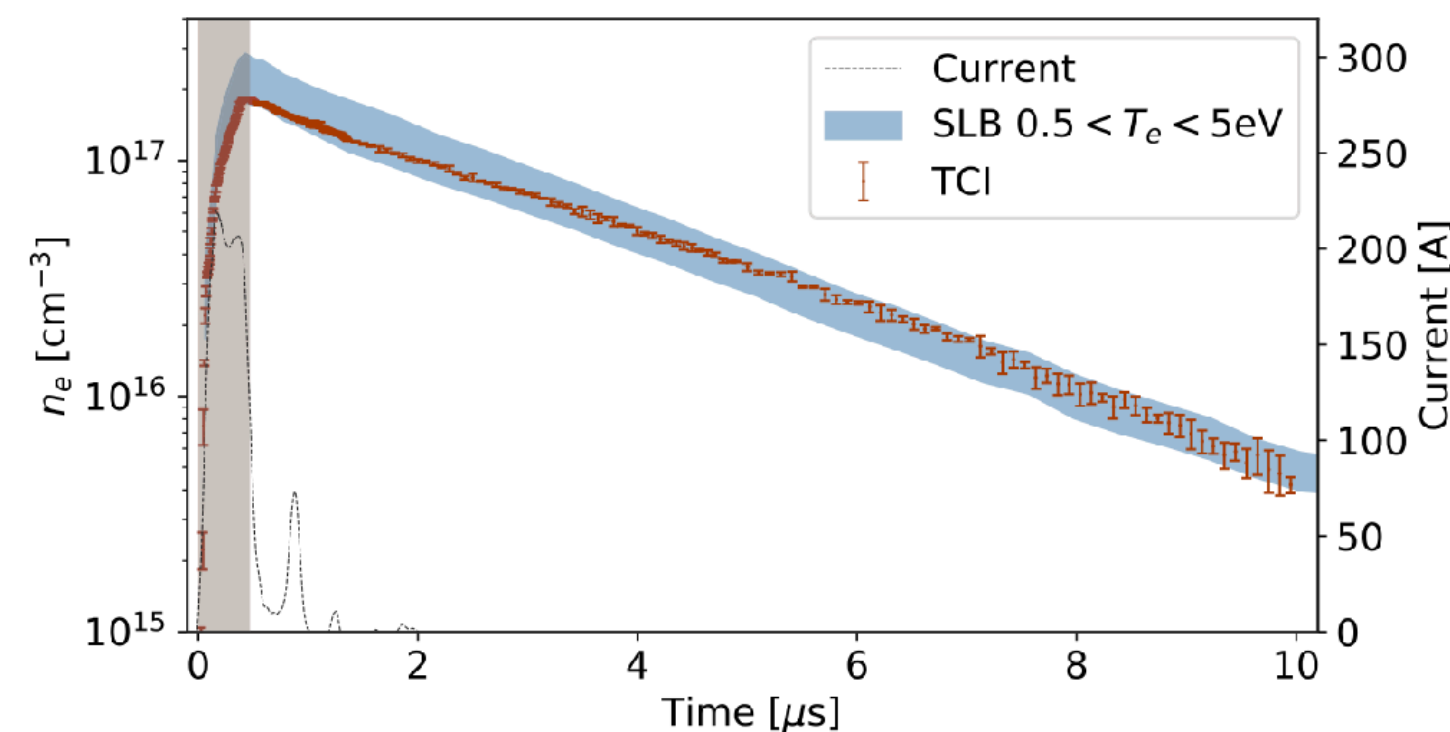


src: INFN-LFN, plasma source

Plasma lenses



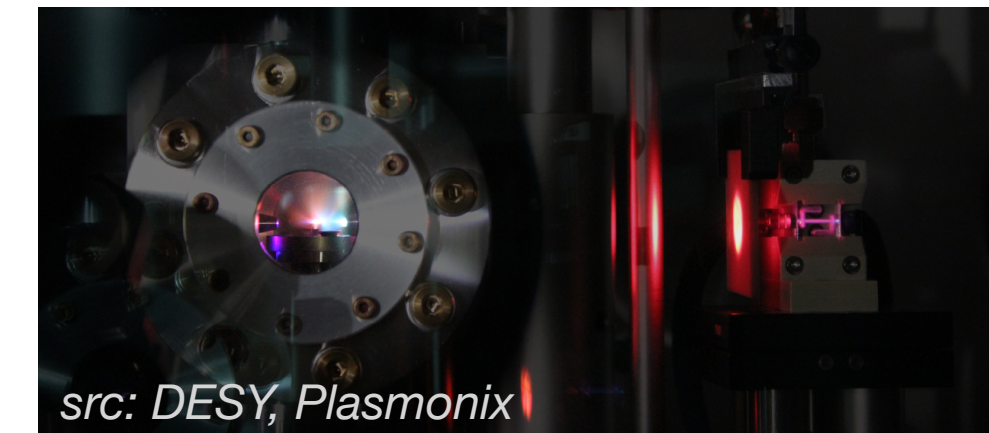
src: DESY



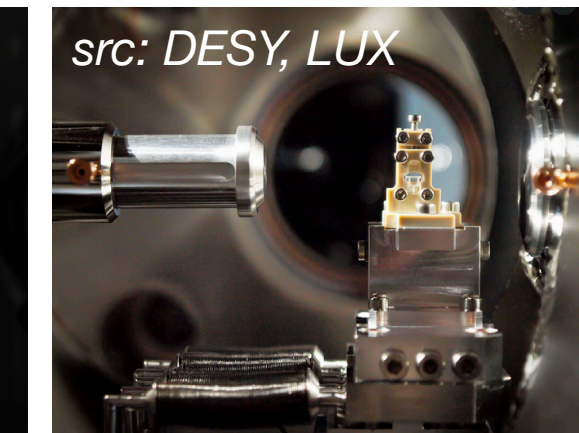
src: DESY, Garland, <http://arxiv.org/abs/2007.08184>

Laser based plasma sources

Including Capillaries, cells, gas jets, HOI channels.



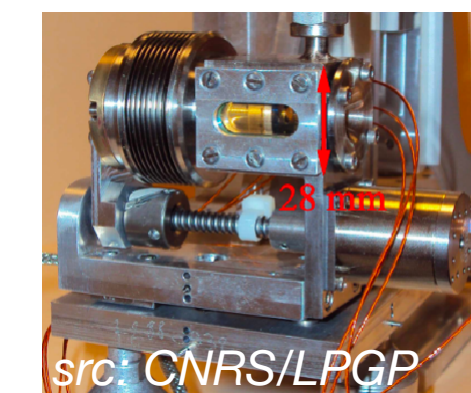
src: DESY, Plasmonix



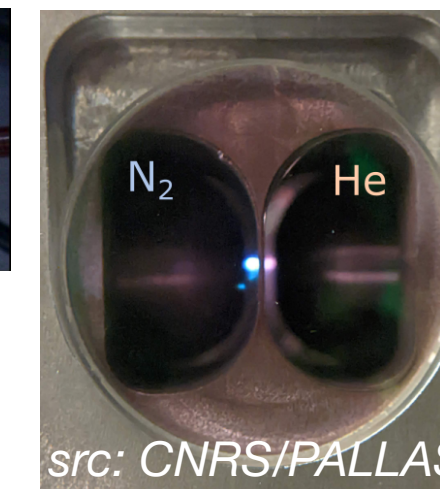
src: DESY, LUX



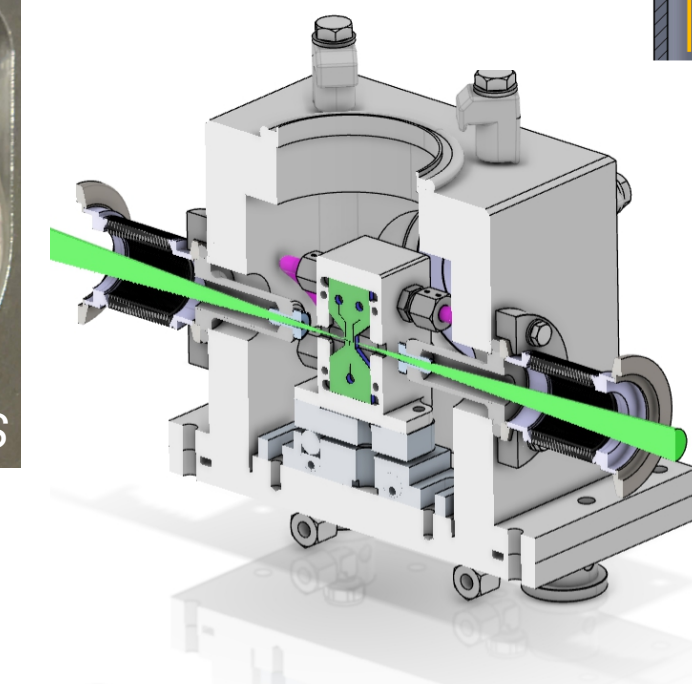
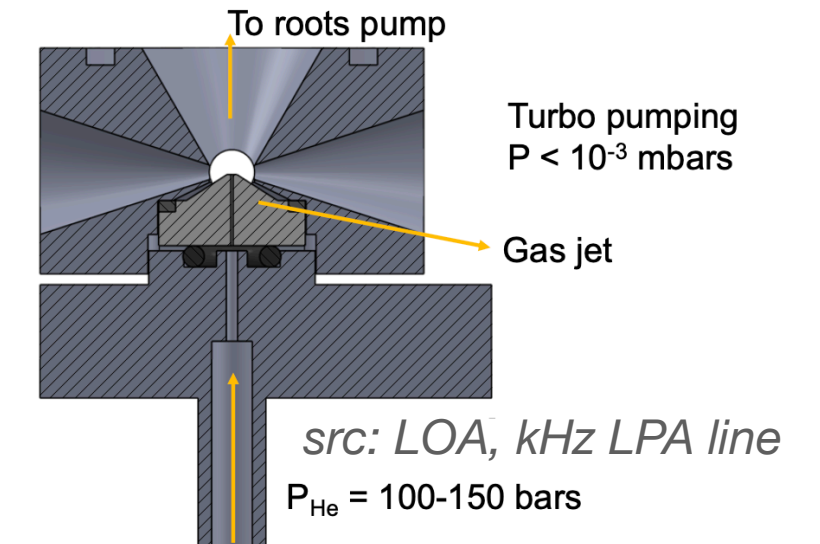
src: JAI, Oxford



src: CNRS/LPGP



src: CNRS/PALLAS



What about plasma mirrors ? Potential candidate for in coupling / removal of laser driver in staging. Presently not covered by the WP10 participants?

Plasma diagnostics

Electron density $n_e(r,z,t)$, gas species $n_p(r,z,t)$.

Plasma electron temperature distribution for some of plasma systems

WP10 - Objectives

Assess the current design of plasma components and related systems

- Plasma source geometries and vacuum technologies
- Methodologies for plasma parameter control and diagnostics.

Define a sustainable roadmap to fulfill the EuPRAXIA scientific goals for plasma components

- Steering of the technical and scientific design
- Proposing an integrated strategy for the development of plasma components and related systems.

Current challenges for plasma components :

- > long./trans. plasma shaping accurate modeling
- > long-term reliability
- > shot-to-shot fluctuations
- > low-density diagnostics with high accuracy
- > cooling/high-avg. power operation
- > beamline integration



+ Multi physics accurate modeling

WP10 - Organisations



Participants:

CNRS (IJClab, LLR, LOA, LPGP): contact Kevin Cassou kevin.cassou@ijclab.in2p3.fr

CNR-INO: contact Fernando Brandi (optical plasma diagnostic) fernando.brandi@ino.cnr.it

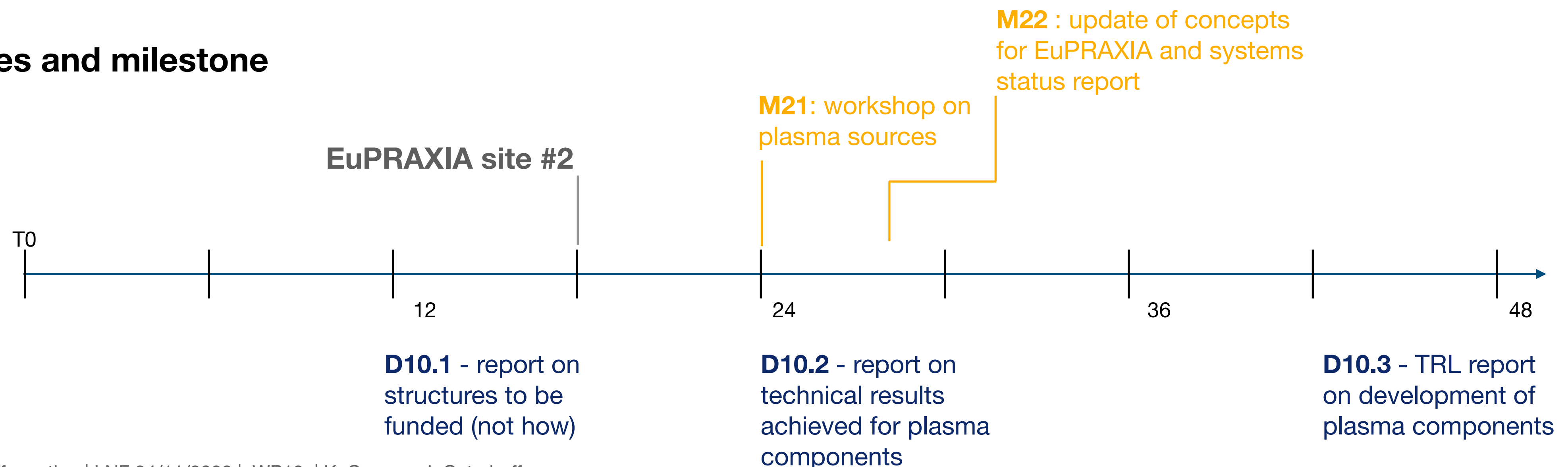
DESY: contact Jens Osterhoff jens.osterhoff@desy.de

ELI-BL: contact Gabriele Maria Grittani grittani@eli-beams.eu

INFN-LNF: contact Angelo Biagioni angelo.biagioni@lnf.infn.it

QU: contact Gianluca Sarri g.sarri@qub.ac.uk

Deliverables and milestone



WP10 - versus Excellence centers

Our understanding: WPs are responsible for TDR report based on *Excellence centers* technical tests and prototyping

Excellence centers concerned by **WP10**

- Plasma acceleration and high repetition rate (DESY)
- Laser plasma acceleration and 1GeV FEL (CNRS - IJCLab/LOA/CEA-IRFU/SOLEIL)
- Theory and simulations
- Technology incubator

At DESY still not defined

The definition of *Excellence center* remains vague

- how work is distributed between excellence centers ?
- What level of redundancy is acceptable or required ?
- funding of distributed EuPRAXIA R&D in excellence centers ?

In France last discussion for Laser plasma acceleration and *1GeV FEL* is gathering

LAPLACE-HR / LAPLACE-HE projects

PALLAS project

UPDATE NEEDED

WP10 versus EuPRAXIA sites



Building collaborations with sites in the technical preparatory phase ?:

All potential candidates are participating in WP10

Specifications of plasma components from sites to WP / excellence centers How and when ?

we need guidelines

PP organisation technical work must stay focus on achieving for EuPRAXIA a «user facility » performance standard

First actions

- setup the mailing list
- set first online meeting for the WP10 beginning of next year (possibly: in-person meeting at side of conference, avoid multiplication of travel to limit the environmental impact)
- survey of who is doing what vs available effective resources for the next steering committee, update mailing list
- participation in a more general discussion with *Excellence centers* is mandatory

We are looking forward to coordinating the development of next-generation plasma source technology for EuPRAXIA!

If your institute/group was missing and you want to join, please get in touch