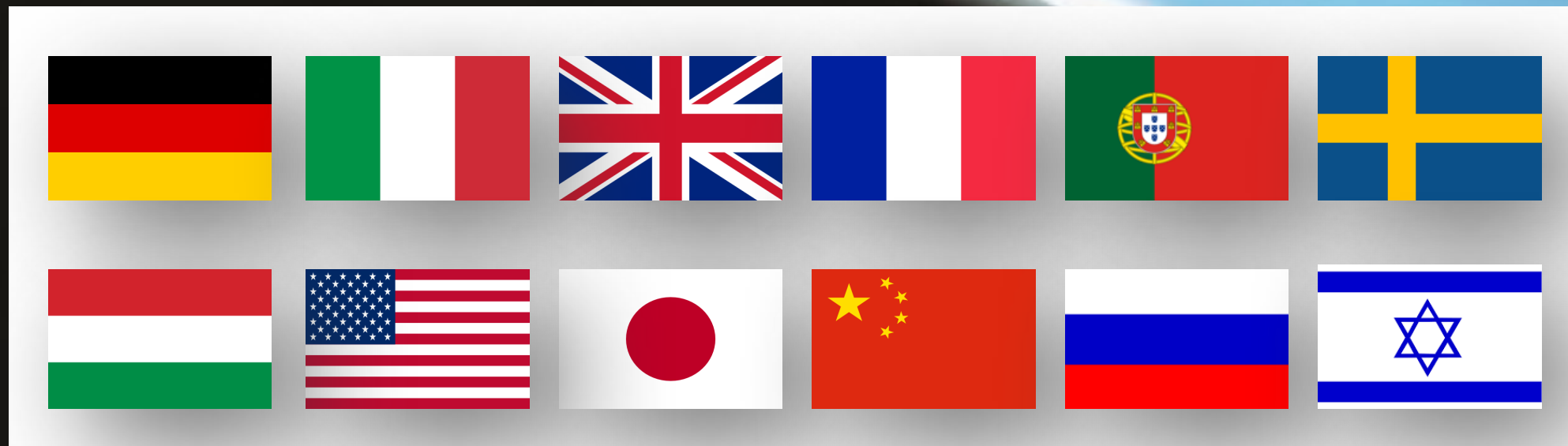


EUROPEAN
PLASMA RESEARCH
ACCELERATOR WITH
EXCELLENCE IN
APPLICATIONS



WP11 - FEL Application Prototyping

M. E. Couprie, V. Malka, A. R. Maier



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WP11 (in-kind)

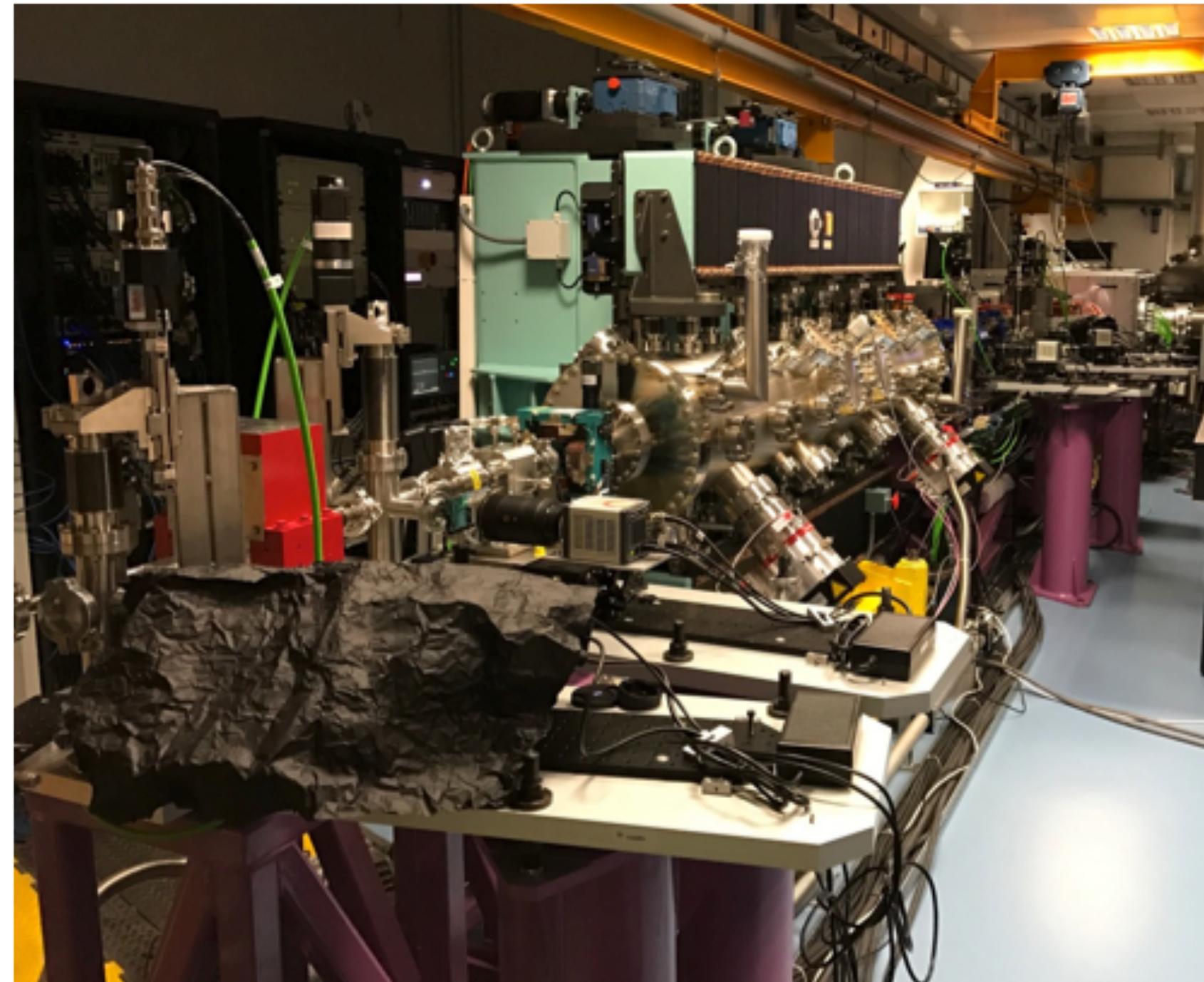
„The objective of this WP is the optimization of LWFA for FEL application [...] to explore new ideas that will permit the improvement of the beam quality and reliability ...“

we understand it as: ... establish close links to experiments...

- ▶ A. R. Maier et al., Phys. Rev. X 2, 031019 (2012)
- ▶ Z. Huang et al., Phys. Rev. Lett. 109, 204801 (2012)
- ▶ A. Loulergue et al., New J. Phys. 17, 023028 (2015)

Slide:
Marie-Emmanuelle
Coupric

ERC Advanced grant COXINEL - 340015 (M. E. Coupric)
Collaboration with ERC Advanced grant COXINEL X-Five (V. Malka)



- ***Transport mastered along the line*** control of the beam position and dispersion demixing chicane design thanks to the QUAPEVA permanent magnet quadrupoles of variable strength*
- ***Undulator radiation measured at 200 nm***

Recent Paper:
T. Andre et al., Nat. Commun. 9, 1334 (2018)

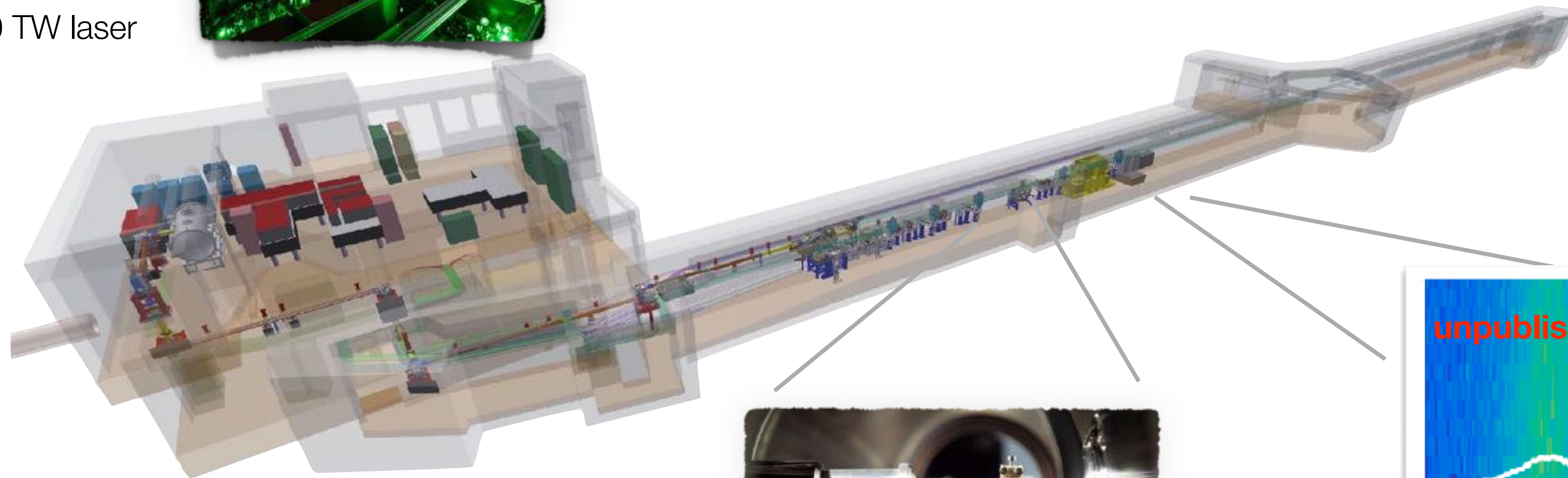
Undulator Radiation at LUX in Hamburg

see also lux.cfel.de

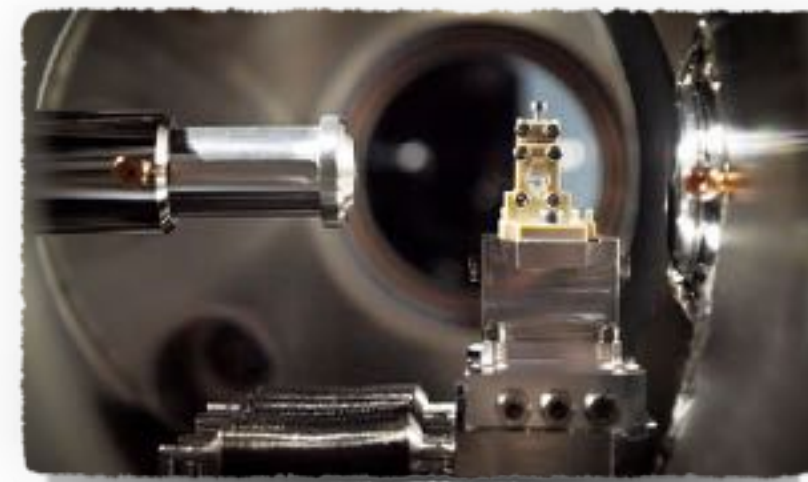
ANGUS
200 TW laser



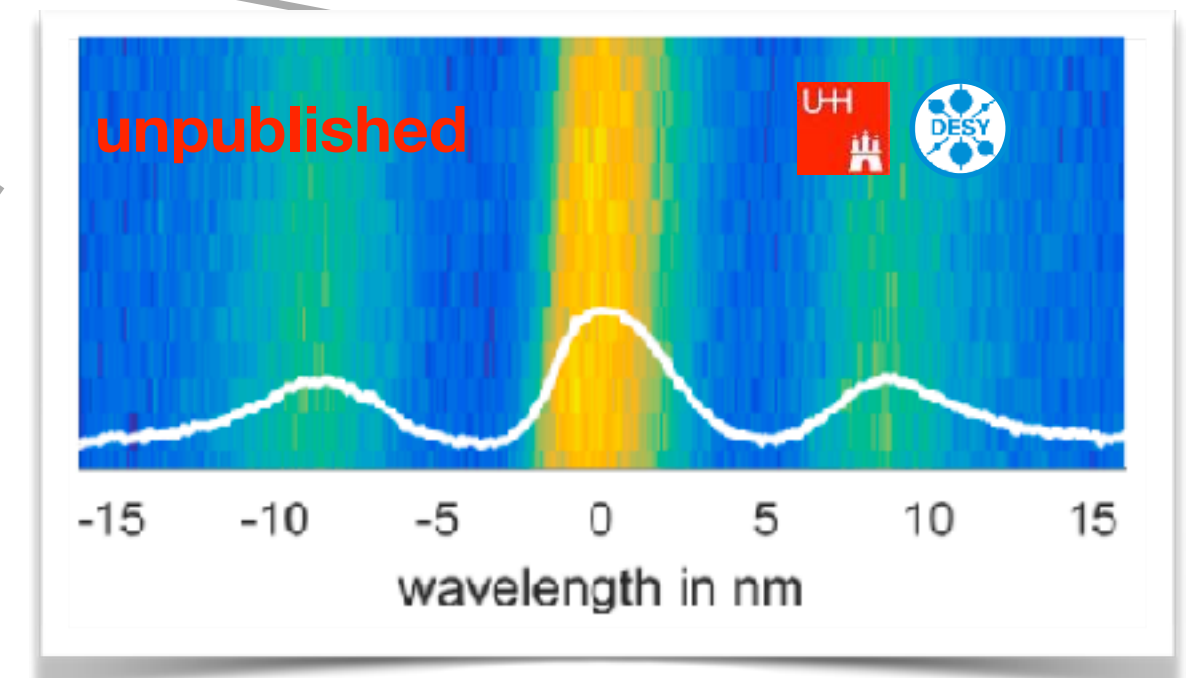
Currently being upgraded to
demoFEL experiment



LUX is built and operated in a close
collaboration of Hamburg University with
DESY and ELI Beamlines



First Electrons 2016
300 - 1000 MeV @ 1 Hz



First X-Rays 2017
few-nm spontaneous undulator radiation

Report

Just released in-kind report D1 1.1 on experiment's lessons learned.

Main conclusion:

- (1) Very good and rapid progress on generating plasma-driven electron beams suitable for applications.
- (2) Lasers are still severely limiting the experiment performance. The EuPRAXIA laser should be specified well beyond the current state-of-the-art.

Conclusion:

Rapid experimental progress towards FEL demonstration. Important lessons learned from experiments. Many ideas how to improve the beams further.

Acknowledgement

Thanks to all WP members for contributions.

