

ELBEX kickoff meeting

WELCOME

Ties Behnke, Louis Helary, Ruth Jacobs



AN ELECTRON BEAMLINE AT THE European-XFEL

HELMHOLTZ



The meeting: some organizational details

Today:

- Presentation of the project, discussion of the planned work and role of partners
- Interaction with our project office
- Discussion of the more formal aspects of the project

Dinner

- Common dinner starting at 19:00 hours downtown in the Hamburg Harbour City

Today:

- Status of the beamline design
- Scientific opportunities with ELBEX
 - High density QED
 - Plasma acceleration
 - Detector physics

The meeting: some organizational details

Today:

- Presentation of the project, discussion of the planned work and role of partners
- Interaction with our project office
- Discussion of the more formal aspects of the project

Dinner

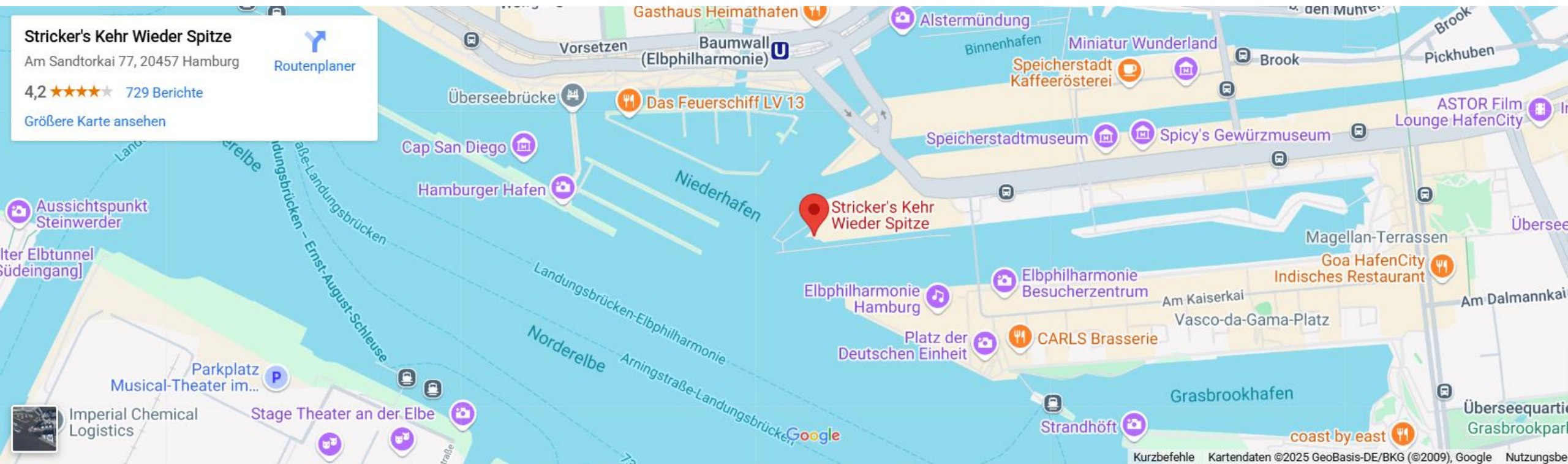
Seminar Room 1

- Common dinner starting at 19:00 hours downtown in the Hamburg Harbour City

Today:

- Status of the beamline design
- Scientific opportunities with ELBEX
 - High density QED
 - Plasma acceleration
- **FLASH Seminar Room**

Dinner Location



Strickers Kehr Wieder Spitze, Am Sandtorkai 77, 22457 Hamburg

How to get there:

Bus Number 1 (Bhf Altona) from DESY to S Bahn Station Othmarschen

Then S1 (Poppenbuettel) to Landungsbruecken, U3 (Wandsbek) to Baumwall, Walk for 5 min

ELBEX: An Introduction



European
Commission



AN ELECTRON BEAMLINE AT THE European-XFEL

We are here



European
XFEL



DESY operates and
develops the accelerator



DESY in numbers

Figures and Facts (2023)

Personnel:	2952
Base budget:	309 Mio
Project funding:	143 Mio
Postdocs:	229
PhD-students:	238
Apprentices:	120



ELBEX: The Project

Project proposed to the EU in 2022

Project approved by the EU in January 2024

Rescoping negotiations between partners and EU finished in summer 2024

Contract formally started January 1, 2025

Work Package No	Work Package name	Lead Beneficiary	Effort (Person-Months)	Start Month	End Month
WP1	Beam extraction line	1 - DESY	81.00	1	60
WP2	Beam transfer line	4 - UMAN	180.00	1	60
WP3	Beam dumps	3 - INFN	30.20	1	60
WP4	Service infrastructure	2 - EUROPEAN XFEL	45.00	1	60
WP5	Project management	1 - DESY	96.00	1	60

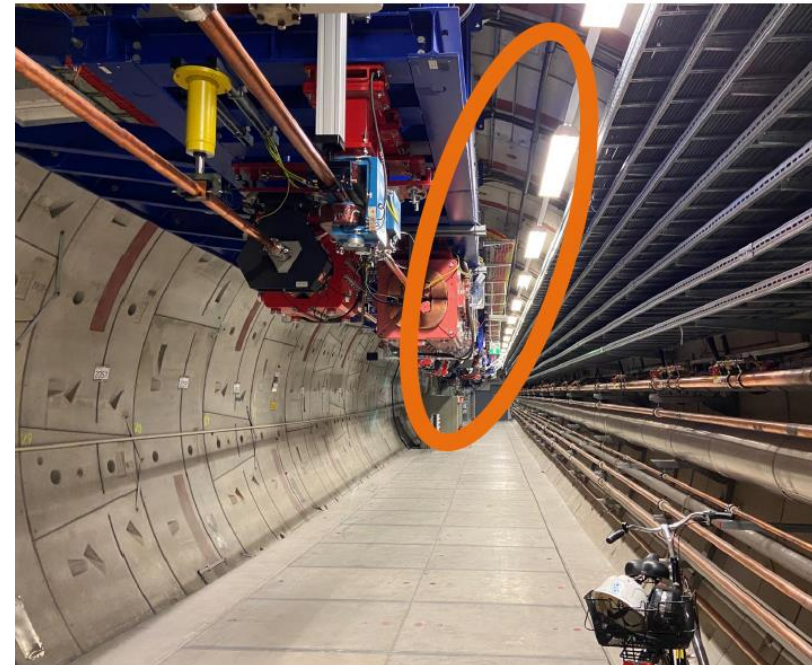
ELBEX: An Electron Beamline at the EU XFEL

- Partners:
 - DESY (lead)
 - EU-XFEL
 - INFN: beam-dumps
 - CSIC: instrumentation
 - Manchester: beam parameters

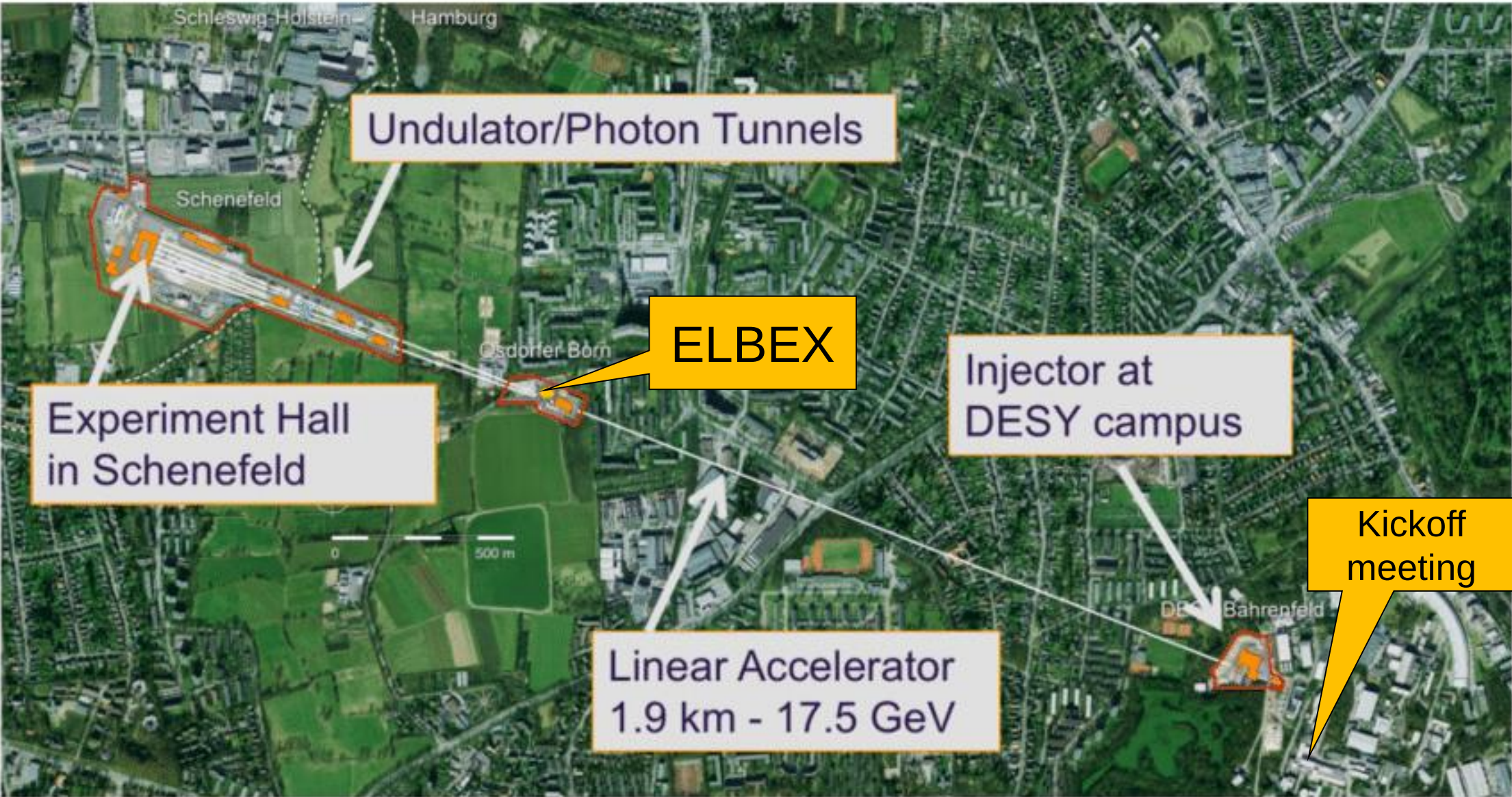
Total project size: 5.4 Mio EUR

Of which funded by the EU: 4.3 Mio EUR

Installation of the beamline will depend on the granting of an extended access time in 2028+ by the EU-XFEL, for which the EU-XFEL schedule will need to be changed



ELBEX @ EuXFEL



ELBEX official start on Jan 1, 2025

 Reply  Reply All  Forward

Mi 01.01.2025 23:00



European Commission <no-reply@ec.europa.eu>

Notification daily **digest**

To Ties BEHNKE

Europa / Funding & Tenders Portal notification

Notification: 1

Notification Subject: ELBEX - 101130174 - DLV-101130174 - Start continuous reporting

Dear Madam/Sir,

The continuous reporting section of the above-mentioned project is now available. In this section you can update the project data and upload any deliverable or milestone as soon as it is ready according to the pre-agreed submission deadlines. This data will be automatically included in your next periodic report.

Note that deliverables which are flagged with the dissemination level "PUBLIC" will be published and openly accessible in line with the provisions on communication and dissemination of your Grant Agreement.

ELBEX Formation: Rescoping

Original Scope of ELBEX

Design, Build and Install an extracted beamline at the EU-XFEL

Problem: the Installation needs an extended shutdown of EU-XFEL
Due to the late approval, planning to include ELBEX in the planned shutdown 2025 shutdown could not be integrated into the schedule any more.
Key components cannot be delivered any more on time
Currently there are no approved plans (yet) to schedule another longer shutdown

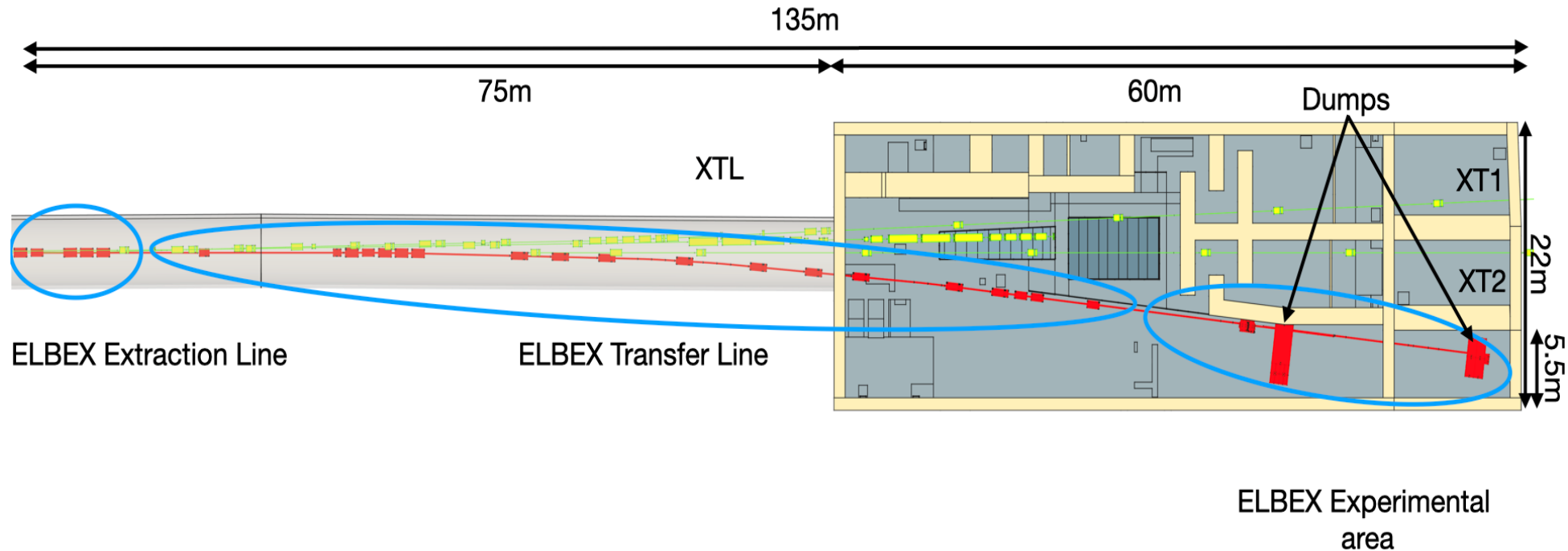
Solution: Re-scoping of ELBEX

ELBEX as a projects does not promise any more the installation of the beamline within the scope of the project.
ELBEX will design, prepare and test as much as possible the beamline, and negotiate with the EuXFEL an installation plan
ELBEX has the ambition to install the beamline around 2028, but there are no commitments to this date

Why ELBEX

ELBEX, once installed, will deliver up to 17.5 GeV extracted electron beam

- Very high quality beam due to the very high quality of the XFEL beam
- Beam will be delivered into an experimental area
- Operation of ELBEX will not impact the operation of EuXFEL for its main users



Parameters of the ELBEX beam

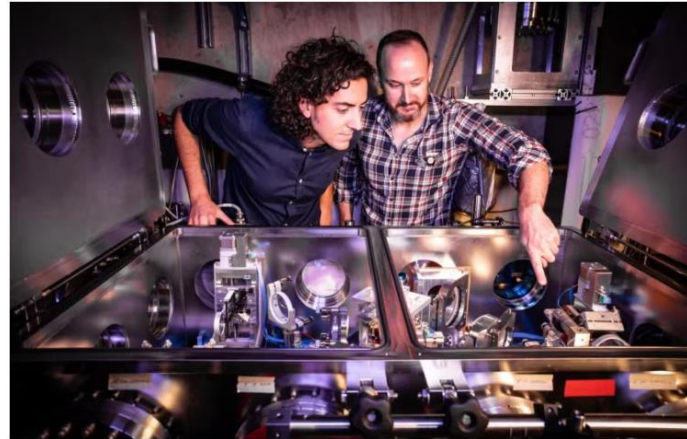
•

Parameter	Value XFEL-EU	ELBEX Beam
Beam Energy [GeV]	≤ 17.5	16.5
Bunch Charge [nC]	≤ 1.0	0.25
Number of bunches/train	2700	1
Repetition Rate [Hz]	10	10
Spotsize at the IP [μm]	–	5
Bunch length [μm]	30–50	30–50
Normalised projected emittance [mm mrad]	1.4	1.4

ELBEX: International Competition

- Unique potential through high energy extracted electron beam

Comparable only to Facet-II
at SLAC



Recently upgraded and reopened to scientific users, FACET-II is the only facility in the world that provides high-energy electron beams for researching a vast array of revolutionary particle accelerator technologies that could make future accelerators 100 to 1,000 times smaller and a lot more capable.

With electron beams a hundred times more intense than anything that came before, FACET-II creates entirely new scientific opportunities, from designing and improving X-ray lasers and other light sources to opening new avenues in high energy physics and materials, biological and energy science.

[FACET-II Fact Sheet >](#)

- ELBEX offers the opportunity to develop a European facility with scientific opportunities in many fields and around twice the energy of the facet beam

The ELBEX concept

- Position ELBEX as an infrastructure with access given to user experiments
 - Unique beam parameters are interesting to a broad range of users
 - Ensure highest scientific standards by peer review of user proposals
- Challenge
 - Complex access restrict turn-over of users
 - Complex infrastructure require tight integration of users into the operation and development of the facility
 - Access scheme will be more typical to HEP experiment than usual photon science experiment
- Opportunity
 - Exciting science opportunities
 - Open EuXFEL for a new user community

ELBEX scientific target community

- High density QED:
 - LUXE experiment: study QED at the Schwinger limit
 - Fundamental science
 - Relevant to future accelerators, future colliders (beam beam interaction)
 - Astrophysically interesting regime
- Searches of new physics
 - Beam-dump like experiment
 - Connection to the on-site DESY Axion program
- Accelerator physics
 - Opportunities to use the extracted beam for studies of novel acceleration methods
 - “boosting” of the electron beam
- Detector physics
 - Radiation studies (em radiation) of components
 - High-energy single particle studies of detector Components

The Goals of ELBEX

- Design of the ELBEX beam
 - Finalise the design of the beamline (see also talk by Daniel tomorrow)
 - Develop a complete planning of the beamline and the installation procedures and schedule
- Procure the beamline elements
 - Prepare the tendering of the key components
 - Procure the beamline components in-house, with partners, and from industry
 - Test and commission as much as possible beam-line elements and systems
- Develop, together with Eu-XFEL, an installation scenario and plan and work towards approval of this
- Work out further the science case of ELBEX
 - Build a user community
 - Support the design and schedule for first-time users of ELBEX

The Kickoff on Monday

13:00	Welcome <i>Seminarroom 1, DESY Hamburg</i>	<i>Ties Behnke</i> 13:00 - 13:10
	The ELBEX project: Outline and Goals <i>Seminarroom 1, DESY Hamburg</i>	<i>Ties Behnke</i> 13:10 - 13:30
	Elbex: Adress by the EU officer of the project <i>Seminarroom 1, DESY Hamburg</i>	<i>Zuleika Saz-Parkinson</i> 13:30 - 13:50
14:00	DESY role in ELBEX <i>Seminarroom 1, DESY Hamburg</i>	<i>Ruth Magdalena Jacobs</i> 13:50 - 14:30
	XFEL role in ELBEX <i>Seminarroom 1, DESY Hamburg</i>	<i>Thomas Tschentscher</i> 14:30 - 15:10
15:00	Coffee break <i>Seminarroom 1, DESY Hamburg</i>	15:10 - 15:30
	INFN role in ELBEX <i>Seminarroom 1, DESY Hamburg</i>	<i>Mauro Morandin</i> 15:30 - 16:10
16:00	CSIC role in ELBEX <i>Seminarroom 1, DESY Hamburg</i>	<i>Juan Fuster</i> 16:10 - 16:50
	Manchester role in ELBEX <i>Seminarroom 1, DESY Hamburg</i>	<i>Stewart Boogert</i> 16:50 - 17:30
17:00	Reporting and Publishing in Horizon Europe <i>Seminarroom 1, DESY Hamburg</i>	<i>Juliane Maraуска</i> 17:30 - 17:50
	Organisation of the ELBEX consortium <i>Seminarroom 1, DESY Hamburg</i>	<i>Ruth Magdalena Jacobs</i> 17:50 - 18:10
18:00		

The Kickoff on Tuesday

09:00	Status of ELBEX beamline design <i>Flash conference room, DESY Hamburg</i>	<i>Daniel Thoden</i> 09:00 - 09:20
	ELBEX as a user facility <i>Flash conference room, DESY Hamburg</i>	<i>Louis Helary</i> 09:20 - 09:35
	LUXE at ELBEX: requirements and interaction <i>Flash conference room, DESY Hamburg</i>	<i>Matthew Wing</i> 09:35 - 10:05
10:00	ELBEX, LUXE and plasma acceleration: Challenges and opportunities <i>Flash conference room, DESY Hamburg</i>	<i>Benno List</i> 10:05 - 10:25