Welcome to the European XFEL Users Meeting

Robert Feidenhans'l
Management Board
Managing Director, Chairman of the Management Board

Schenefeld/Bahrenfeld, 25 January 2017

As of 20 January 2017

Tuesday, 24 January 2017: European XFEL Satellite workshops			
Wednesday, 25 January 2017: Plenary Sessions and Site Visit Schenefeld			
8:30–10:00	**Registration**		
10:00–10:20	**Opening session**		
10:00	Welcome	R. Feidenhans'l	European XFEL
10:10	Opening address from the Council Chair	M. M. Nielsen	DTU
10:20–12:30	**Project Update Session**	***Chair: M. M. Nielsen***	
10:20	General status of the project	R. Feidenhans'l	European XFEL
10:50	Electron accelerator	H. Weise	DESY
11:20	Detectors at European XFEL	M. Kuster	European XFEL
11:40	Laser systems for science instruments	M. Lederer	European XFEL
12:00	FXE Instrument	C. Bressler	European XFEL
12:15	SPB/SFX Instrument	A. Mancuso	European XFEL
12:30–13:50	**Lunch break**		
13:50–14:40	**Hard X-ray FELs Science Highlights**	***Chair: T. Ishikawa***	
13:50	Femtosecond structural dynamics on PYP	M. Schmidt	Univ. Wisconsin
14:15	Photoinduced enhancement of the charge density wave amplitude	A. Singer	Univ. California
14:40–	**Extended coffee break**		
14:50–18:10	**Bus shuttles to Schenefeld (every ~20 min.)**		
15:20–18:30	Guided Facility tours (30 min., start every 10 min.) and Project Status Update presented by posters of European XFEL groups		
18:30–22:00	**European XFEL Dinner Reception (Schenefeld Foyer)**		
19:15–22:30	**Bus shuttles to DESY Side Entrance (every ~20 min.)**		

General status of the project

Robert Feidenhans'l
Management Board
Managing Director, Chairman of the Management Board

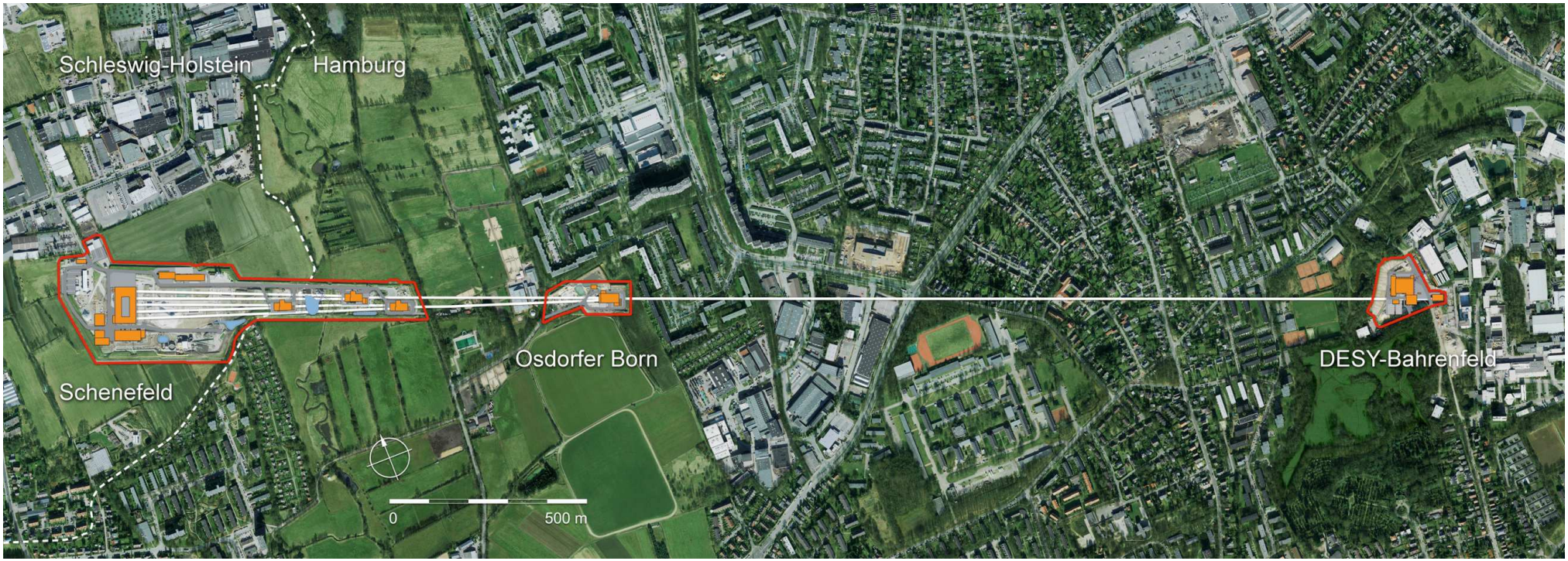
Schenefeld/Bahrenfeld, 25 January 2017

The headquarters building on 22 November 2016

Change in Management

Robert Feidenhans´l New Managing Director since Jan 1.

Aerial view of the facility



Inauguration of the headquarters building on 29 June 2016

Visualisation of the headquarters building

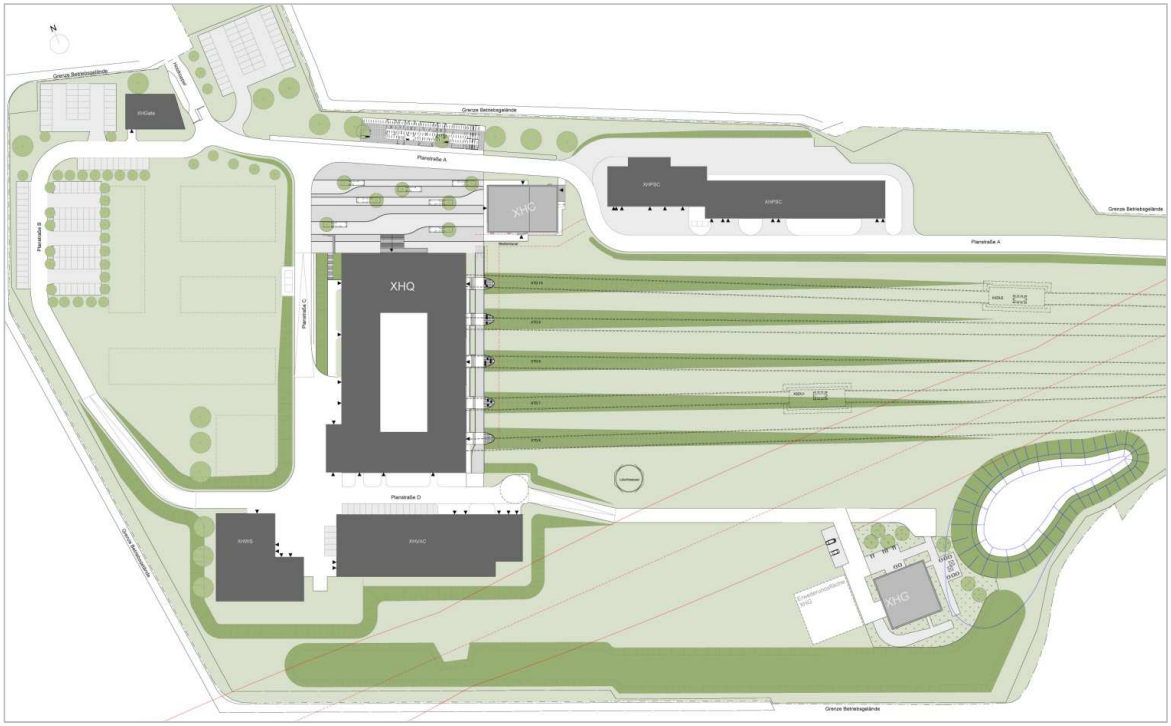
The canteen XHC

- Start of construction April 2017
- Completion summer 2018
- Seats for 150 persons
- Kitchen capacity for 450 meals
- Opportunity to use the room for events

The guesthouse XHG

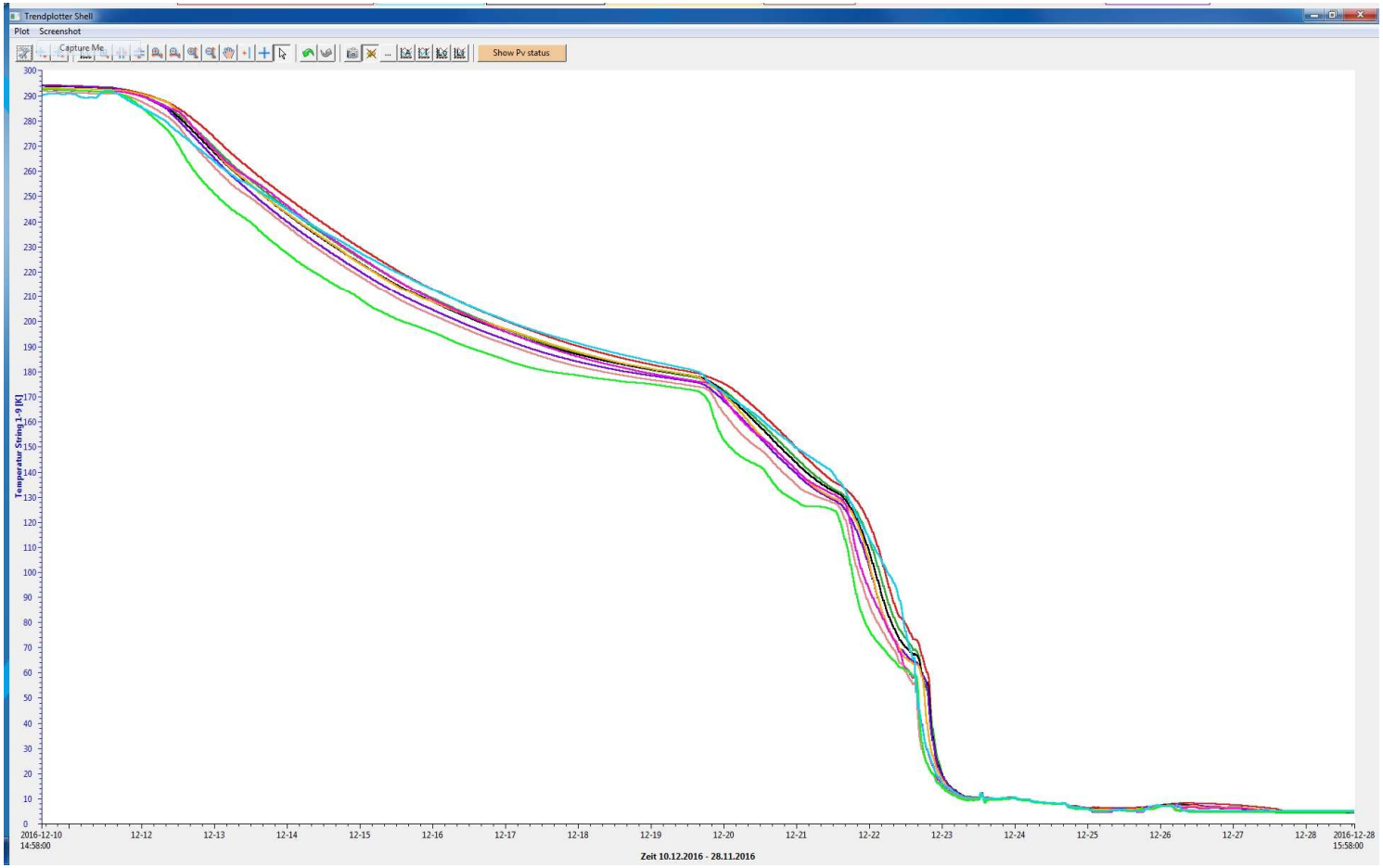
- Start of construction June 2017
- Completion summer 2018
- 56 rooms with 59 beds

Location of the canteen and guesthouse



Official start of commissioning of the European XFEL on 6 October 2016

Cool Down of Accelerator



The SPB/SFX and FXE User Workshops in November/December 2016

First Call for Proposals for Early User Experiments FXE and SPB/SFX

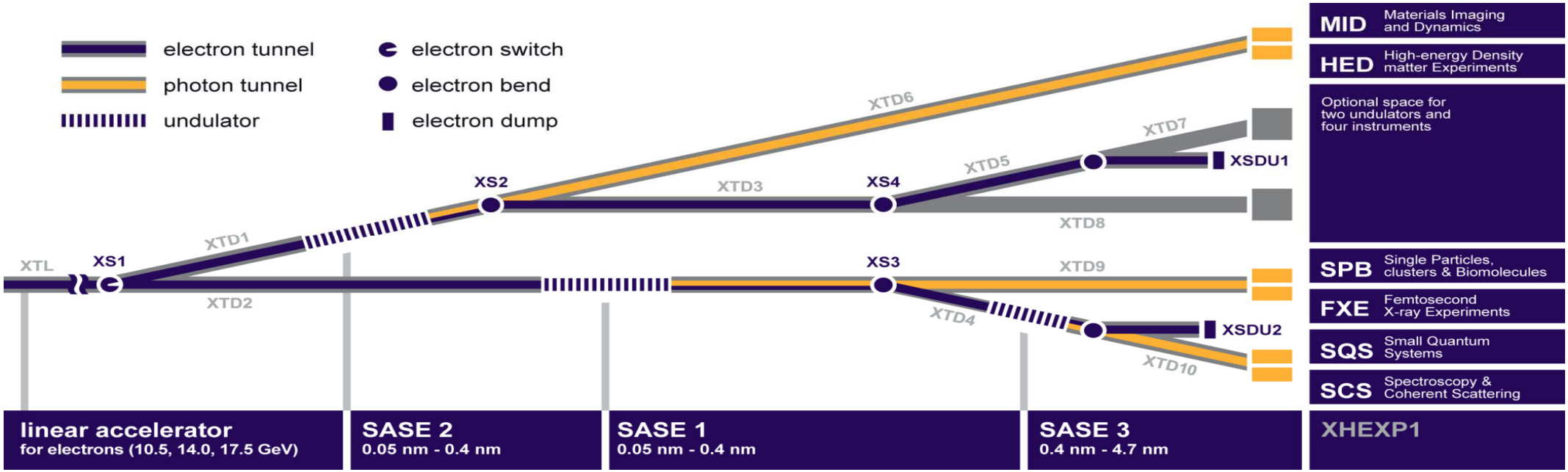

Silvia Bertini

- **OPEN!!!**
- **DEADLINE for SASE1 call: Monday, 20 March 2017 inclusive (UTC+01:00)**
- **Please note the specific conditions for Early User operation at the SASE1 instruments**
- Instructions on web page of the call: http://www.xfel.eu/call_for_proposals
- Please do not hesitate to **contact the relevant instrument scientists** when required, needed and in case of doubt. Please note that, being the European XFEL a brand-new facility, the Early User Operation conditions may be increasingly improving.
- The European XFEL is a research facility open to scientists worldwide, beam time is free of charge, but experiment proposals must go through a review process. As an important condition for access, after the experiments, the authors must strive to the publication of the results in peer-reviewed journals.

Proposal submission

- Proposal submission only through UPEX (User Portal to the European XFEL): https://in.xfel.eu/upex
- **All scientists appearing on a proposal and/or later joining an experiment team need an account in UPEX!**
- As soon as the call is open
  - Please proceed timely with setting up your **UPEX accounts** (Main proposers, Principal Investigator, and all other co-proposers) and
  - Please submit your proposals **as early as possible** in order to avoid overloading UPEX before the deadline!

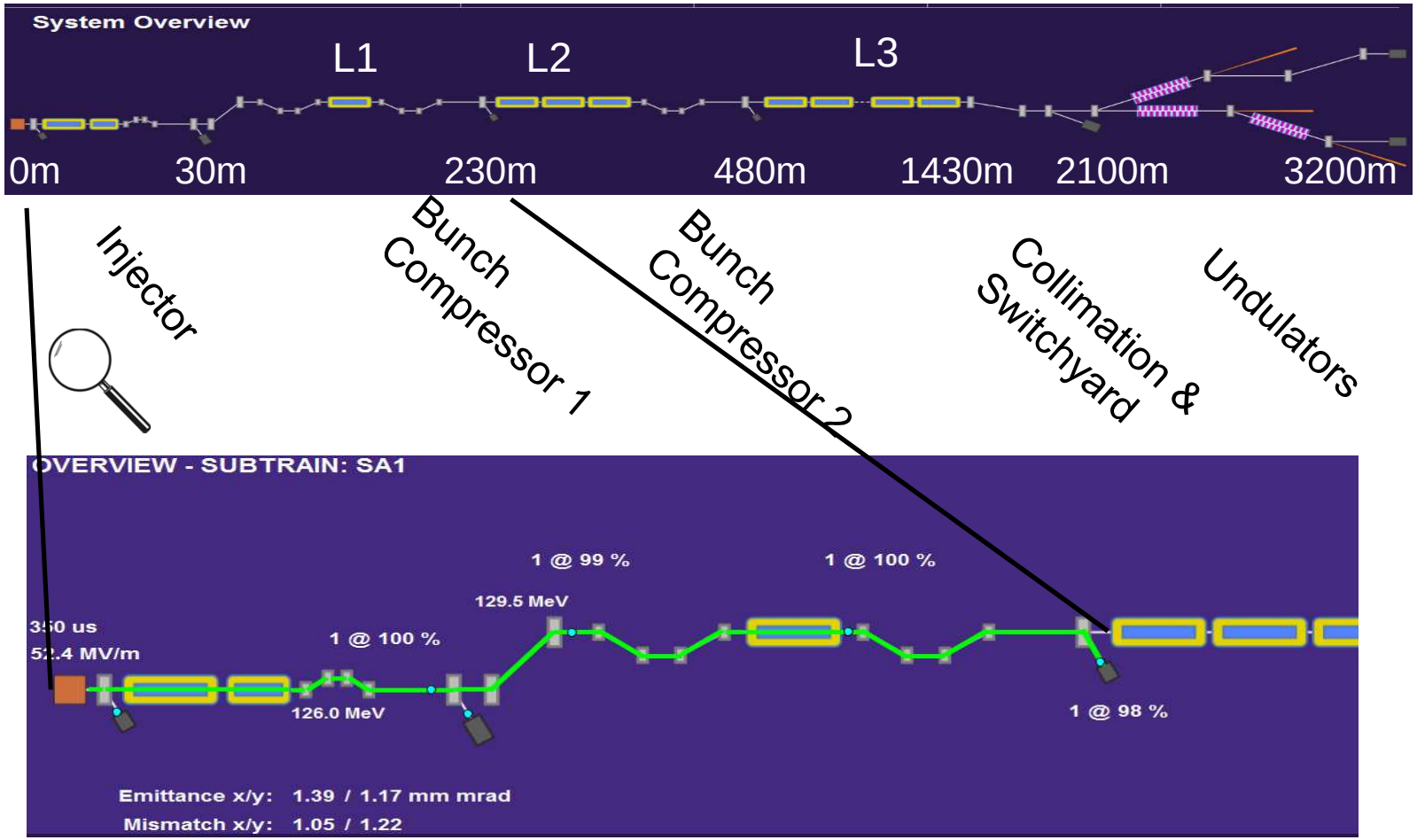
Undulator Segment	FEL radiation energy [keV]	Wavelength [nm]
SASE 1	3 - over 24 (Hard XR)	0.4 - 0.05
SASE 2	3 - over 24	0.4 - 0.05
SASE 3	0.27 – 3 (Soft XR)	4.6 – 0.4



Orange color: X-ray optics & Beam Transport

Accelerator Control Room (BKR)

System Overview - BKR perspective



LINAC Commisioning

- Sequential commissioning of RF and beam lines
  - Injector at 130 MeV, pass on to BC1 beam dump for L1 commissioning (1 RF station needs recommissioning)
  - L1 at E_{final} = 600 MeV ( ), pass on to BC2 beam dump for L2 commissioning (1 RF station, 01/02)
  - L2 at E_{final} = 2.4 GeV, pass on to XTL dump for L3 commissioning (3 RF stations, 15/02)
  - L3 up to E_{final} = 17.5 GeV (15-18 RF stations, 15/04)

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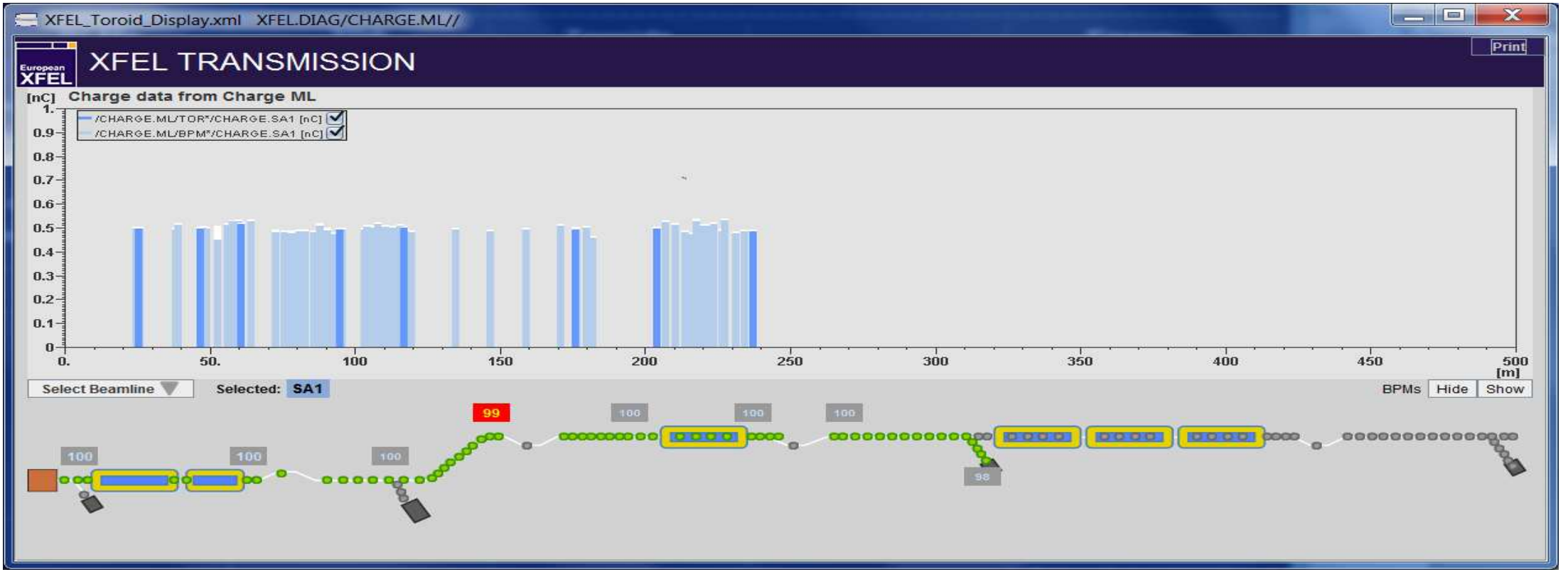
Beam Transmission up to dump after Bunch Compressor 1



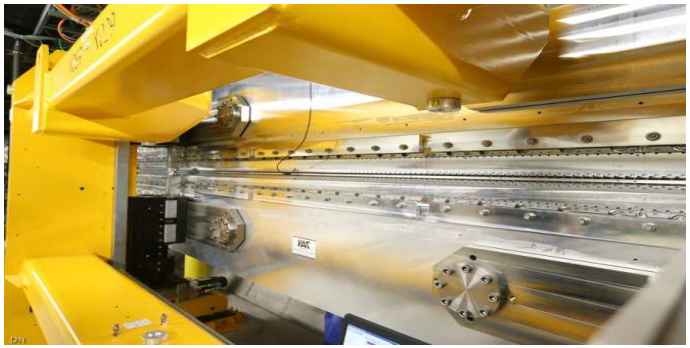
North branch commissioning

- Set-up bunch compression in parallel to linac commissioning
- Once Northern Branch ready transport beam to dump after SASE1&3 (April)
- First lasing in SASE1 (May)
- SASE1 photon systems and experiment commissioning follows
- First lasing in SASE3 (June) and following photon systems and experiment commissioning depends on operation priorities and systems readiness
- South branch (SASE2) commissioning depends on installation readiness and operation priorities, first lasing presently scheduled for November

Status of Undulator Systems (Jan2017)

SASE System without

with enclosure



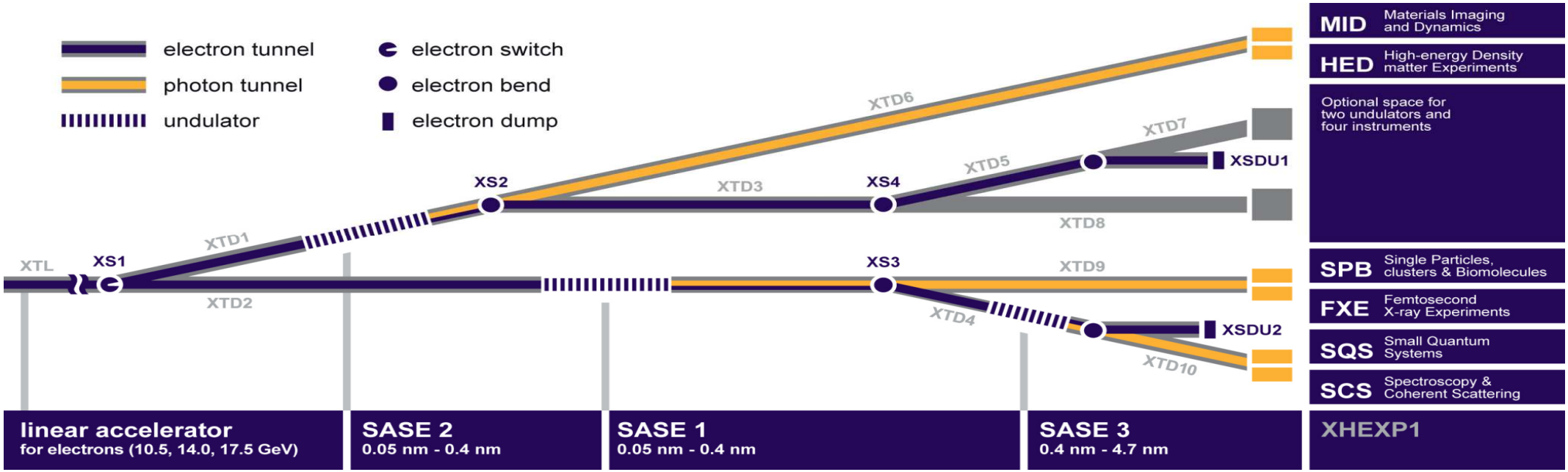
All SASE1 35 gaps closed to 10.000mm
Dec 22,2016

SASE1: Hardware installed & Aligned
Control System operational
Air Conditioning commissioned
All 35 gaps closed to 10.000mm
The system is almost operational

SASE3: Hardware installed 50% Aligned
Control System operational
Air Conditioning commissioned
Gap not yet closed
Limits switches not yet adjusted

Plan:
SASE1 and SASE3 Undulators will be fully operational by the end of March 2017

Undulator Segment	FEL radiation energy [keV]	Wavelength [nm]
SASE 1	3 - over 24 (Hard XR)	0.4 - 0.05
SASE 2	3 - over 24	0.4 - 0.05
SASE 3	0.27 – 3 (Soft XR)	4.6 – 0.4



Orange color: X-ray optics & Beam Transport

Installation of Photon Beamlines (X-ray Optics & Vacuum group, WP73)

October 6, 2016 at the end of XTD9 photon tunnel

- October 6, 2016: Closing of SASE1 vacuum system (FXE branch) and official start of technical commissioning
- Cabeling, software implementation, and testing now ongoing with highest priority
- Tunnel closure end of March 2017

Installation of Photon Beamlines (X-ray Optics, Diagnostic & Vacuum group, WP73)

Differential pump + XGM in XTD9

Installation of Photon Beamlines (X-ray Optics, Diagnostic & Vacuum group, WP73)

Soft X-ray Monochromator, SASE3, XTD10

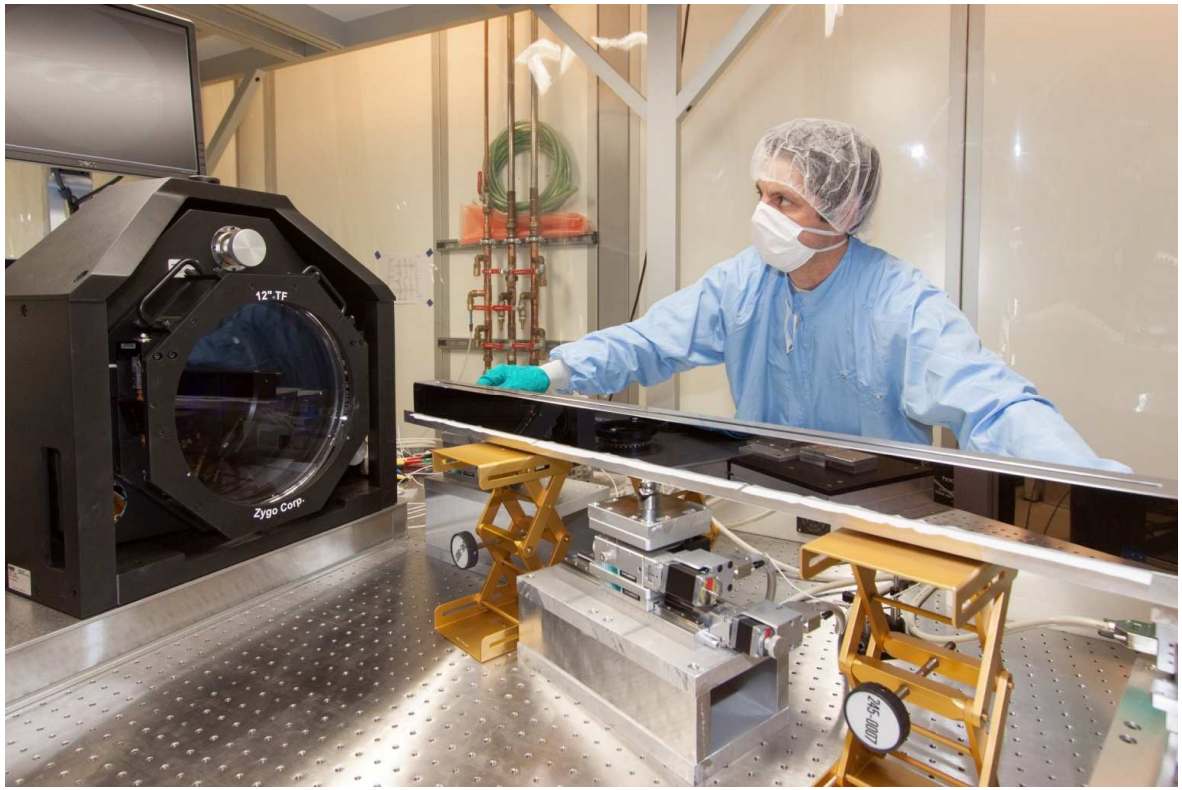
SASE3:

- Components placed in tunnel
- Work ongoing on vacuum system, cabeling and technical commissioning
- Tunnel closure end of March

SASE2:

- Preparation for installation ongoing
- First components are placed
- Tunnel closure in October 2017

Status of X-ray mirrors (Harald Sinn)



Metrology on first long JTEC mirror by Maurizio Vannoni

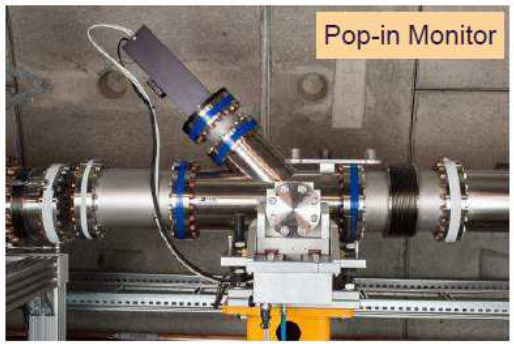
- Last user meeting: First long mirror finished (2 nm peak to valley, JTEC)
- In 2016: >14 mirrors received from JTEC and ZEISS and went through metrology at XFEL and HZB
- 14 accepted
- 1 rejected (physical damage)
- Coating ongoing

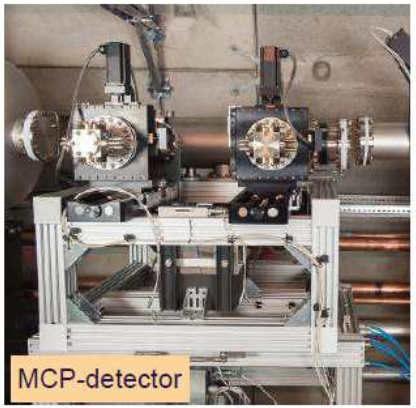
Status of X-ray mirrors

Area	Type	Quantity	Received	Comment
SASE1	Beam transport	3	3	Coated, ready for installation
SASE3	Beam transport	3	3	Ready for coating
SASE2	Beam transport	3	3	Coating end of January
SASE3	Soft Mono pre-mirrors	2	1	2nd mirror ships end of January
SASE3	Soft Mono Gratings	3	2	Initial configuration (short grating) received
MID	Steering	2	2	Ready for coating
SPB	KBs	6	0	4 close to finish, expected in February
SCS	KBs	3	0	September 2017
SQS	KBs	2	0	December 2017
Total		**27**	**14**	

WP74 status SASE1 – XTD2 (Jan Grünert)

- WP74 status SASE1 installation :
  - all planned WP74 vacuum systems are installed in SASE1 (XTD2 and XTD9 tunnels)
  - all devices are cabled and under technical commissioning





Jan Grünert, WP74, European XFEL

WP74 status SASE1 – XTD9 (Jan Grünert)

- WP74 status SASE1 installation :
  - all planned WP74 vacuum systems are installed in SASE1 (XTD2 and XTD9 tunnels)
  - all devices are cabled and under technical commissioning

Jan Grünert, WP74, European XFEL

Outlook WP74 / activities and schedule

- Final Assembly & Testing of remaining SASE3 and all SASE2 systems
- Installation of **SASE3 chambers:** will complete until end of **3/2017** (remaining imagers)
- Installation of SASE3 cables & electronics
- SASE2 installation in summer 2017
- Commissioning with X-rays:
  - by the specific device experts of WP74
  - + WP74 joined w/ 2 people in *Commissioning Team*

- **Critical tasks (challenging and other groups involved):**
  - Finishing WP74 crates & cabling in SASE1 and SASE3
  - **Establish Full Control incl. interlocks over all devices**
  - Control and Readout of XGM (→ DOOCS – karabo interface)

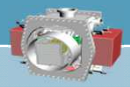
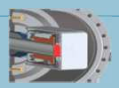
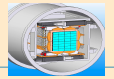
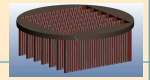
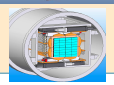
Detectors for the Scientific Instruments

SASE I / SASE II / High E	Single Particles, Clusters and Biomolecules (SPB)	1st AGIPD		Gotthard V2		
	Materials Imaging & Dynamics (MID)	2nd AGIPD		Gotthard V2		Gotthard V1
	Femtosecond X-ray Experiments (FXE)	LPD		Gotthard V2		Gotthard V1
	High Energy Density Matter (HED)			Gotthard V2		
SASE III / Low E	Small Quantum Systems (SQS)	1st DSSC		Fast CCD	pnCCD	MCP
	Spectroscopy and Coherent Scattering (SCS)	2nd DSSC		Fast CCD	pnCCD	MCP

Detectors – Timeline and Status

This column provides the time when the detector arrives at XFEL and we will start with DAQ/Control integration and end-2-end testing.

This column provides the time when the detector is ready to be installed at the beam line. We we will need additional 12 weeks for commissioning at the beam line for AGIPD/DSSC and 10 weeks for LPD.

Detector System	Beam Line	Scientific Instrument	Project Status	Arrival at XFEL	Ready for Installation at Experiment
AGIPD 	SASE I	SPB	DAQ Control Integration	December 2016	May 2017
LPD 	SASE I	FXE	Integration/Testing	February 2017	June 2017
FastCCD 	SASE III	SCS	DAQ/Control Integration	May 2016	July 2017
AGIPD 	SASE II	MID	Integration	February 2017	September 2017
Gotthard V2 	SASE I-III	FXE/HED/MID/SP B/Diagnostics	Development	February 2018	April 2018
DSSC MiniSDD 	SASE III	SCS	Development	February 2018	
MCP DLD 	SASE III	SQS	Development	February 2017	
DSSC DePFET 	SASE III	SCS/SQS	Development	Sensors available 2017	

This bar provides a rough overview on the individual detector project phases.
The corresponding column in the table above is named “Project Status”. The time “Arrival at XFEL” corresponds to the start of the “End-2-End Test”.

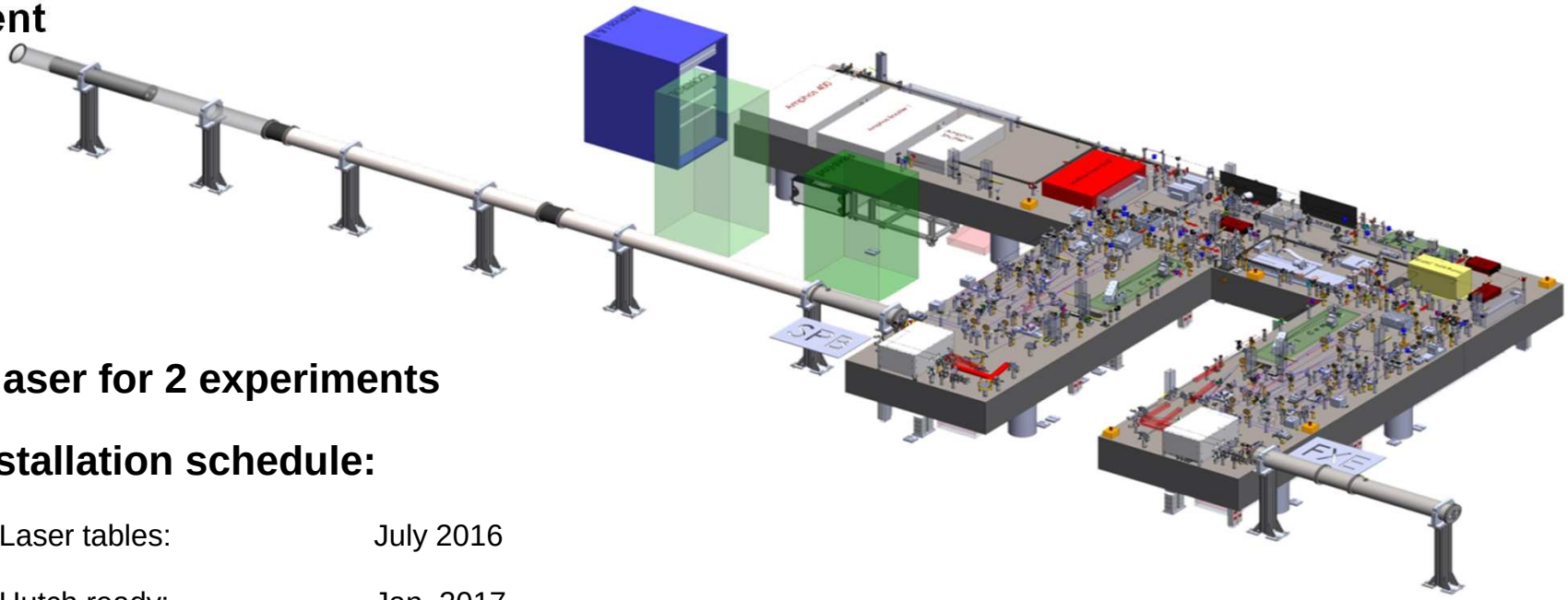
External

Development → Integration → Testing → Commissioning Calibration DAQ/Control Integration → End-2-End Test → at XFEL → Beam Line Integration Commissioning → User Operation

Arrival at XFEL

Pump-probe laser production system SASE 1 (Max Lederer)

to SPB-Experiment



to FXE-Experiment

- **1 laser for 2 experiments**
- **Installation schedule:**
  - Laser tables: July 2016
  - Hutch ready: Jan. 2017
  - Beam to experiment: Q3 2017

PP-laser installation schedule

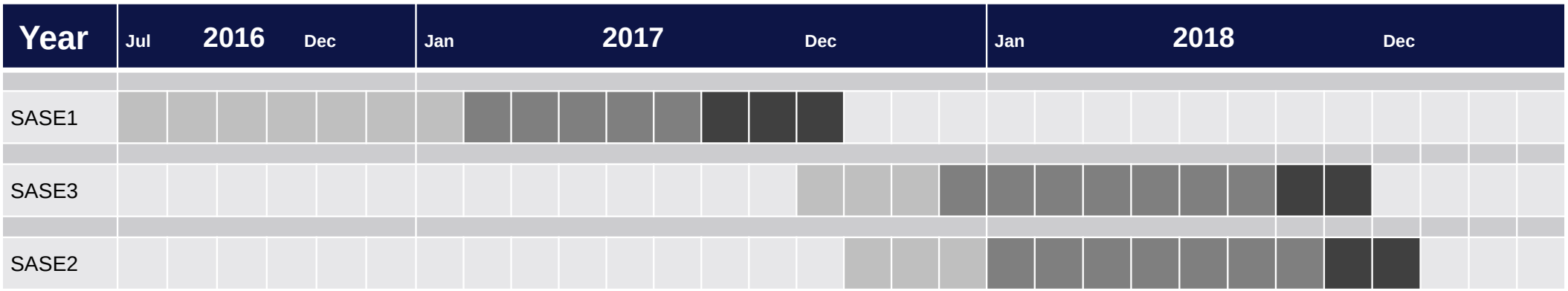
- General PP-laser installation schedule:

  Task 1: Laser tables and infrastructure in PP and ILH-hutches

  Task 2: Components + commissioning in PP and ILH-hutches

  Task 3: Beam to experiment for day-1

- **SASE-specific schedules:**



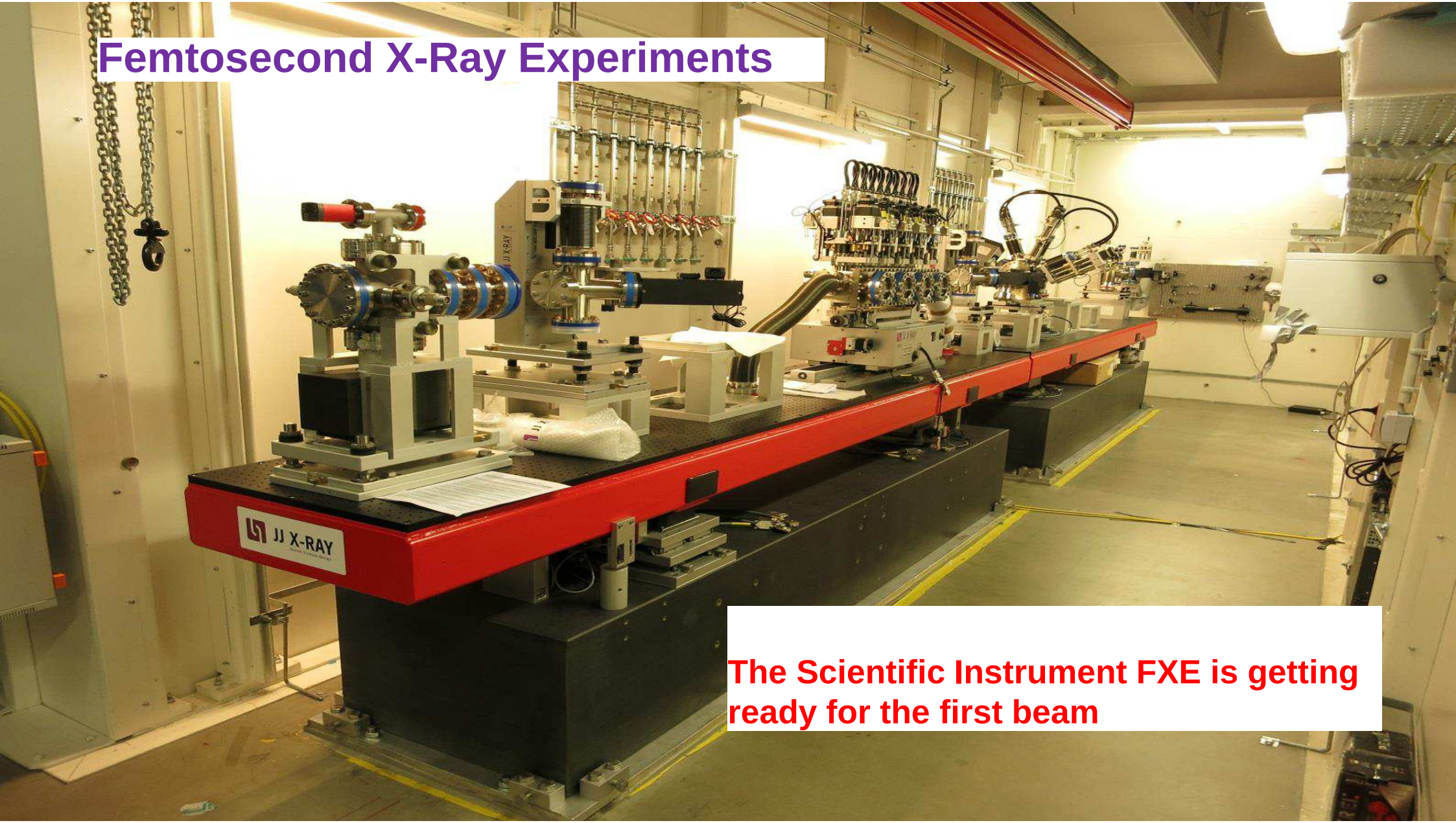
Overall Schedule For XFEL

1st Call for proposals (SASE1)	January 2017
First lasing in SASE1	May 2017
Commissioning SASE1 and instruments	May-September 2017
Start of users operation FXE, SPB/SFX	September/October 2017 (2 months)
2nd call for proposals	Summer 2017
Lasing SASE3	Summer 2017
Lasing SASE2	Very early 2018
Start users operation SASE2 and SASE3	Mid 2018

User time:

- 2017 : 800 hours
- 2018 : 2000 hours
- 2019 : 4000 hours

Femtosecond X-Ray Experiments



The Scientific Instrument FXE is getting ready for the first beam

The SPB/SFX Instrument: Day one edition

What you can expect:

~ 8.86 keV photon energy
~2.5 µm
Liquid j
AGIPD
"Basic"
Essenti
SPB/SF

er &
er

IPD-1Mpix

SASE1 - Undulato

Beam Dump

The SPB/SFX Team: The most important component!

http://www.xfel.eu/research/instruments/spb_sfx

Snapshot of what to do (from yesterday, Tobias Haas) :

- Commissioning of AC system in SASE1 ongoing
  - Some technical hiccups (power/water failures)
- Phase 2 Cabling of FXE 98% done
- Phase 2 Cabling of SPB optics makes good progress
- Smoke extraction test on 27 Jan
  - No access to experiment hall on this day
- Start of AC installations in SASE3 on 13 Feb
  - Installation of big AC boxes start early March
- Phase 1 Cabling time schedule received from Vater
  - Delivery of racks foreseen in early May
- Final phase of FXE installation by JJ Xray ongoing

We do our very best

Thank you

to all the Staff