

PAUL SCHERRER INSTITUT

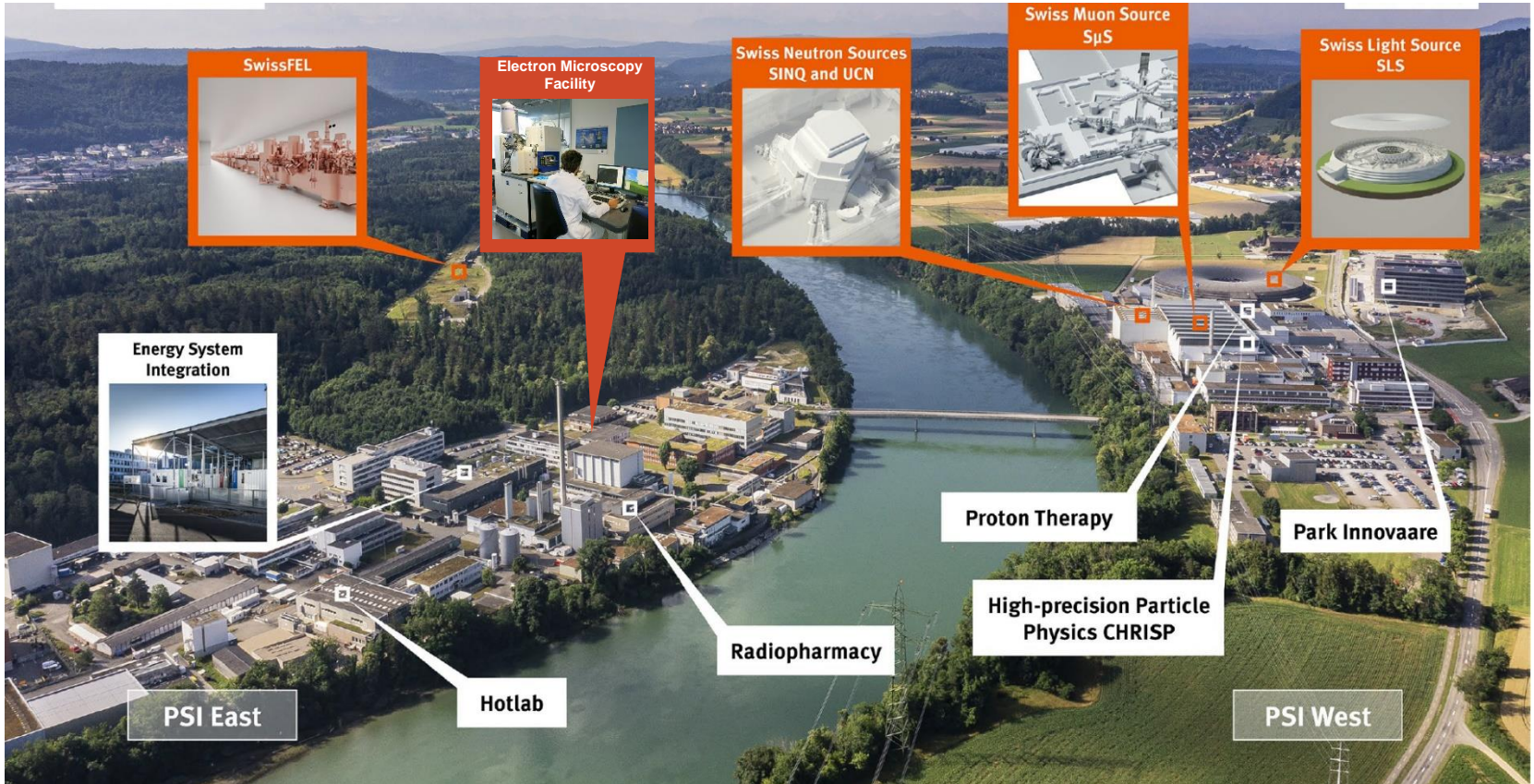


Alun Ashton ; CaSIT Work package lead

# PSI /SLS Upgrade organisation

19 September Soleil Visit to PSI

# Facilities at the PSI Campus



Research Committee	Prof. Dr. Marco Stampanoni
Human Resources Management	Karsten Bugmann
Center for Proton Therapy	Prof. Dr. Damien Weber

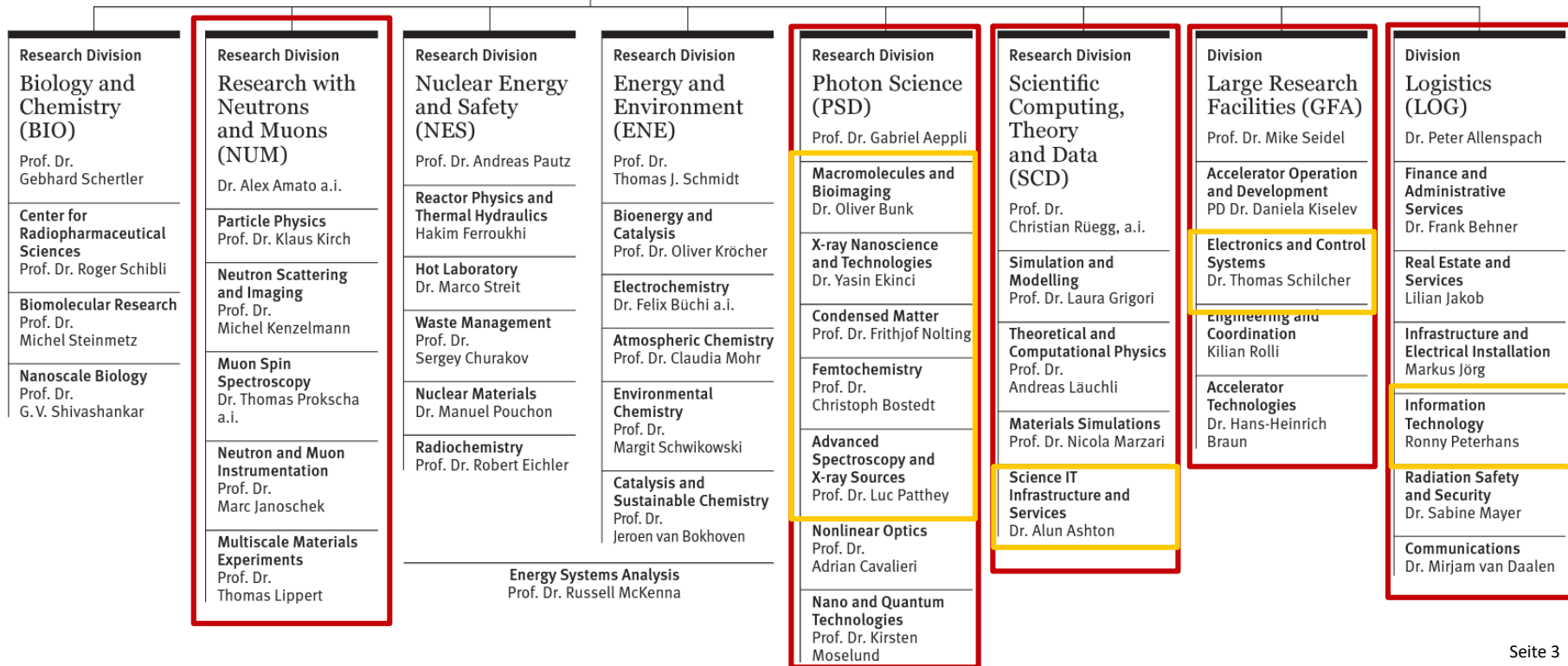
Director:

Prof. Dr. Christian Rüegg

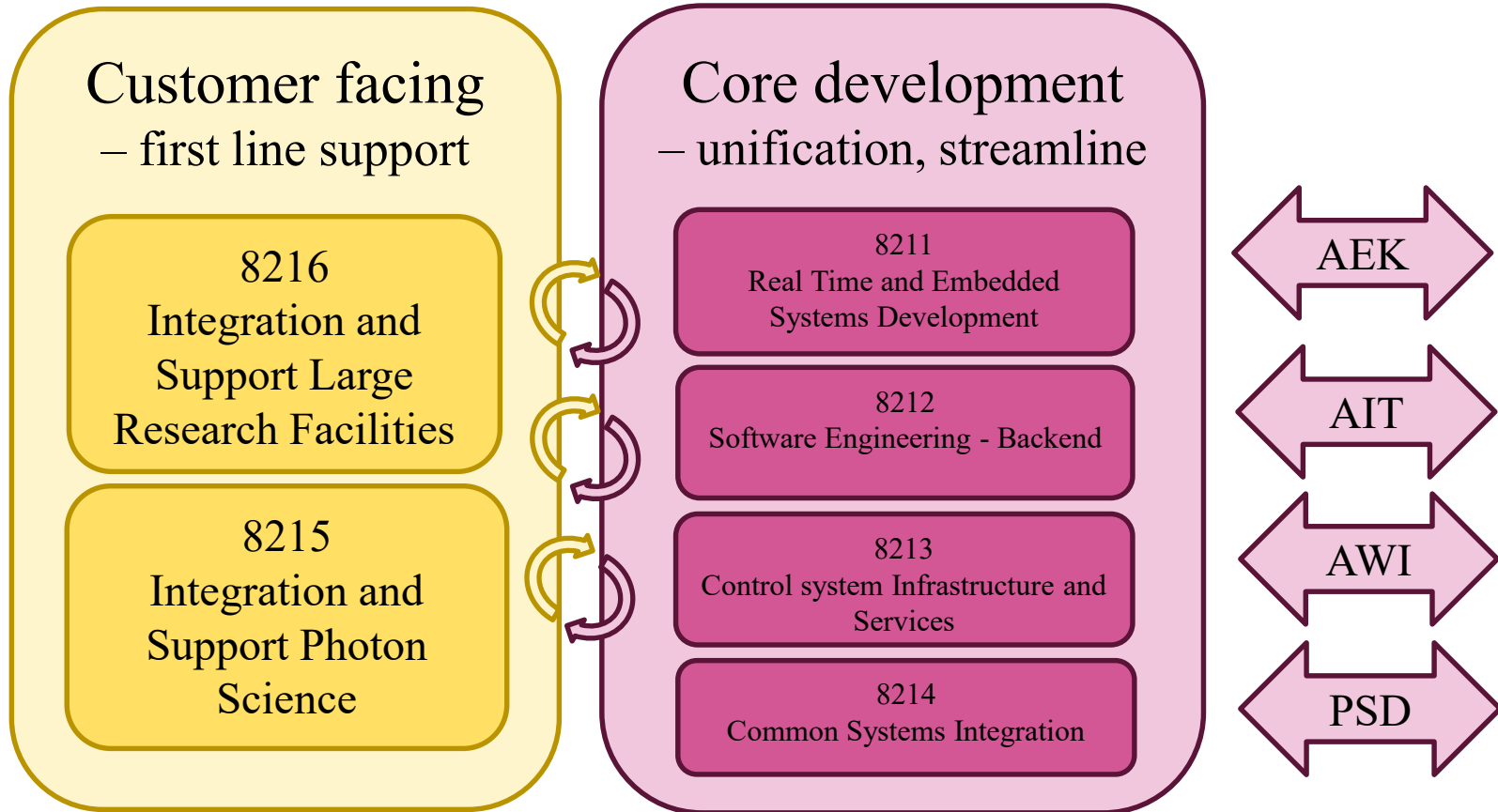
Members of the board of directors:

Prof. Dr. Gabriel Aeppli\*  
 Dr. Peter Allenspach  
 Prof. Dr. Andreas Pautz  
 Prof. Dr. Gebhard F. X. Schertler  
 Prof. Dr. Thomas J. Schmidt  
 Prof. Dr. Mike Seidel  
 Dr. Thierry Strässle\*

# PSI Divisions involved in SLS 2.0



# Controls Group Structure



# AWI Group Structure



Alun Ashton  
(Head of AWI)



Simon Ebner  
Core Linux  
Research Services

**MISSION:**  
To support and standardize the installation of all PSI Linux servers and consoles services underpinning large scale research facilities and HPC services.

New group formed from resources currently in AIT and Controls.



Derek Feichtinger  
HPC and Emerging  
Technologies

**MISSION:**  
We enable high-performance computing at PSI by architecting computing resources, coordinating external HPC partners, integrating software, and supporting digital science.



Leonardo Sala  
Data and Analysis  
Research  
Infrastructure

**MISSION:**  
Provides the infrastructure services and consultancy for acquisition of high throughput detectors, high performance data storage, and required computational resources and tools for data analysis, including integration with Data Curation and management systems.



Leonardo Sala a.i.  
Scientific Data  
Curation  
(ORD)

**MISSION:**  
We enable scientist) to catalogue their data safely for long-term, allowing the data to be annotated and published in agreement with the FAIR principles. Scope of group will broaden as the Open Research Data project is defined.



Markus Janousch  
Data Processing  
Development and  
Consulting

**MISSION:**  
We work hand in glove with scientist and user communities to develop and support data reduction and processing software tools on the most appropriate platforms to meet their experiment and data analysis needs.

New group formed from splitting Development and Consulting in Science IT

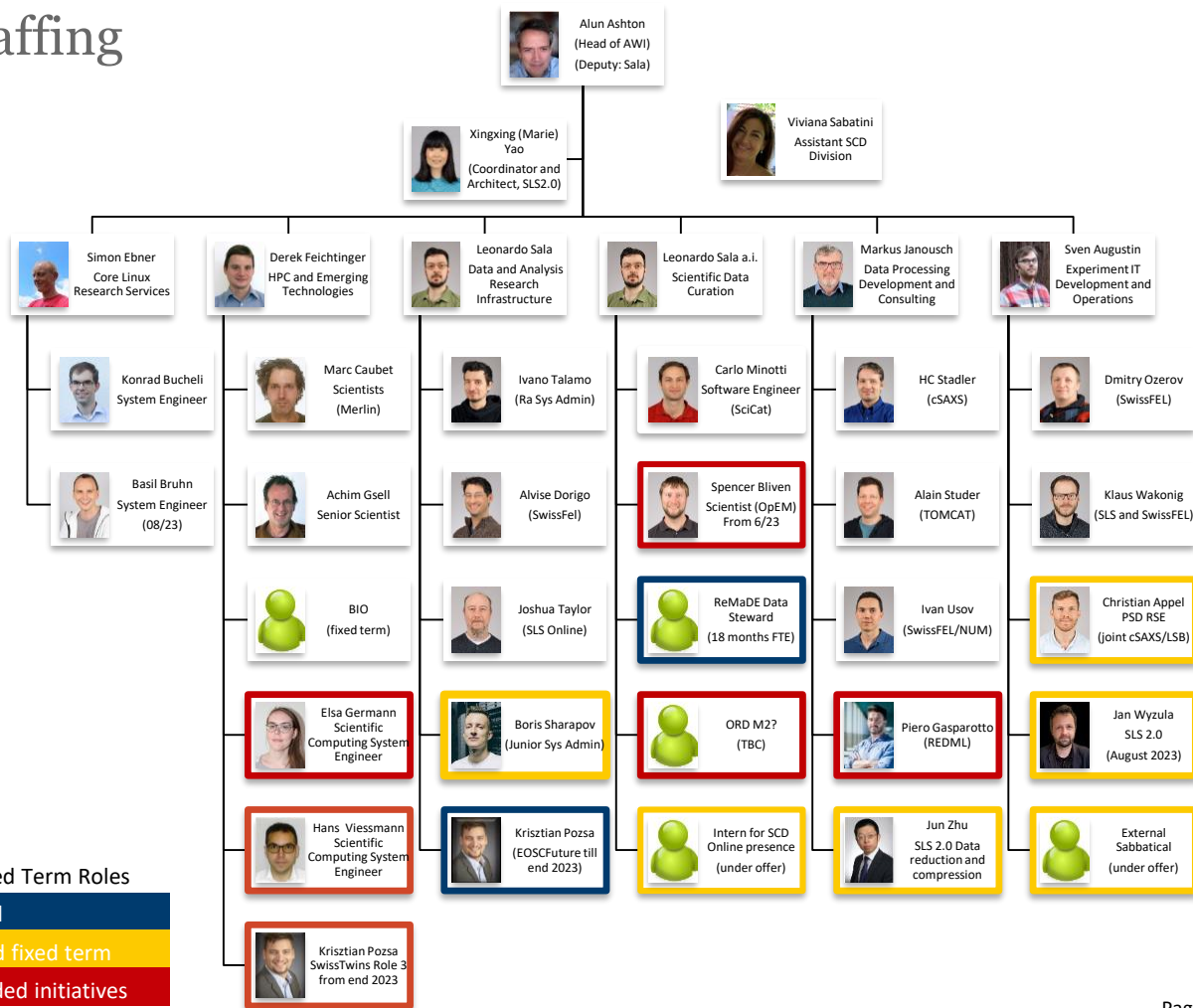


Sven Augustin  
Experiment IT  
Development and  
Operations

**MISSION:**  
To work closely with beamline/instrument scientists, controls and other departmental colleagues to ensure the operations, continued and smooth IT environment and development for PSD experiments.

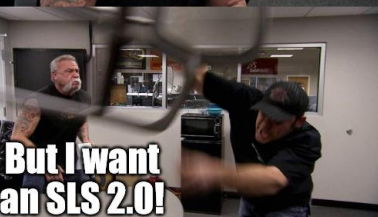
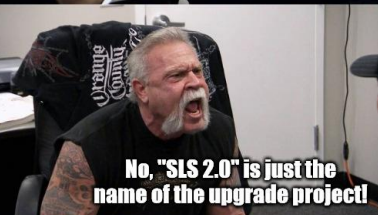
New group formed from splitting Development and Consulting in Science IT

# AWI Staffing



### Key to Fixed Term Roles

- EU Funded
- PSI Funded fixed term
- Swiss Funded initiatives



## What is the upgrade on the machine?

The Swiss Light Source (SLS) will be upgraded by replacing the storage ring in the existing hall in 2023-24. The SLS lattice built from 12 triple-bend arcs operating at 2.4 GeV is replaced by a 12×7-BA lattice operating at 2.7 GeV to increase hard X-ray brightness by a factor 60. The layout is constrained by the existing tunnel to 288 m circumference, nevertheless a low emittance of 158 pm is realized using longitudinal gradient and reverse bends. Dynamic aperture is sufficient to start with classical injection based on a 4- kicker bump. An upgrade path for on-axis injection with fast kickers has been implemented. Small beam pipes of 18 mm inner diameter and corresponding reduction of magnet bores, and the use of permanent magnets for all bending magnets enables a densely packed lattice and contributes most to a reduction of total power consumption of the facility by 30%.

- <https://accelconf.web.cern.ch/ipac2022/papers/tupost032.pdf>

### SLS today

- Lattice type **Triple bend achromat**
- Circumference **288 m**
- **3× long, 3× medium, 6× short** straights
- total straight length **~ 80 m**
- Beam current **400 mA**
- Beam energy **2.41 GeV**
- Emittance **5500 pm**

### SLS 2.0

maintained

- Circumference **288 m**
- **3× long, 3× medium, 6× short** straights
- total straight length **~ 80 m**
- Beam current **400 mA**

Almost maintained

- Source point positions: |shifts| < **70 mm**

Improved

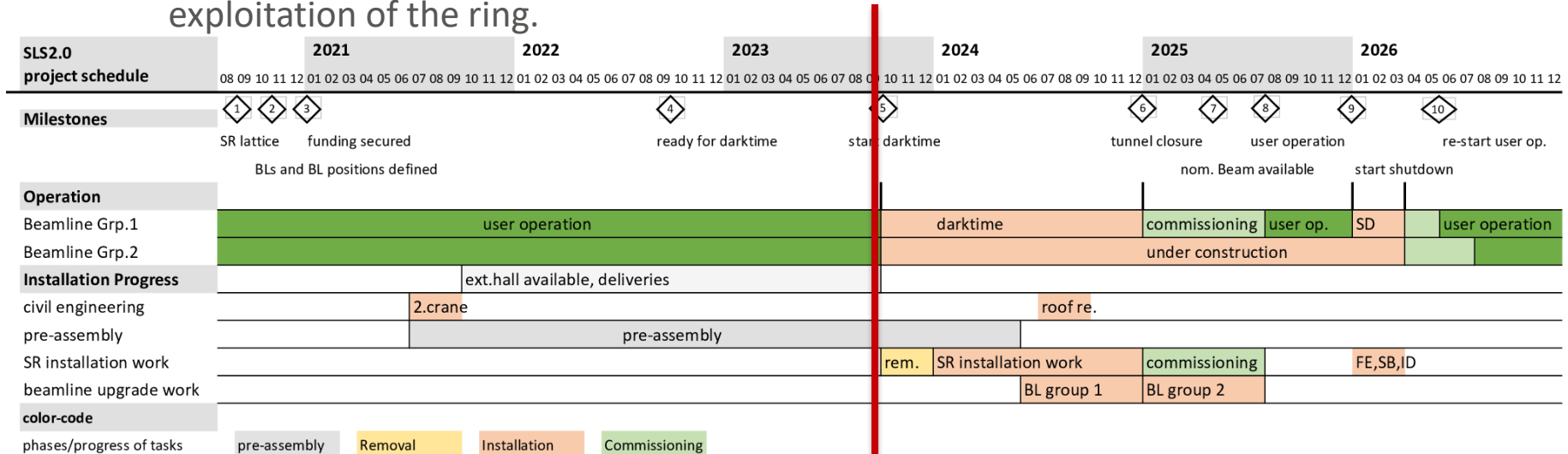
- Lattice type **7-bend achromat**
- Energy **2.7 GeV**
- Emittance **157 pm**



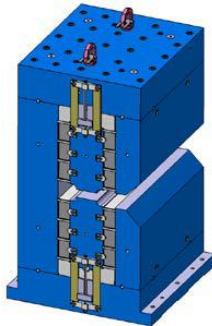
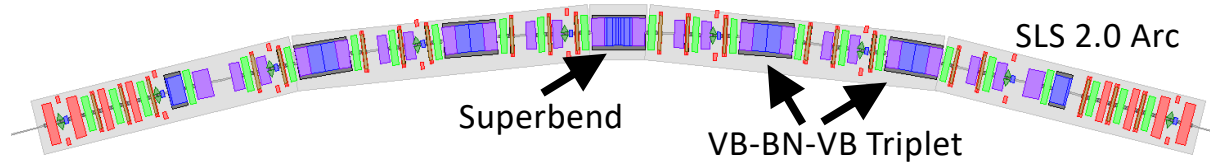


# Project Schedule

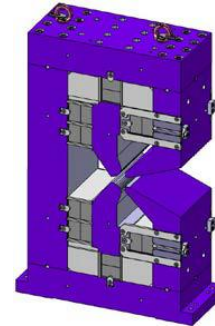
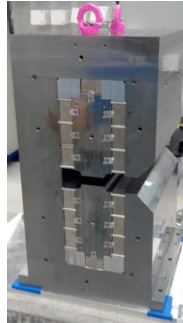
- The SLS 2.0 upgrade requires a comprehensive rebuild of the storage ring and magnet lattice, resulting in an improvement in emittance and associated increase in brightness by a factor of forty compared to the existing performance in the most commonly used hard x-ray regime.
- A phased program of upgrades of the beamlines will begin in parallel to optimize exploitation of the ring.



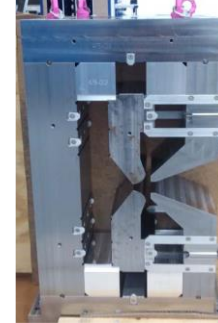
# Magnets: Permanent Bendig Magnets



BN-Type



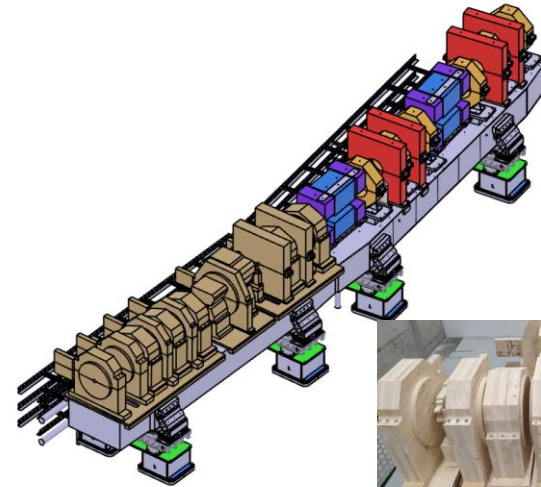
VB-Type



- ca. 18'200 kg of permanent magnet material needed
- ca. 1270 new power supplies and controller needed

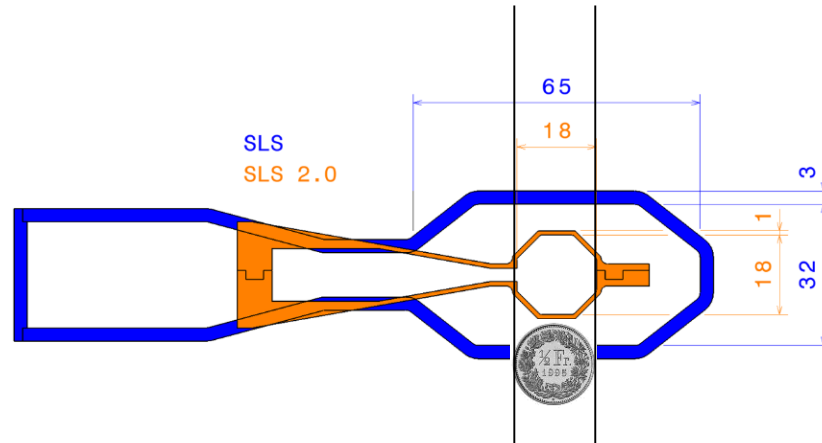


- Next Girder prototype in January 2022
- Test vibration characteristic
- Install wood and steel dummy magnet
- Install vacuum chamber



# Vacuum Chamber

- Octagonal Cross Section of 18 mm with a 3mm slit to the antechamber (magnet gap 22mm)
- Chambers walls material: Cu OFE (except at steering magnets)
- NEG Coating to reduce Photon Stimulated Desorption Rate
- Ion Getter pumps at each Absorber
- No bellows within arc,  
No in-situ baking: Activation of 18 m long sector outside tunnel;
- transport of 18m long chamber under vacuum



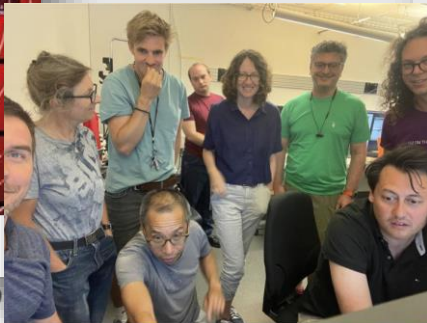
# What are the beamline upgrades?

2023												2024														
Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1		
J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M

- Mono light 01.09.2023



LaB<sub>6</sub> powder standard



- Group 2: Replace 2-T magnets @ D  
microXAS, QUEST, VUV, All FEs for Phase-2 BLs

Dark period

Installation new ring

Beam  
vacu

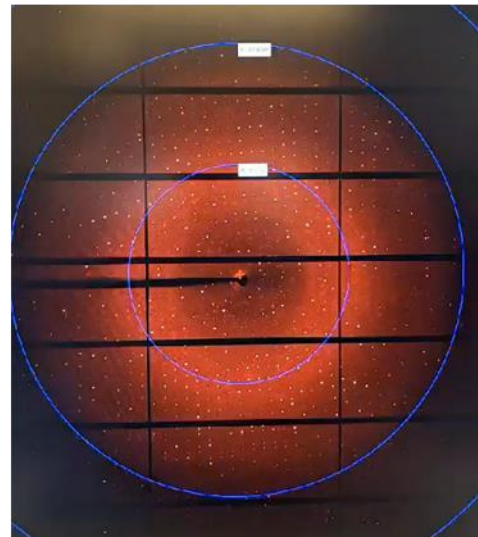
lations, modifications and upgrades  
as 2nd priority

inst, mod  
and upg  
1st prior

lations, modifications and upgrades  
as 3rd priority

inst, mod  
and upg  
2nd prior

- Lyzosome 04.09.2023

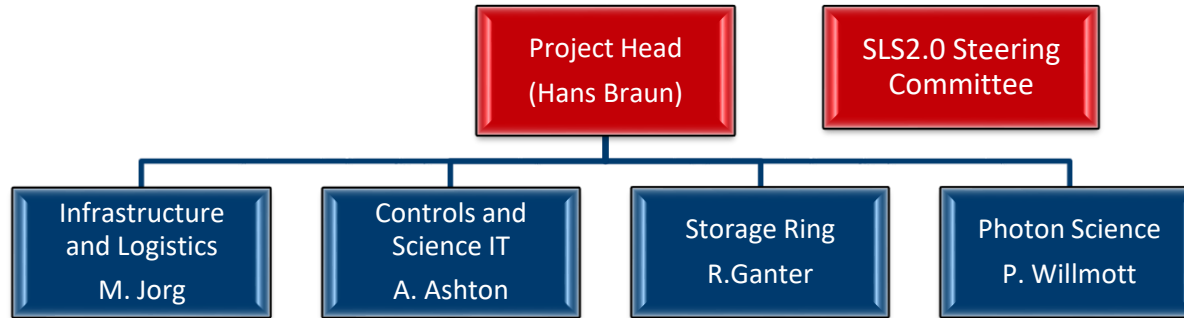


Pilatus4 1M, 150 μm pixel size,  
fast readout

Real research data now being recorded,  
industry included!!

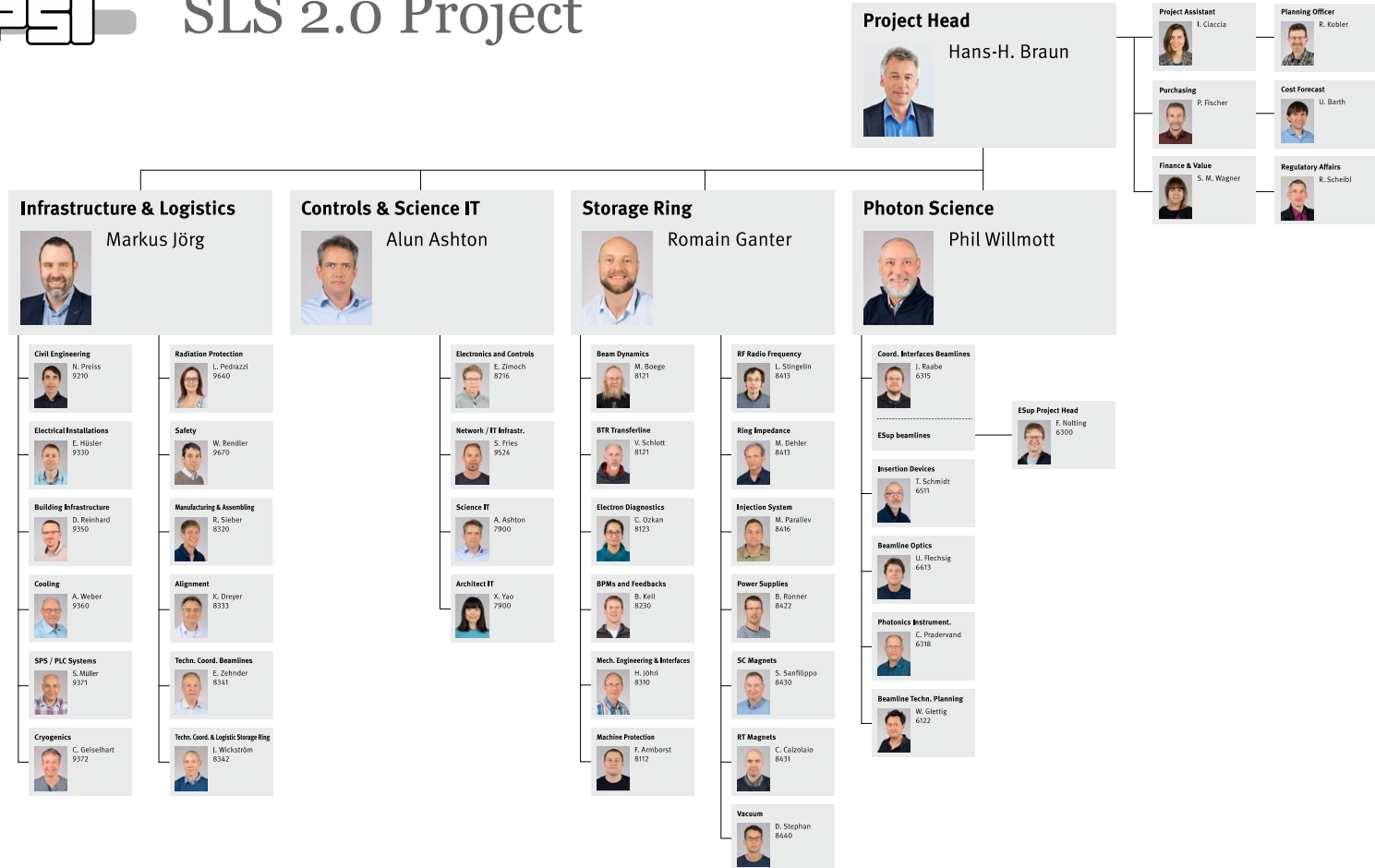
Correct in 2021, minor updates occurred.

# SLS2.0 Project Structure and Visibility of IT



Based on lessons learnt and increasing challenges/opportunities

- Controls and Science IT represented at the highest level of the project management.
- Increased communication/reporting, visibility, impact consideration, budget negotiation, accountability.



# Schnittstellen (Interfaces) für das Teilprojekt Controls & Science IT: from December 2021

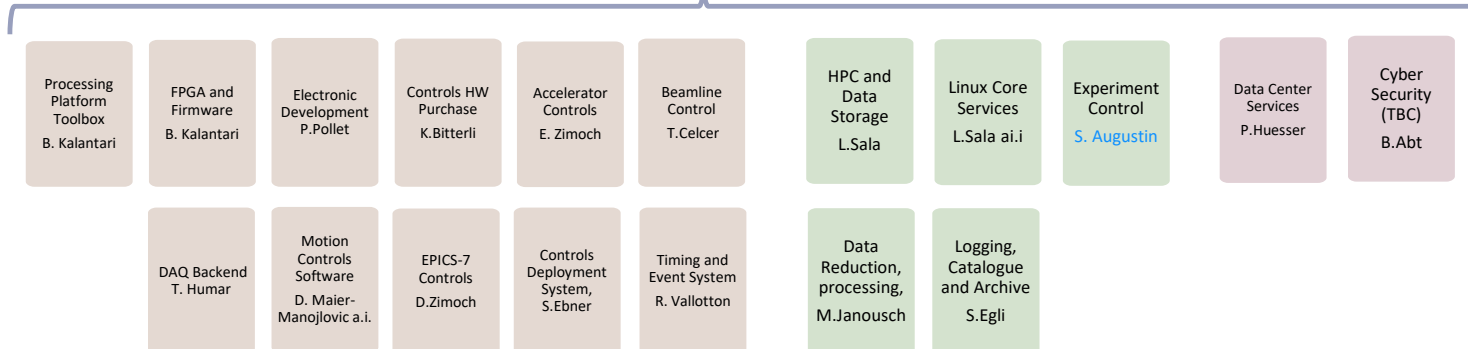
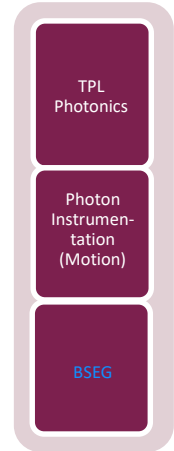
**aCaSIT:** advisory group for Controls and Science IT  
(HBraun, TSchilcher, **SBaymani**, RPeterhans, AAshton, MarieYao, **OBunk**)

## External Collaborations and Engagement

TPL  
Infrastruktur



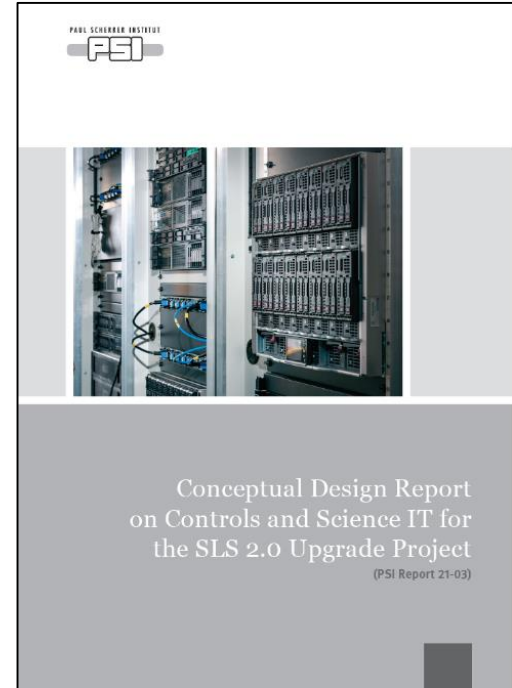
TPL  
Maschine





# SLS 2.0 CaSIT Conceptual Design Report

- 21 authors, 82 pages
- Virtual review on 19<sup>th</sup> and 20<sup>th</sup> of May 2021
  - 16 talks
  - 6 reviewers from ESRF, APS, BESSY, Diamond, and SKA
- Variations in the level of detail in the report highlight the level of maturity of different services
- Published and available open access (Nov 2021):  
<https://www.dora.lib4ri.ch/psi/islandora/object/psi%3A39514>



# SLS 2.0 project meetings

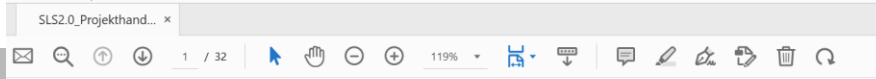
<b>SLS2.0 Meetings Overview</b>					
	project wide	Infrastructure&logistics	Controls&ScienceIT	Machine	Photon Science
strategic level					
meeting name	<b>SteCo</b> Steering Committee	<b>I&amp;L BM</b> I&L Baumassnahmen	<b>aCaSIT*</b> Advisory group for Controls&Science IT	<b>MAC</b> Machine Advisory Committee	<b>PSAC</b> Photon Science Advisory Committee
chair	C. Rüegg	P. Allenspach		Inn Soo Ko	J. Hastings
participants		TPL I&L, FG Civil Engineering,			
rhythm/duration	every 3 month	every 3 month	Every 3 months + virtual		
description	decides about project strategy	involves ETH-Rat; prepares requests to BaKo	reactive advice and guidance as requierd		not SLS2.0 specific but for all PSD activities
management level					
meeting name	<b>MB</b> Management Board Meeting	<b>TP-I&amp;L</b> TP Infrastruktur & Logistik Meeting	<b>mCaSIT*</b> Management group for Controls&Science IT	<b>SRDG</b> Storage Ring Design Group Meeting	<b>SIEM</b> SLS2.0 Information Exchange Meeting
chair	H. Braun	M. Jörg	A. Ashton	T. Garvey	P. Willmott
participants	PL, TPL	FG	Architect, AA, EZ, SF TBC	FG GFA	LL PSD, FG
rhythm/duration	every 2 weeks	every 4 weeks	every 2 weeks	every 2 weeks	every 4 weeks
description					
operational level					
meeting name	<b>PSIM</b> Project Interfaces and Information Meeting	<b>DAM</b> Dismantling Assembly Meeting	<b>iCaSIT*</b> interfaces and information for Controls&ScienceIT	<b>KTM</b> Konstruktion Taskforce Meeting	<b>BRM</b> Beamline Refurbishment Meeting
chair	R. Kobler	J. Wickström	A Ashton (a.i.)	M. Wurm	W. Glettig
participants	PL, TPL, FG				
rhythm/duration	every 12 weeks / 1.5h	every month	every month	every month	every month
description					
operational level					
meeting name	<b>PPM</b> Projekt Planungs Meeting		<b>pCaSIT</b> Project planning for Controls&ScienceIT		
chair	H.Braun		A.Ashton (a.i.)		
participants	PL, PO		AA, EZ, (as needed)		
rhythm/duration	every 2 weeks / 1h		weekly		
description					
			*All TBC		20200630_meeting-overview.xlsx

- XX

20230907\_SLS2.0\_Risk-Management-List

Inconsistency between development environment and production environment

	A	B	C	D	E	F	G	H	J	K	L	M	N	O
	Risk ID	Entry Date	Risk Issue	Description (Impact on Project Effect / Consequences)	Risk Type Category	Likelihood	Impact	Risk Rating	Strategy	Mitigation Measure(s) Actions are included in project plan	Status	related sub project	techn. Category	OE
158	RML_0150	24/11/2021	Beckhoff Delivery Times	Delivery times are currently raising (32 weeks, servo motors 25 weeks). This can lead to late delivery, installation, and commissioning.	TI	5	4	20		Phase-0 mitigated. However, ongoing concerns for later beamlines	In Progress	CaSIT	Electronics and Controls	8210
161	RML_0153	24/11/2021	CaSIT Project execution	Unclear interfaces, timeline and dependencies	TI	4	5	20		Management collaborates in forming dynamic teams as soon as possible, identify and document names and percentage of time; team members provide regular updates on tasks worked on and progress	Open	CaSIT	Coord. & IT-Architect	7900
162	RML_0154	24/11/2021	Availability of Staff	Current issues with reorganisations, retirements, recruitment, retention, resignations and sick leave along with a high level of single points of failure	QU	4	5	20		Individual units will need to plan accordingly, raise concerns early and try to reduce the impact and risks of skill and knowledge loss.	Open	CaSIT	Coord. & IT-Architect	7900
208	RML_0200	06/01/2023	Lacking of a cohesive set of project tools for software development and documentat	Fragmented software project development to easily and consistently 1. collect and progress/status throughout development with proper history and access control processes, risks timely deliverables, and organizational knowledge accumulation and retention.	GP	5	4	20	Reduce	Work with service providers/contractors to put tools in place, and provide training and usage guidelines. Investigations into feasible, cost effective tools	Open	CaSIT	SP-Controls & ScienceIT	7900



 <b>PAUL SCHERRER INSTITUT</b>		<small>Projekt/Project</small> <b>SLS2.0</b>
<small>Titel/Title</small> <b>Handbuch der Projektorganisation SLS 2.0 Projekt</b>	<small>Dokument Nummer/Document Identification</small> <b>VA-8010-358</b>	
<small>Autor/Author</small> Markus Lüthy, Roland Kobler	<small>Externe Referenz/External reference</small>	
<small>Mitautor(en)</small> <small>Co-Author(s)</small>	Hans Braun, Markus Jörg, Alun Ashton, Terry Garvey, Philip Willmott, Romain Ganter	

### Zusammenfassung/Summary

Das vorliegende Handbuch gibt eine Übersicht über die Projektorganisation des SLS 2.0 Projekts und die dazugehörigen Teil- und Unterprojekte. Dazu werden die verschiedenen Funktionen und Gremien aufgelistet und deren Zusammensetzung und Kompetenzen beschrieben.

Das Handbuch beschreibt insbesondere die Prinzipien und die Vorgehensweise, wie das SLS 2.0 Projekt geleitet wird. Der Inhalt ist kurzgehalten, um Freiraum für schnelle Änderungen zu lassen und die Mitarbeitenden nicht unnötig einzuschränken.

Es liegt in der Verantwortung eines jeden Mitarbeitenden im Projekt, die Details in dessen Bereich festzulegen. Nur die Prinzipien nach denen z.B. Entscheide getroffen, Änderungen implementiert und mit Terminverschiebungen umgegangen wird, sind in diesem Plan dokumentiert und dienen dazu, das Projekt mit nachvollziehbaren Kriterien und Prozessen zu leiten.

Weisungen auf Instruktionsebene haben Vorrang gegenüber vorliegenden Handbuch, insbesondere Weisung AW-91-18-02 «Bewilligungskompetenz und Unterschriftsberechtigung bei Geschäfte mit Dritten inklusive Beschaffung».

- **Summary:** This manual provides an overview of the project organization of the SLS 2.0 project and the associated sub-projects and sub-projects. For this purpose, the various functions and committees are listed and their composition and competencies are described. In particular, the manual describes the principles and procedures for managing the SLS 2.0 project. The content is kept short in order to leave room for quick changes and not to restrict the employees unnecessarily. It is the responsibility of each member of the project to define the details in their area. Only the principles according to which, for example, decisions are made, changes are implemented and deadlines are postponed are.....

Thanks to the team an apologies to our visitors!

