DESY Photon Science Users' Meeting 2016
European XFEL Users' Meeting 2016

Jointly organized Users' Meeting of
DESY Photon Science and European XFEL

DESY Photon Science Users' Meeting 2016
European XFEL Users' Meeting 2016

January 27-29, 2016 in Hamburg - DESY Auditorium (Bldg. 5)

Wednesday January 27 — European XFEL Users' Meeting (9:00-18:30 DESY Auditorium)

09:00–10:00	**Registration**		
10:00–10:20	**Opening Session**		
10:00	Welcome	M. Altarelli	*European XFEL, Hamburg*
10:10	Opening Address from the Council Chair	M. M. Nielsen	*Techn. Univ. of Denmark*
10:20–12:20	**Project update session**	**Chair: M. M. Nielsen**	
10:20	General Status of the Project	M. Altarelli	*European XFEL, Hamburg*
10:50	The Electron Accelerator	W. Decking	*DESY, Hamburg*
11:20	User services at European XFEL	S. Bertini	*European XFEL, Hamburg*
11:40	Laser systems for science instruments	M. Lederer	*European XFEL, Hamburg*
12:00	User laboratories for sample preparation	J. Schulz	*European XFEL, Hamburg*
12:20–14:00	**Lunch break**		
14:00–16:00	**European XFEL Science Instruments**	**Chair: D. M. Fritz**	
14:00	Femtosecond S-ray Experiments: FXE	C. Bressler	*European XFEL, Hamburg*
14:20	Single Particles, Clusters, Biomolecules and SFX: SPB/SFX	A. Mancuso	*European XFEL, Hamburg*
14:40	Materials Imaging & Dynamics: MID	A. Madsen	*European XFEL, Hamburg*
15:00	High Energy Density science: HED	U. Zastrau	*European XFEL, Hamburg*
15:20	Small Quantum Systems: SQS	M. Meyer	*European XFEL, Hamburg*
15:40	Spectroscopy and Coherent Scattering: SCS	A. Scherz	*European XFEL, Hamburg*
16:00–16:30	**Coffee break**		
16:30–18:30	**Science session: Key advances in FEL methodology**	**Chair: G. Materlik**	
16:30	FERMI based multi-wave experiments	C. Masciovecchio	*ELETTRA, Trieste*
17:00	Photon spectroscopy by Fourier-transform inelastic X-ray scattering	M. Trigo	*SLAC, Stanford*
17:30	Macromolecular diffractive imaging using imperfect crystals	H.N. Chapman	*DESY/CFEL, Hamburg*
18:00	Spectral control of an inner shell excited states laser pumped by X-ray FEL pulses	H. Yoneda	*ILS, Tokyo*

19:00 — **European XFEL Reception for speakers and participants (DESY canteen, Bldg. 9)**

Thursday January 28 — FLASH Session | Soft X-ray FEL experiments – jointly organized by DESY and European XFEL (9:00-13:00 DESY Auditorium)

		Chair: J. Feldhaus, DESY, Hamburg	
09:00-09:05	Welcome	E. Weckert	*DESY, Hamburg*
09:05-09:35	FLASH – today and tomorrow – status report and future plans	W. Wurth	*DESY,Univ. Hamburg*
09:35-10:00	The CAMP End-Station at FLASH1	B. Erk	*DESY, Hamburg*
10:00-10:30	Temporal photon pulse diagnostics based on transverse deflecting cavities	C. Gerth	*DESY, Hamburg*
10:30-10:40	Report of the "Komitee Forschung mit SR" (KFS)	S. Eisebitt	*KFS Chair, MBI, Berlin*
10:40-11:00	**Coffee break**		
11:00-13:00	**Soft X-ray FEL experiments**	**Chair: M. Altarelli, European XFEL, Hamburg**	
11:00-11:30	X-ray movie camera at FLASH	D. Rupp	*TU Berlin*
11:30-12:00	Mapping chemical interactions and dynamics with soft X-ray laser spectroscopy	P. Wernet	*HZB, Berlin*
12:00-12:30	XUV lasers in noble gases and clusters – recent results from FLASH	L. Mercadier	*MPSD, Hamburg*
12:30-13:00	Coherent control with the Free Electron Laser FERMI	K. C. Prince	*ELLETTRA, Trieste*
13:00-14:00	**Lunch break**		
14:00-19:00	**Satellite Meetings - Workshops**	*see next page for details*	

Thursday January 28 SATELLITE MEETINGS - WORKSHOPS

14:00-17:30	X-ray magnetic dichroism at beamline P09	*SemR 1, Bldg. 1*
14:00-18:00	X-ray absorption spectroscopy at P64/65 - begin of user operation	*SemR III, Bldg. 99*
14:00-18:00	DESY- 6th Workshop on X-Ray Nano-Imaging of Biological and Chemical Systems at PETRA III	*SemR FLASH, 28c*
14:00-18:00	Serial crystallography at synchrotron sources	*SemR II, Bldg. 99*
13:00-18:00	DESY- SAXS/WAXS/GISAXS-User Workshop @ DESY	*SemR 4ab, Bldg. 1b*
14:00-18:00	P08 and P07-DESY: Diffraction with hard X-rays up to 100 keV	*SemR109, 25b*
14:00-18:00	Tutorial to X-ray Photon Correlation Spectroscopy – how to probe dynamics from 10^{-9} to 10^{3} s on nanometer length scales in condensed matter	*SemR L202, Bldg. 48e*
14:00-18:00	XFEL-Matter Interaction: Recent Advances in Theory	*SemR I, Bldg. 99*
13:30-17:00	The German Engineering Materials Science Centre (GEMS): Status and perspectives of the Helmholtz-Zentrum Geesthacht Outstation at DESY	*SemR456, Bldg.25f*
14:00-18:30	4th Satellite Workshop on Photon Beam Diagnostics	*Main Auditorium, Bldg. 5*
14:00-18:00	Status and Science at HED instrument and of the HIBEF UC	*SemR, ZOQ, Bldg.90*
19:00	**DESY Photon Science Reception for speakers and participants**	(DESY canteen Bldg. 9)

Friday January 29 DESY Photon Science Users' Meeting (9:00-13:00 DESY Auditorium)

08:30	**Registration**		
		Chair: A. Stierle, DESY, Hamburg	
09:00-09:05	Welcome	E. Weckert	*DESY, Hamburg*
09:05-09:50	Photon science at DESY	E. Weckert	*DESY, Hamburg*
09:50-10:20	The most incompressible metal osmium at static pressures above 750 GPa	L. Dubrovinsky	*University of Bayreuth*
10:20-10:50	**Coffee break**		
		Chair: C. Schroer, DESY, Hamburg	
10:50-11:20	Recent results from PETRA III – Stacking charge density wave order in high-temperature superconductor	J. Chang	*University of Zürich*
11:20-11:50	High numerical aperture multilayer Laue lenses	S. Bajt	*DESY-CFEL, Hamburg*
11:50-12:20	Synchrotron radiation techniques reveal a molecular ruler that determines the length of lipopolysaccharides in Escherichia coli	G. Hagelüken	*University of Bonn*
12:20-12:35	Report of the DESY Photon Science Users Committee (DPS-UC)	P. Müller-Buschbaum	*DPS–UC Chair, TU München*
12:35-12:50	Report of the Europ. Synchrotron User Organis.(ESUO)	U. Pietsch	*ESUO Chair, Univ. Siegen*
12:50-14:00	**Lunch break**		
14:00 – 17:00	**POSTER SESSION (14:00 – 17:00) and Vendor exhibition (13:00-18:00) - Jointly organized by DESY and European XFEL** (CFEL Bldg. 99, PETRA Bldg. (North) 46 and FLASH seminar room Bldg. 28k)		

Tuesday January 26 *SATELLITE MEETINGS - WORKSHOPS*

13:00-19:00	*DAC setup at the HED instrument of the European XFEL*	*SemR 459, Bldg. 30b*
08:30-17:00	*From Picoseconds to Femtosecond X-Ray Experiments*	*SemR FLASH, 28c*
09:00-17:00	*Sample environments for biology at XFELs*	*SemR 3.11, AER 19*
08:30- 20:00	*DESY/European XFEL - Turkey Workshop "Science at accelerator-based X-ray sources"*	*SemR 4ab, Bldg. 1b*

General Information

Oral and postsession and oral

Oral sessions will be held in the DESY auditorium.

The poster session will be held in the CFEL building (Bldg. 99) and in
the PETRA III extension Hall North (Bldg. 46).

Sessions Vendor exhibition

The vendor exhibition will take place in the CFEL building (Bldg. 99),
in the PETRA III extension Hall North (Bldg. 46) and the FLASH seminar room (Bldg. 28c).

Social event

The European XFEL reception
will take place on Wednesday 27 January in the DESY canteen (Bldg. 9)

The DESY Photon Science reception
will take place on Thursday 28 January in the DESY canteen (Bldg. 9)

DESY WLAN

Name:	UserMeeting2016
WPA/WPA2-PSK:	4cpidRNt

Organizers

T. Bäcker (DESY)
T. Baumann (European XFEL)
I. Gembalies (European XFEL)
M. Kreuzeder (DESY)
S. Klumpp (DESY)
W. Laasch (DESY)
F. Lehmkühler (DESY)
A. Rothkirch (DESY)
T. Tschentscher (European XFEL)

Local Information

Cash machine/ATM

You will find a cash machine in the foyer of the DESY canteen (Building 9).

Meals

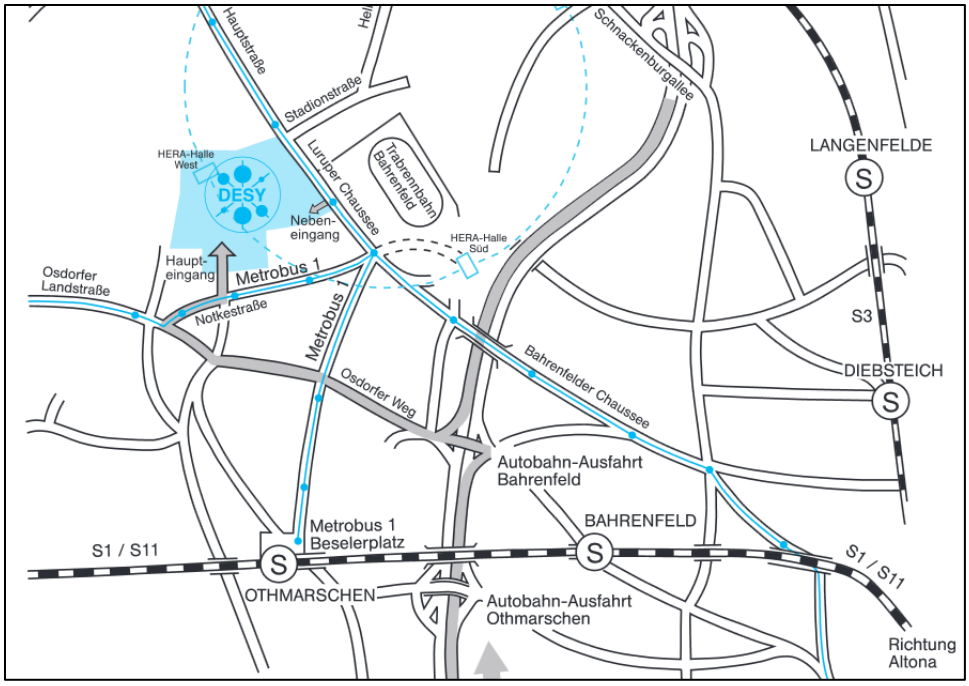
Breakfast
If you stay at the DESY guest house you may have breakfast in the DESY cafeteria (opens at 07:00h, Bldg. 9) at your own expenses.

Lunch
You may have lunch in the DESY canteen (Bldg. 9) or CFEL Cafeteria (Bldg. 99) at your own expenses.

Supermarkets

LIDL
From the main gate at Notkestrasse turn right and follow the street (700 – 800m).

PENNY
From the DESY main gate (Notkestrasse) walk straight down the street "Zum Hünengrab" (700 – 800m).
Opposite to this supermarket you will find a bakery and other shops (drugstore).



I Main sessions
Abstracts of the talks

FERMI based Multi-Wave Experiments

F. Bencivenga[1], C. Masciovecchio[1]

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Wave mixing processes, based on coherent nonlinear light-matter interactions, can combine time resolution with energy and wavevector selectivity, and enables to explore dynamics inaccessible by linear methods.[1] Wave mixing experiments have allowed important advances in physics, chemistry and biology, and led to the development of cutting edge technologies. The extension of this approach to extreme ultraviolet (EUV) and x-ray wavelengths is a revolutionary step towards dynamic studies with elemental selectivity and nano to atomic spatial resolution.

Here we show how EUV transient gratings generated by coherent free electron laser (FEL) pulses can be used to stimulate FWM processes at sub-optical wavelengths. In a broader context, the demonstration of FEL-based FWM opens up new perspectives for the application of coherent non-linear optics in the EUV/x-ray range.[2]

[1] N. Bloembergen Nonlinear optics and spectroscopy, *Rev. Mod. Phys.* **54**, 685-695 (1982).
[2] F. Bencivenga, R. Cucini, F. Capotondi, A. Battistoni, R. Mincigrucci, E. Giangrisostomi, A. Gessini, M. Manfredda, I. P. Nikolov, E. Pedersoli, E. Principi, C. Svetina, P. Parisse, F. Casolari, M. B. Danailov, M. Kiskinova & C. Masciovecchio, *Nature* **520**, 205 (2015).

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Phonon spectroscopy by Fourier-transform inelastic x-ray scattering

Mariano Trigo[1]

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In a solid, the elementary excitations of the lattice (phonons) can be obtained by inelastic neutron or x-ray scattering where the energy of the phonon is known from the energy shift of the scattered particle. In the case of x-ray scattering these require sophisticated monochromators and spectrometers. In this talk, I will present an alternative approach for measuring collective lattice excitations in solids that exploits femtosecond diffuse x-ray scattering using Free Electron Lasers. I will show that the ultrafast excitation induces time-dependent coherences in the lattice modes that span multiple wavelengths across the entire reciprocal space. The frequency of the phonon is then recovered by a simple Fourier transform. Using this approach we obtain an extremely high-resolution map (~ 0.3 meV) of the acoustic phonon dispersion of germanium over large sections of momentum space. I will then show how these non-equilibrium measurements help elucidate the role of the valence electrons in the peculiar phonon properties of lead-telluride (PbTe).

These results emphasize how pump-probe measurements can obtain information that would otherwise be hidden in a static measurement.

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Macromolecular Imaging Using Imperfect Crystals

Henry N. Chapman[1,2,3]

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The resolution of a macromolecular electron density map is crucial for proper biological interpretation of structure and function. In crystallography, the resolution is set by the highest scattering angles recorded in the diffraction pattern. The biggest limitation and frustration associated with X-ray crystallography is the fact that more often than not, macromolecular crystals do not yield diffraction patterns with Bragg peaks extending to high angles. Such Bragg peaks are the result of the coherent addition of scattering from the many regularly arranged molecules in the crystal, and their absence at high scattering angles is due to a loss of periodicity at a particular length scale—either due to a variability in the molecular structures in the crystal, or due to a variability in the rigid-body positions of those molecules, or both.

In the case of large macromolecular complexes, one may expect that the loss of high-angle Bragg peaks is not the fault of the molecules, given that cryo-EM can now often achieve resolutions of 3Å and that shrinking crystals (e.g. by dehydration) often improves the diffraction resolution. In this case, random translational disorder suppresses the coherent addition in Bragg peaks, as can be described by the familiar Debye Waller factor. But the molecules themselves still diffract as strongly as they would if they were perfectly periodically arranged. At the high scattering angles beyond the Debye Waller cut off, this “single molecule” continuous diffraction accumulates incoherently from all molecules. That is, the disordered crystal provides the means to deliver a large number of aligned molecules into an X-ray beam. The continuous diffraction should allow *de novo* phasing, using iterative phasing algorithms of coherent diffractive imaging, enabled by the large increase in information recorded as compared with the Bragg peaks alone.

We demonstrate these ideas on diffraction recorded at the LCLS from a large macromolecular complex, improving resolution from 4.5 Å to 3.5 Å and obtaining a model-free electron density image.

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Spectral control of an inner shell excited state laser pumped by X-ray FEL pulses

Hitoki Yoneda[1]

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The recent success of the X-ray Free Electron Laser (XFEL) [1, 2] opens the door to a broad range of new scientific results. Specifically, in the Japanese XFEL SACLA, a 50 nm focusing system [3] and two-color operation of the XFEL [4] are powerful tools to perform sophisticated experiments in high intensity X-ray field. The high intensities make it possible to produce many quantum-optical phenomena with hard x-rays. For example, an atomic inner-shell x-ray laser pumped by the XFEL is now possible. A 0.8 keV laser in neon gas was demonstrated at LCLS [5] and recently an 8 keV hard X-ray laser was achieved in SACLA [6]. After obtaining a large enough gain length, we input a weak seed pulse into the gain area. Spectral narrowing of the Kα line spectra is observed. The minimum width of this Kα laser is about 0.9eV and it is much smaller than natural width of Kα emission. In addition, we have some evidence of a change of the branching ratio among the relaxation process after making an inner shell vacancy of 1s electron. As well-known, the ratio between Kα1 and Kα2 is 2:1 in cold material condition. But, with success of srong seeding of Kα2 line, almost pure Kα2 line emission is obtained.

We also succeed to obtain spectral control with various target conditions. For example, we demonstrate (1) control of spectral width with composite Cu materials, (2) Double pulse lasing with surface structure target, (3) MOPA type Kα laser inside solid target materials. Some of the spectral modulation is evidence of coherent interaction of x-ray laser with matter. By analogy to ordinary quantum optics, we can expect many quantum optics applications such as frequency conversion, laser mode control and x-ray control of atoms in matter.

[1] Emma, P. et al., *Nature Photon.* **4**, 641-647 (2010).
[2] Ishikawa T. *et al.*, *Nature Photon.* **6**, 520 (2012).
[3] Mimura, H. *et al. Nature Commun.* **5**, 3539 (2014).
[4] Hara, T. et al. *Nature Commun.* **4**, 2919 (2013).
[5] Rohringer, N. et al., *Nature* **481**, 488-491 (2012).
[6] Yoneda H., et al, *Nature* **524**, 446–449 (2015).

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FLASH - today and tomorrow- status report and future plans

Wilfried Wurth[1,2] for the FLASH group

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In 2015 we have celebrated 10 years of user operation at FLASH and on this occasion we had a very nice ceremony were we named the two experimental halls of FLASH honoring two pioneers of light-matter interaction, Albert Einstein and Kai Siegbahn, respectively.
In terms of user operation 2015 was a very successful year for FLASH with an increase in dedicated user beamtime and improved stability of machine operation. In 2016 we will start user operation of the second FEL line, FLASH2, after intense commissioning in the last year and will then for the first time run two independent FEL lines for user experiments in parallel. In addition, we are preparing plans for a major upgrade of the facility towards cw operation.
In the talk I will review the status of FLASH, present new instrumental developments and some selected recent achievements. Furthermore, I will briefly discuss our ideas for the mid- and long-term future of the facility.

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The CAMP End-Station at FLASH1

B. Erk[1], C. Bomme[1], J. Correa[1], R. Boll[1], E. Savelyev[1], E. Plönjes-Palm[1], B. Keitel[1], K. Tiedtke[1], A. Sorokin[1], G. Brenner[1], S. Dziarzhytski[1], S. Düsterer[1], R. Treusch[1], R. Moshammer[2], J. P. Müller[3], M. Sauppe[3], D. Rupp[3], T. Möller[3], D. Rolles[1], and the CAMP collaboration

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[3] *Institut für Optik und Atomare Physik, Technische Universität Berlin, Berlin, Germany*

The beamline BL1 at FLASH1 has been equipped with new transport and Kirkpatrick-Baez focusing mirrors, and a newly installed permanent end-station for imaging and pump-probe experiments – CAMP.

The new mirrors cover the full energy range of FLASH1, including the carbon K-edge, and focus the beam to a 5µm by 7µm spot. The permanently installed, multi-purpose end-station can be equipped with large-area pnCCD photon detectors and, additionally, comprises various ion- and electron-spectrometers, including velocity-map imaging and ion-electron-coincidence devices. The pnCCD detectors allow single-photon counting and have a large dynamic range (up to 10^4 photons per pixel at 100eV) operating at 10Hz. With a dedicated pump-probe setup using the FLASH1 optical laser, and an XUV split-and-delay setup, this endstation facilitates femtosecond time-resolved studies on a large variety of gas-phase, liquid and solid samples.

The end-station is in user-operation since the end of 2014 and in the first two proposal blocks 12 experiments where performed using the CAMP instrument.

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Temporal photon pulse diagnostics based on transverse deflecting cavities

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X-ray free-electron lasers (FELs) offer unique photon pulse properties for time-resolved X-ray studies in the femtosecond regime. Typical pulse durations vary from several hundred down to a few femtoseconds with about 10^{11}–10^{13} photons per pulse. For the data interpretation in many user applications, e.g. nonlinear X-ray sciences and molecular imaging studies, diagnostics that provides femtosecond time resolution with single-shot capability is highly desired.

At the free electron laser in Hamburg (FLASH), a longitudinal electron bunch profile monitor based on the transverse deflecting structure LOLA has been realized. In combined use with a fast kicker magnet and an off-axis imaging screen, selection and measurement of a single bunch out of a bunch train can be achieved without affecting the remaining bunches which continue to generate FEL radiation during user operation. This longitudinal bunch profile monitor has been proven to be a versatile tool for the tuning of the accelerator driving the FEL and provides constraints on the expected FEL photon pulse durations.

However, the temporal photon pulse profiles depend on time-dependent electron beam properties, such as the beam current, slice emittance and energy spread, and may deviate from that of the electron bunch. At the Linac Coherent Light Source (LCLS), an X-band transverse deflecting cavity (XTCAV) has been installed downstream of the FEL undulators. X-ray photon pulse profiles can be reconstructed by measuring the induced energy loss or energy spread in the electron bunch profile. This single-shot diagnostics is non-invasive to user operation and independent of photon energy with a large dynamic range (femtoseconds to hundreds of femtoseconds).

Feasibility studies on the reconstruction of photon pulse profiles at FLASH2 have been carried out. By introducing an XTCAV behind the SASE undulators an electron bunch and photon pulse profile monitor with femtosecond time resolution can be realized.

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X-ray Movie Camera at FLASH

Mario Sauppe[1], Leonie Flückiger[1,2], Katharina Kolatzki[1], Bruno Langbehn[1], Maria Müller[1], Björn Senfftleben[1], Anatoli Ulmer[1], Jannis Zimbalski[1], Julian Zimmermann[1], Tobias Zimmermann[1], Tais Gorkhover[1,3], Christoph Bostedt[3,4], Benjamin Erk[5], Cédric Bomme[5], Marion Kuhlmann[5], Daniel Rolles[5,6], Dimitrios Rompotis[5], Stefan Düsterer[5], Rolf Treusch[5], Torsten Feigl[7], Thomas Möller[1] and Daniela Rupp[1]

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Short-wavelength free-electron lasers have enabled a large number of exciting novel experiments, all making use of the combined high spatial and temporal resolution of the ultraintense pulses. One example is single-shot imaging of individual nanostructures in free flight via elastic light scattering. This method allows for the study of laser-cluster interaction at an unprecedented level of detail; combined with spectroscopic methods, the single-shot data from individual gas-phase clusters can be sorted for particle size and laser intensity, information that is contained in the scattering image [1,2]. In the extreme ultraviolet region, where intense scattering patterns up to large scattering angles are recorded, even the 3D shape of the nanoparticle and its orientation from a single-shot can be extracted from the image [3].

In a pump-probe scenario, single-cluster imaging can be utilized to follow the ultrafast light-induced dynamics in the clusters. However, for non-reproducible particles a real movie of the dynamics can only be assembled if the initial structure is known.

We developed a novel imaging setup for capturing two spatially separated images of the same nanoparticle at different stages of the dynamics, consisting of the multilayer based split-and-delay unit “DESC” (Delay stage for CAMP) for XUV double pulses and a novel detector unit called ”X-ray Movie Camera”. DESC extends the CAMP [4] endstation at BL1 by an important element for the time-resolved analysis of dynamic processes from short to long timescales (20fs-650ps delay). Since October 2015 it is available for user experiments.

In this talk I will present results from the first experiment with the X-ray Movie Camera studying the fs to hundreds of ps dynamics of resonantly excited large xenon clusters. From each cluster one image of the intact structure and one of the same cluster at a later stage were collected via two opposing large-area detectors, together with the single-cluster ion spectrum. By sorting on similar initial images, a movie of the surface melt-off in a hydrodynamic expansion [5,6] can be assembled. This promising proof-of-principle experiment opens the door for a variety of fascinating research opportunities such as studying the explosion dynamics of heterogeneous clusters and following ultrafast changes of electronic properties and non-equilibrium melting phenomena in metal nanoparticles with the capability of making a 3D X-ray Movie.

[1] T. Gorkhover et al., Phys. Rev. Lett., **108**, 245005 (2012)
[2] D. Rupp et al., under review at Phys. Rev. Lett.
[3] I. Barke et al., Nature Comm. **6**, 6187 (2015)
[4] L. Strüder et al., Nucl. Instr.and Meth. **614**, 483–496 (2010)
[4] C. Peltz et al., Phys. Rev. Lett. **113**, 133401 (2014)
[5] T. Gorkhover et al., in press at Nature Photonics

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Mapping chemical interactions and dynamics with soft x-ray laser spectroscopy

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The reactivity and selectivity in the chemical reactions of transition-metal complexes and metalloproteins is determined by charge and spin density changes at the metal sites. To understand their function and to optimize complexes for photocatalytic applications the changes of charge and spin densities need to be mapped and ultimately controlled. I will discuss how soft x-ray laser spectroscopy enables a fundamental understanding of local atomic and intermolecular interactions and their dynamics on atomic length and time scales of Ångströms and femtoseconds. The approach consists in using time-resolved, atom- and orbital-specific x-ray spectroscopy [1] and quantum chemical theory [2] to map the frontier-orbital interactions and their evolution in real time of ultrafast chemical transformations [3].

We recently used femtosecond resonant inelastic x-ray scattering (RIXS, the x-ray analog of resonant Raman scattering) at the x-ray free-electron laser "LINAC Coherent Light Source" (LCLS, Stanford, USA) to probe the reaction dynamics of a transition-metal complex in solution on the femtosecond time scale [3]. Spin crossover and ligation were found to define the excited-state dynamics. This demonstrates how correlating orbital symmetry and orbital interactions with spin multiplicity allows for determining the reactivity of short-lived reaction intermediates.

I will discuss how this complements approaches that probe structural dynamics and how it can be extended [4] to map the local chemical interactions and their dynamical evolution in metalloproteins.

[1] Ph. Wernet, Phys. Chem. Chem. Phys. **13**, 16941 (2011).
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XUV lasers in noble gases and clusters – recent results from FLASH

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When an intense, ultrashort x-ray free-electron laser (XFEL) beam is focused onto matter, inner-shell electrons are photo-ionized and the subsequent relaxation processes can lead to population inversion between two highly energetic states: the basic ingredient for an atomic x-ray laser.

We present recent experiments performed at FLASH on XUV lasers in xenon and krypton. First, we demonstrate lasing of the two noble gases in an elongated target at sub-atmospheric pressure. The photo-ionization of the xenon 4d shell by the focused XFEL beam creates a vacancy that rapidly decays via various Auger channels. This results in the creation of long-lived population inversion within the n=5 shell. Three extremely narrow, stimulated emission lines in the XUV domain are observed in the XFEL propagation direction, with gain spanning over 4 orders of magnitude. Similar decay processes lead to the observation of one lasing line in krypton.

In a second experiment, probing the same lasing schemes, we study the transition from a homogeneous gaseous medium to an ensemble of clusters with sizes comparable to the lasing wavelength. Are the nano-emitters coherently contributing to the lasing signal? Are they comparable to random lasers of small scattering centers, where the stimulated light gets multiply scattered from nanoparticle to nanoparticle? Can lasing be observed from a single, big cluster?

We show that it is possible to stimulate emission lines from xenon and krypton clusters, and that the lasing signal exhibits striking differences with its gaseous counterpart. At the so-called xenon 4d giant resonance (92 eV), the strong energy coupling creates dense nanoplasmas and high charge states in which collisions quench the lasing process and broaden the emission lines. At higher photon energies (136 eV), no quenching is observed but the lasing gain is linear as opposed to exponential in the gas phase. We characterize the charge states by fluorescence spectroscopy and the size of emitters by small angle scattering and discuss the effects of the various parameters that control the size and density of the emitters.

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Coherent control experiments with the Free Electron Laser FERMI

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XUV and X-ray Free Electron Lasers (FELs) have demonstrated most of the characteristics of pulsed optical lasers: extremely high intensity, ultrashort duration, well-defined polarization and transverse coherence. However to date longitudinal coherence has not been exploited in FEL experiments. This property is fundamental for optical experiments such as coherent control, where the outcome of light-matter interaction is directed via the coherence properties of the light. This is because most FELs are based on Self Amplified Spontaneous Emission (SASE), with limited longitudinal coherence. In contrast, the seeded FEL FERMI is designed to produce nearly transform limited pulses, and commensurate wavelengths (different harmonics of the same seed wavelength) have been predicted to be mutually phase coherent. We have demonstrated experimentally the longitudinal phase correlation between two colours (first and second harmonics), and applied it to coherently control a photoionization experiment [1]. Neon was ionized at wavelengths of 63.0 and 31.5 nm, and the asymmetry of the 2p photoelectron angular distribution (PAD) was manipulated by adjusting the phase, in a Brumer-Shapiro type experiment [2]. The outgoing 2p electrons, ionized by one (second harmonic) photon or two (first harmonic) photons interfere to give an asymmetric PAD whose asymmetry depends on the relative phase of the two photon fields.

The relative phase of the two wavelengths was locked and tuned with temporal resolution of about 3 attoseconds. The key to this extremely precise manipulation of the phase lies in the use of phase shifters located between the radiators of FERMI. This innovative approach provides a degree of control that is impossible with HHG laser sources operating in the XUV region. Such sources provide naturally coherent harmonics, which is the basis for producing attosecond pulse trains, but it is difficult to control the relative phase of the harmonics.

The present results open the door to new coherent control experiments in the XUV and soft X-ray region, with ultrahigh time/phase resolution. Very recent results will be shown of applications which are unique to Free Electron Lasers, and prospects for further development will be discussed. Short wavelengths can access core levels and therefore provide chemical sensitivity, and in the future, this capability may be combined with this new method of steering quantum processes.

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Behavior of some metals from X-ray diffraction data

at static pressures above 5 Mbar

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The impact of high-pressure studies on fundamental physics and chemistry, and especially on the Earth and planetary sciences, has been enormous. While experiments in diamond anvil cells (DACs) at pressures of ~250 - 400 GPa are proven to be very difficult but possible, at higher static pressures any matter has not been investigated until very recently.

We have developed a method of synthesis of balls and semi-balls (of 10 to 50 μm in diameter) made of nanodiamond (with individual nano-particles of linear dimensions below 30 nm) and used them as second-stage or indentor-type anvils in conventional DACs. In experiments on rhenium, osmium, gold, platinum, and tungsten we were able to generate pressures above 700 GPa and demonstrated crucial necessity of the ultra-high pressure measurements for accurate determination of the equation of state of materials at extreme conditions.

Especial attention have been paid on studies of osmium. Metallic osmium (Os) is one of most exceptional elemental materials having at ambient pressure highest known density, and one of the highest cohesive energy and melting temperature. Osmium is also very incompressible, once even claimed to be less compressible than diamond. However, osmium have been studied so far only at relatively low pressures below 70 GPa, and it necessarily limited accuracy of determined bulk modulus and provoke controversy regarding existence of isostructural transition at about 25 GPa. We investigated osmium by means of X-ray powder diffraction at multimegabar pressures using conventional and double stage diamond anvil cells. The bulk modulus of Os is high (414(1) GPa) but lower than that of diamond.

While molar volume of osmium monotonically decreases with pressure, we found anomalies in the behavior of unit cells parameters ratio *c/a* at ~155 GPa and at ~435 GPa. Such effects may be related to electronic topological transitions similar to reported recently by us in isostructural with osmium high-pressure iron phase. We found that upon compression to over 750 GPa osmium remains in hexagonal close packed structure.

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Recent results from PETRA III - Stacking charge density wave order in a high-temperature superconductor

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For three decades researchers have tried to unlock the secrets of high-temperature superconductivity found in copper oxide materials − known as cuprates. Connected to this problem is a mysterious pseudogap phase and strange metallic behavior.

Recently, high-temperature charge ordering has added further complexity. This talk covers recent experimental progress made at PETRA III.

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High numerical aperture multilayer Laue lenses

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Due to their large penetration depth and short wavelengths hard x-rays are ideal for non-destructive imaging of internal properties, dynamics and structure of complex materials. Progress in high precision x-ray optics development is essential to take full advantage of ultra-bright x-ray sources. To generate hard x-ray beams below 10 nm in size requires optical elements with a nanometer fabrication precision. Multilayer Laue lenses (MLLs) hold great promise to reach this resolution. The depth-graded structures of these diffraction elements are fabricated by layer deposition. The thickness of the layers in such structures can be controlled with sub-nanometer precision, which is considerably better than positioning of zones in lithographic processes used to make standard zone plates. The resolution of an MLL is determined by the numerical aperture (NA), which is determined by the range of angles over which the optics focuses x-rays of a certain wavelength, dependent in turn on the smallest layer thicknesses that can be fabricated. To achieve significant efficiency in the hard X-ray regime these lenses must be optically thick. Obtaining high aspect ratios in MLLs is not a problem. This can be achieved by simply slicing the multilayer to the desired thickness. However, because the structures are optically thick the condition of efficient diffraction is given by Bragg's law. So, in each point in the zone plate the layers have to simultaneously satisfy the Fresnel zone-plate formula and Bragg's condition. To achieve this, each layer must be tilted differently, resulting in a MLL where the layers are wedged along the optical path. These high-NA, high efficiency structures can in ideal case approach theoretical efficiency of ~60 % across the full lens aperture.

We developed a novel way to fabricate wedged high-NA MLLs with high accuracy and control. This was used to prepare several MLLs, which were then tested at PETRA III (beamline P11). Their performance was characterized with a combination of interferometry and ptychography. Using one MLL a line focus of 8 nm with 22 keV X-rays was achieved. We developed and tested a portable x-ray microscope, including software, controls, and data processing, and used it to align and characterize MLL optics and to perform nanoscale imaging on selected samples. Two crossed MLLs were used to form a focus. This was initially employed for high-resolution projection imaging with a uniformly - illuminated field of view. The latest results on the development and performance of MLLs as well as our future outlook will be discussed.

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Synchrotron radiation techniques reveal a molecular ruler that determines the length of lipopolysaccharides in *Escherichia coli*

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Many bacterial polysaccharides are built from simple carbohydrate blocks and have defined lengths; such regulation of polymerisation is common in biology.

In *Escherichia coli* O9a, a model organism for ABC transporter dependent polysaccharide assembly, the carbohydrate is polymerized by WbdA and terminated by WbdD. The latter enzyme stops the polymerisation reaction by phosphorylating the terminal non-reducing mannose of the O-PS. The MTase domain of WbdD then methylates the phosphate group. This modification of the non-reducing end of the glycan is essential for export. Our crystal structures of WbdD reveal a conventional bacterial methyltransferase domain that is fused to a kinase domain, which is very similar to eukaryotic kinases. WbdA and WbdD are known to form a complex were the C-terminus of WbdD interacts with WbdA.

Combining crystallography, small angle X-ray scattering and synchrotron-radiation CD spectroscopy, we show that an extended coiled-coil domain is formed by the C-terminal domain of WbdD. This coiled coil acts as a physical separation between WbdA and WbdD. The effects of insertion and deletion mutations within the coiled-coil region were analyzed in vivo, revealing that polymer size can be controlled by varying the length of the coiled-coil domain. The coiled-coil domain of WbdD thus functions as a molecular ruler that along with WbdA:WbdD stoichiometry controls the chain length of a model polysaccharide O antigen.

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II Programmes Satellite Meetings

SATELLITE WORKSHOP - Photon Science

DAC setup at the HED instrument of the European XFEL

Tuesday, 26 January 2016 — **Seminar Room 459, Bldg. 30b**

Over the last decade new technical developments in the field of static and dynamic diamond anvil cell (DAC) work has significantly increased the demand for very brilliant light sources to be able to conduct very fast diffraction and spectroscopy experiments. Although new detectors have made it possible to collect diffraction images at very brilliant 3rd generation sources, kHz repetition rates are at the limit of what can be achieved. A natural progression is now to conduct these demanding experiments at 4th generation sources such as the High Energy Density Instrument of the European XFEL, which holds the promise of revealing new and unprecedented understandings of the dynamics of materials. In July 2015 the senate of the Helmholtz Association decided to fully fund the Helmholtz International Beamline for Extreme Fields (HIBEF) consortium at the HED instrument of the European XFEL. Part of this funding is reserved for the design and construction of a dedicated setup to conduct dynamic high-pressure experiments, e.g. the dynamic DAC or the double-stage DAC. During this workshop different experimental approaches and their feasibility will be presented as well as discussions of proposed pilot experiments. Finally, we will outline the technical implementation plan for 2016 - 2017 with the goal of being prepared to conduct the first experiments at the beginning of 2018.

Organiser: Hanns-Peter Liermann

Contact: hanns-peter.liermann@desy.de

PROGRAMME

	Session 1: Science with the Dynamic Compression DAC and the dsDAC at the HED	H.-P. Liermann	DESY
13:00	Welcome	Christian Schroer Carsten Baehtz	DESY HIBEF
13:15	Introduction and scope of the workshop	H.-P. Liermann	DESY
13:30	Science with dynamic drive DACs	N.N.	
14:00	***Coffee break***		
14:15	Science with the double stage DAC	Z. Konopkova L. Dubrovinsky	DESY BGI
14:45	Fast physico-chemical transformations in DAC using pulsed laser heating and irradiation	A. Goncharov	GL
15:45	WDW science in the DAC	S. McWilliams	Uni. Of Edinburgh
16:15	Discussion: Science of first experiments for DAC at the HED instrument and technical requirements	H.-P. Liermann	DESY
16:45	***Coffee break***		
	Session 2: Conceptual Design of DAC at the HED	C. Baehtz	HIBEF
17:00	Status of the HED instrument at the Eur. XFEL	U. Zastrau K. Appel	XFEL
17:30	Conceptual design of the DAC at the HED	H.-P. Liermann	DESY
18:15	Discussion	C. Baehtz	HIBEF
19:00	***Off side dinner TBD***	(self-payer)	

Update: 18 January 2016

SATELLITE WORKSHOP - Photon Science

DESY/European XFEL - Turkey Workshop "Science at accelerator-based X-ray sources"

Tuesday, 26 January — **Seminar Room 4ab, Bldg. 1b**

In connection with the recently finished German-Turkish year of science, DESY and European XFEL have started an initiative to better promote the cooperation with Turkish research institutions and universities. The main goal of the workshop is to nurture further collaborations between Turkish scientists and DESY/European XFEL and to increase the usage of these novel X-ray sources in the Turkish community.
Each session (nano, surfaces, soft matter/bio) will start with a short introduction into general methodologies/techniques at lightsources. The remaining slots will be filled by the Turkish senior scientists who will briefly talk about their research, their challenges and their experimental needs.

Organiser: F. Lehner

Contact: frank.lehner@desy.de

PROGRAMME

08:30 - 09:45	Opening Session (jointly with the Workshop "From Picoseconds to Femtosecond X-Ray Experiments (FXE)" in the FLASH Sem. Room.)
10:15 - 11:50	Workshop Goals and Overview Facilities (SemR 4a/b)
12:10 - 13:40	Nano and catalysis
13:40 - 15:00	Lunch Break
15:00 - 16:30	Surfaces, Interfaces
17:00 - 18:30	Bio & Soft matter
18:45 - 19:45	Closing Session

For further details please see https://kib.desy.de/bilim

Satellite Workshop on Sample Environments for Biology at XFELs

26 January 2016, European XFEL, Albert-Einstein-Ring 19, Hamburg, Germany

Organizers: Joachim Schulz (European XFEL), Dan DePonte (SLAC) and Saša Bajt (DESY)

The satellite workshop on Sample Environments for Biology at XFELs is organized as a satellite of the 2016 European XFEL Users' Meeting. The day before the users' meeting, we're inviting users with interest in biology sample environments to share their ideas and views with us. The focus this year lies on liquid jets, single particle imaging and the sample environment activities at LCLS, SACLA, SwissFEL and European XFEL. In the last session, there will be time for short contributed talks about new developments in biology sample delivery. There will be sufficient time for discussion.

Programme

Tuesday, 26 January 2016

9:00	**Welcome**	Joachim Schulz	*European XFEL*
9:05	New developments of gas dynamic virtual nozzles	Kenneth Beyerlein	*CFEL*
9:30	Liquid jets: theory, simulation, experiments, and technologies	Alfonso M Gañán-Calvo	*Universidad de Sevilla*
10:00	Meshless simulation of liquid jets	Božidar Šarler	*University of Nova Gorica*
10:30	*Development of microfluidic devices*	Daniel Langley	*La Trobe University*
10:50	**Coffee break**		
11:10	SPI aerodynamic lens experiments at XBI and AMO	Johan Bielecki	*Uppsala University*
11:30	Aerosol injectors for FEL diffraction measurements	Rick Kirian	*Arizona State University*
11:50	Mass Spectrometry based biology samples	Charlotte Uetrecht	*Heinrich-Pette-Institut*
12:10	**Lunch break**		
13:30	Sample injection at SACLA	Michihiro Sugahara	*RIKEN*
13:50	European XFEL sample environment group	Rita Graceffa	*European XFEL*
14:10	LCLS sample environment group	Jake Koralek	*SLAC*
14:30	Membrane Protein sample preparation at SwissFEL	Xiaodan Li	*Paul Scherrer Institut*
14:50	Biology infrastructure at the European XFEL	Kristina Lorenzen	*European XFEL*
15:10	**Coffee break**		
15:40	New developments in biology sample delivery	Short talks to be announced	
16:20	Discussion: The European XFEL sample environments		

Registration at www.xfel.eu/2016-users-meeting

European XFEL

From Picoseconds to Femtosecond X-Ray Experiments

26 January 2016, DESY campus, FLASH Lecture Hall, Hamburg

Organizers: C. Bressler, A. Galler, W. Gawelda, D. Khakhulin, M. Rübhausen

Recent developments at Petra III now exploit the high X-ay photon flux available with a newly developed high repetition rate (up to 7.8 MHz) detection system, which will also be used at the FXE Instrument of the European XFEL. The high quality of X-ray signals, which can be now routinely achieved in pump-probe experiments carried out at Petra III at MHz rates, opens up new venues for studies of photophysical and photochemical processes occurring on the picosecond to sub-microsecond time scales. Some initial results will be presented during the workshop pointing towards challenging new research activities to be pursued in the next years, both at Petra III and at European XFEL.

Programme

Tuesday, 26 January 2016

08:00	**Registration Desk open**		
08:30 – 09:45	**Opening Session (jointly with DESY/European XFEL – Turkey Workshop)**		
08:30	General Welcome		
08:45	Overview DESY	H. Dosch	*DESY*
09:15	Overview European XFEL	M. Altarelli	*European XFEL, Hamburg*
09:45 - 10:15	**Coffee Break** (Split into two Sessions)		
10:15 – 11:30	**MHz Time-Resolved X-Ray Sources: Petra III and European XFEL**		**A. Meents, *DESY***
10:15	Workshop Welcome	C. Bressler F. Boscherini M. Rübhausen	*European XFEL* *University of Bologna* *CFEL*
10:30	FXE Scientific Opportunities at European XFEL	W. Gawelda	*European XFEL*
11:00	(MHz) TR avenues at Petra III: P01, P04, P11	H. Yavas	*DESY*
11:30 – 13:00	**(Bio)chemical Dynamics: New Observables with hard x-rays**		**C.Bressler, *European XFEL***
11:30	Transform Methods for ns-ms time resolution	A. Pearson	*CFEL*
12:00	Primary Steps in Homogeneous Photocatalysis	S. Lochbrunner	*Uni-Rostock*
12:30	Bio-Inorganic compounds for TR experiments	M. Rübhausen	*CFEL*
13:00 - 14:00	**Lunch Break (Sandwiches for Registrants in Flash Lecture Hall)**		
14:00 - 16:00	**TR Experiments with hard X-Rays, New Sources**		**M. Rübhausen, *CFEL***
14:00	X-Ray Detection of Magnetic Resonance Using Heterodyne Approach	A. Rogalev	*ESRF*
14:30	Solid State Experiments at FXE	F. Boscherini	*University of Bologna*
15:00	Irreversible Material Dynamics Studied by Single-Pulse TR X-Ray Scattering	K. Sokolowski-Tinten	*Uni Duisburg*
15:30	AXSIS at DESY: Exploring Frontiers in Attosecond Science, Imaging and Spectroscopy	F. Kärtner	*CFEL*
16:00-16:30	**Coffee Break**		
16:30 – 18:00	**Introduction of FXE capabilities for the early user experiments phase (2017/2018)**		
16:30	Scientific Instrument FXE: reminder	C. Bressler	*European XFEL*
	Discussion Round: The first Experiments at FXE	FXE Group	*European XFEL*
18:00	**Closeout / Adjourn**		
20:00 – 22:30	**Dinner for Speakers/Chairs**		

Registration at www.xfel.eu/2016-users-meeting

SATELLITE WORKSHOP - Photon Science

6th Workshop on X-Ray Nano-Imaging of Biological and Chemical Systems at PETRA III

Thursday, 28 January 2016 — **Seminar Room FLASH, Bldg. 28c**

The workshop covers x-ray microscopy at PETRA III with special emphasis on applications in biology and chemistry. It is held for the 6th time as part of the activities of the Helmholtz Virtual Institute “In-Situ Nano-Imaging of Biological and Chemical Processes" and brings together scientists from biology, chemistry, and x-ray microscopy.

Organiser: G. Falkenberg, C. Schroer

Contact: Gerald.Falkenberg@desy.de

PROGRAMME

14:00	Welcome & Introduction to X-ray Microscopy at PETRA III	Christian Schroer	DESY, Uni Hamburg
14:30	Research opportunities with high-resolution imaging by ptychography at P06	Andreas Schropp	DESY
15:00	Surveying catalyst particles at multiple length scales using high resolution X-ray imaging	Florian Meirer	University of Utrecht
15:30	Aging in high power Li-ion battery electrodes - when boring is best!	Dorthe Ravnsbæk	Aarhus University
16:00	***Coffee break***		
16:30	Nanoscale phase contrast tomography of biological samples	Mareike Töpperwien	Uni Göttingen
17:00	Bragg coherent X-ray diffractive imaging of a single indium phosphide nanowire	Dmitry Dzhigaev	DESY
17:30	Nanolab at DESY	Andreas Stierle	DESY
18:00	Closing remarks and end of meeting		

Update: 14 January 2016

SATELLITE WORKSHOP - Photon Science

Tutorial to X-ray Photon Correlation Spectroscopy – how to probe dynamics from 10^{-9} to 10^{3} s on nanometer length scales in condensed matter

Thursday, 28 January 2016 — **Seminar Room L202, Bldg. 48e**

The workshop will concern an introduction to X-ray Photon Correlation Spectroscopy (XPCS) with special attention on strategies how to plan, perform and analyze XPCS experiments. Science talks will cover examples of classical and state-of-the-art XPCS experiments such as (glassy) dynamics in soft matter systems, particles in fields and XPCS applications in rheology, accompanied by an overview of XPCS possibilities at beamline P10. In addition, new concepts will be discussed ranging from low-intensity XPCS at large wave vector transfers as well as possibilities of XPCS at free-electron laser facilities, in particular the European XFEL. Users that want to obtain a decent overview on the XPCS technique and plan to extent their portfolio to studying dynamics by means of XPCS are especially encouraged to join the workshop.

Organiser: M. Sprung, F. Lehmkühler, W. Roseker Contact: Michael.sprung@desy.de

PROGRAMME

14:00	Introduction to XPCS	Michael Sprung	DESY
14:30	Multi-speckle XPCS	Anders Madsen	European XFEL
15:00	Low intensity and double shot XPCS for radiation-sensitive materials	Christian Gutt	Uni Siegen
15:30	***Coffee break***		
16:00	Sequential XPCS at FEL sources	Felix Lehmkühler	DESY
16:20	Double pulse XPCS at FELs using hard X-ray delay line	Wojciech Roseker	DESY
16:40	Probing direction-dependent dynamic processes by means of XPCS	Joachim Wagner	Rostock
17:00	Connecting structure, dynamics and viscosity in sheared soft colloidal liquids	Eric Stellamanns	DESY
17:20	Nanoscale fluctuations in complex materials by XPCS	Alessandro Ricci	DESY
17:40	Wrap-up and ideas for continuation of workshop and tutorial series		

Update: 14 January 2016

SATELLITE WORKSHOP - Photon Science

XFEL-Matter Interaction: Recent Advances in Theory

Thursday, 28 January 2016 — **Seminar Room I, Bldg. 99**

The workshop aims at presenting recent advances in theoretical research on XFEL-matter interactions. Six invited experts will report on the research highlights covering a broad spectrum of scientific interests ranging from atomic and molecular physics through condensed matter to warm-dense-matter and plasma research. Future outlines of development will be discussed in connection with recent experimental achievements.

Organiser: B. Ziaja-Motyka, S.-K. Son, O. Vendrell, R. Santra Contact: beata.ziaja-motyka@cfel.de

PROGRAMME

	Session 1	Oriol Vendrell	DESY
14:00	Welcome address	Robin Santra	DESY
14:15	Response to Peak-Intensity X-ray Pulses, from Atoms to Complex Systems	Phay Ho	
14:45	Probing Femtosecond Nonadiabatic Molecular Dynamics using XFELs: Experimental achievements and Theoretical Challenges	Tom Penfold	
15:15	Towards dynamical x-ray imaging of ultrafast nanoplasma dynamics	Thomas Fennel	
15:45	***Coffee break***		
	Session 2	Sang-Kil Son	DESY
16:15	Ultrafast laser-induced magnetization dynamics in metals: perspectives of experiments and models involving XUV-excitation	Baerbel Rethfeld	
16:45	Nonequilibrium, nonthermal and nonadiabatic effects in FEL-excited semiconductors	Nikita Medvedev	
17:15	Tba	Dirk Gericke	
17:45	Closing Remarks	Beata Ziaja-Motyka	DESY

Update: 13 January 2016

SATELLITE WORKSHOP - Photon Science

Serial crystallography at synchrotron sources

Thursday, 28 January 2016 — **Seminar Room II, Bldg. 99**

Serial crystallography has become a great success story at X-ray Free Electron Lasers and has recently been also successfully applied at synchrotrons sources. At these sources, the method allows structure determinations from multiple crystals which are too small for conventional diffraction experiments and has great potential for time resolved studies of enzyme reactions. It is the goal of the workshop to exchange knowledge about the latest experiments and to bring together facility staff and user groups to identify new potentials and define further needs and directions in the field of serial crystallography.

Organiser: H. Chapman, T. Schneider (EMBL), A. Meents Contact: alke.meents@desy.de

PROGRAMME

13:50	Welcome and introduction by the organisers		
14:00	Serial crystallography in living insect cells	Lars Redecke	Uni Lübeck
14:30	Bridging Enzyme Kinetics and Structure Determination	Dietmar Manstein	Med. HS, Hannover
15:00	Time-Resolved Structural Biology: Phytochrome Drivers of R&D at Synchrotrons & XFELs	Allen Orville	Diamond Light Source
15:30	In situ serial crystallography of soluble and membrane proteins in the lipid cubic phase	Martin Caffrey	Trinity College Dublin
16:00	***Coffee break***		
16:30	Recent developments in serial crystallography at synchrotrons and XFEL's	Henry Chapman	CFEL
16:50	Opportunities for serial crystallography at DESY beamline P11	Alke Meents	DESY
17:10	Multiple crystals and serial data collection strategies on P13 and P14	Thomas Schneider	EMBL Hamburg
17:30	Wrap-up, final discussion		
18:00	End of workshop		

Update: 18 January 2016

SATELLITE WORKSHOP - Photon Science

X-ray absorption spectroscopy at P64/65 - begin of user operation

Thursday, 28 January 2016 — **Seminar Room III, Bldg. 99**

Beamline P65 got first beam in October 2015, and the first external users performed experiments in November. The satellite workshop is intended to give an overview about the current status of both beamlines P64 and P65, and the associated project. We will discuss the experimental environment which will be available in the first half of 2016, and the options for the second half of 2016. Users, who plan to do an experiment at either P64 or P65 in the first half of 2016, or who plan to submit a proposal for the second half of 2016, are strongly encouraged to participate in this workshop and to discuss their options with the beamline staff.

Organiser: E. Welter, W. Caliebe

Contact: Edmund.welter@desy.de

PROGRAMME

14:00	Welcome	Wolfgang Drube	DESY
14:20	Status of beamline P64	Wolfgang Caliebe	DESY
14:40	Results from the early commissioning of EXAFS beamline P65	Edmund Welter	DESY
15:00	Read out of the SIS 3302 ADC for the 100 pixel HPGe detector	Vadim Murzin	DESY
15:20	Status of the IXS spectrometer for P64	Aleksandr Kalinko	Uni Paderborn
15:40	***Coffee break***		
16:10	Inelastic scattering at beamline P01	Hasan Yavas	DESY
16:30	Status of the QEXAFS monochromator at P64	Oliver Müller	Uni Wuppertal
16:50	First in situ and operando XAS experiments at the new XAS beamline P65	Andreas Gaenzler	KIT Karlsruhe
17:10	Possibilities for EXAFS users in the DESY nanolab	Heshmat Noei	DESY Nanolab
17:30	Discussion	Wolgang Caliebe / Edmund Welter	DESY
18:00	End		
19:00	***Dinner***		

Update: 13 January 2016

SATELLITE WORKSHOP - Photon Science

X-ray magnetic dichroism at beamline P09

Thursday, 28 January 2016 — Seminar Room 01, Bldg. 1

X-ray magnetic circular dichroism (XMCD) in the hard x-ray regime, has been successfully implemented at beamline P09 at Petra III during the past years. XMCD is an element- and orbital-selective tool to investigate magnetic properties in systems with net magnetization, and provides new possibilities for the investigation of (ferri)ferromagnetically or canted AFM ordered systems at P09. In this workshop, we propose to discuss the possibilities opened by this technique and identify further needs of the user community for future experiments.

Organiser: J. Strempfer

Contact: joerg.strempfer@desy.de

PROGRAMME

14:00	Presentation of beamline P09	Jörg Strempfer	DESY
14:20	First XMCD experiments at P09	Jose Mardegan	DESY
14:40	Recent advances in hard X-ray dichroisms	Andrei Rogalev	ID12, ESRF
15:20	***Coffee break***		
15:30	Magnetic reflectivity studies between 2.4 keV and 13.5 keV on XMaS, the UK-CRG beamline at ESRF	Laurence Bouchenoire	XMaS, ESRF
16:30	XMCD under high pressure	Larissa Veiga	DESY
17:00	User presentations and further discussion		

Update: 13 January 2016

SATELLITE WORKSHOP - Photon Science

P08 and P07-DESY: Diffraction with hard X-rays up to 100 keV

Thursday, 28 January 2016 — **Seminar Room 109, Bldg. 25b**

Since last year the High Resolution Diffraction Beamline P08 and the DESY endstation of the High Energy Materials Science Beamline P07-EH2 are operated jointly. P08 covers the photon energy range from 7 - 28 keV and P07 can be operated at 40 - 200 keV. In this workshop we want to discuss with users in three sessions: 1. Scattering on Surfaces and Interfaces (florian.bertram@desy.de), 2. Studies of nanostructured materials (ann-christin.dippel@desy.de) and 3. Diffraction on bulk crystals and powders (uta.ruett@desy.de). In all three topics we want to point out the capabilities and advantages of using P08 or P07.

Organiser: U. Ruett, A.-C. Dippel, F. Bertram Contact: uta.ruett@desy.de

PROGRAMME

14:00	Development and plan for the High Resolution Beamline P08 and the High Energy X-ray endstation P07-EH2
14:55	Session 1: Powder and amorphous materials
15:45	***Coffee break***
16:10	Session 2: Nanostructured materials
17:00	Session 3: Interface and surfaces

Update: 13 January 2016

SATELLITE WORKSHOP - Photon Science

DESY- SAXS/WAXS/GISAXS-User Workshop @ DESY

Thursday, 28 January 2016 **Seminar Room 4ab, Bldg. 1b**

This workshop addresses current and potential users of small- and wide-angle X-ray scattering at PETRA III. It is intended to present and discuss the status and perspectives of the experimental facilities, especially the Petra III micro- and nanofocus X-ray scattering beamline P03 (MiNaXS), and recent as well as planned user activities. It shall foster communication among the users and identify common interests.

Organiser: R. Gehrke, S. Roth

Contact: rainer.gehrke@desy.de

PROGRAMME

13:00	Computing for SAXS/WAXS/GISAXS	Rainer Gehrke	DESY
13:20	Status of the MiNaXS Beamline	Stephan Roth	DESY
13:40	Status of the Nanofocus Endstation	Christina Krywka	DESY
14:00	X-ray Scattering During Deformation and Fracture at the MINAXS-Beamline - Recent Results and Planned Enhancement of the Technique	Konrad Schneider	Leibniz-Institut fuer Polymerforschung Dresden e.V.
14:20	Microfluidics at Microfocus X-ray Sources: Status and Perspectives	Martin Trebbin	Uni Hamburg
14:40	Microfluidics and Cellulose	Daniel Soederberg	KTH Royal Inst. of Techn.
15:00	DESY NanoLab – Complementary Techniques to Improve Sophisticated X-ray experiments at PETRA III.	Thomas Keller	DESY
15:20	***Coffee break***		
16:00	Thermoplastic Polyurethanes: The Variation of the Hard Domain Volume During Straining and its Relation to Strain at Break.	Almut Stribeck	Uni Hamburg
16:20	Time-Resolved X-ray Probing of the Crystallization of Supercooled Liquid Argon and Krypton	Robert Grisenti	Uni Frankfurt
16:40	Moisture-Structure Relationship of Gluten Protein Plastics under Deformation	S. Yu	KTH Royal Inst. of Techn
17:00	Improved Power Conversion Efficiency of Organic Solar Cells Caused by Nanoparticle Addition	Peter Müller-Buschbaum	TU München
17:20	Towards the Geometrical Structure of Au Nanoclusters Using Grazing Incidence Scattering	Deniza Chekrygina	Uni Hamburg
17:40	Nanofabrication of Laser Induced Periodic Surface Structures on Polymer Thin Films as Revealed by Grazing Incidence X-ray Scattering	Tiberio Ezquerra	Uni Madrid
18:00	Spray Deposition of the Active Layer of Hybrid Solar Cells Monitored with In-situ GISAXS and GIWAXS.	Volker Körstgens	TU München

Update: 20 January 2016

4th Satellite Workshop on Photon Beam Diagnostics

28 January 2016, DESY auditorium (building 05 on DESY campus)

Organizer: Jan Grünert (European XFEL)

The Satellite Workshop on Photon Beam Diagnostics is organized as part of the European XFEL Users' Meeting, like in previous years. The target of this Workshop is to bring together the experts in FEL Photon Diagnostics, to strengthen existing collaborations and create new ones, to share the latest progress but also to discuss new experimental methods and instrumentation suited as FEL photon beam diagnostics. Last but not least, progress in this field at the European XFEL facility is presented, and there will be sufficient time for discussions.
This time the discussions will particularly revolve around the topic of commissioning which is approaching in 2016 for several XFEL facilities currently under construction.

Programme

Thursday, 28 January 2016

13:45	**Coffee**		
14:00	**Welcome and short status update about the European XFEL photon diagnostics**	Jan Grünert	*European XFEL, Hamburg*
14:15	High Resolution hard X-ray single shot spectrometer (HIREX) for Photon Diagnostics	Naresh Kujala	*European XFEL, Hamburg*
14:40	Novel ultra-fast parallel X-ray spectrometers and monochromators	Alexander Firsov	*HZB, Berlin*
15:05	MCP detectors of European XFEL	Eugeniy Syresin	*JINR, Dubna, Russia*
15:30	Monitoring the wave front by means of single 2D phase grating: Towards single shot wavefront sensing	Patrik Vagovic	*CFEL, European XFEL, Hamburg*
15:55	**Coffee Break**		
16:15	Molecular polarimetry: a mean to determine the complete polarization state of the ionizing light (Stokes parameters s1, s2, s3) in the VUV-soft Xray range, based on molecular frame photoemission	Danielle Dowek	*Institut des Sciences Moléculaires d'Orsay (ISMO), France*
16:40	A new compact Design of a three-dimensional Ionization Profile Monitor	Heiko Breede	*DESY-Zeuthen*
17:05	Effect of pulse duration and partial temporal coherence in the characterization of ASE XUV sources generated from plasmas	Annie Klisnick	*ISMO, CNRS, Universite Paris-Sud, France*
17:30	Pulse duration measurment of FERMI FEL	Flavio Capotondi	*FERMI@elettra, Trieste, Italy*
18:00	**Discussion / Summary**		
18:30	**Closeout / Adjourn**		

Registration at www.xfel.eu/events/users_meetings/2016_users_meeting/

Status and Science at HED instrument and of the HIBEF UC

28 January 2016, DESY campus, Building 90, Seminar Room ZOQ

Organizers: Carsten Bähtz, Ulf Zastrau

The workshop on the HED instrument and the HIBEF UC is organized as a satellite of the 2016 European XFEL Users' Meeting. We will present the current status of the HED instrument with emphasis on the expected setups and early user experiments. Further the status of the HIBEF project in general are presented and linked to the schedule of the HED installation. The recent activities in the US and at DESY are presented. Talks will give an overview of planned instrumentation and science at HED as well as recent achievements at the LCLS.

Programme

Thursday, 28 January 2016

14:00	**HED instrument - Early parameters**	**Ulf Zastrau**	***European XFEL***
14:20	**Status of HIBEF**	**Carsten Bähtz**	***HIBEF, HZDR***
14:40	The US HIBEF Consortium	Bob Cauble	*LLNL*
15:00	Conceptual design of the DAC-setup at HIBEF	Hans-Peter Liermann	*ECB, DESY*
15:20	**Coffee Break**		
15:50	The single-shot incident spectrometer at HED	Bolun Chen	*Chinese Acad. of Sciences*
16:10	Ion dynamics using highest-resolution inelastic x-ray scattering	Ingo Uschmann	*Universität Jena*
16:30	Transverse Diffraction Setup at LCLS: Shock Compressed Silicon	Emma McBride	*European XFEL/SLAC*
16:50	Dynamic warm dense matter research using XFELs	Dominik Kraus	*UC Berkeley*
17:10	Recent results from the HED group at MEC, LCLS	Siegfried Glenzer	*SLAC/Stanford University*
17:30	**Adjourn / Informal discussions**		

Registration at www.xfel.eu/2015-users-meeting

SATELLITE WORKSHOP AT DESY PHOTON SCIENCE USERS' MEETING 2016

The German Engineering Materials Science Centre (GEMS): 4th Workshop on Status and Perspectives of the Helmholtz-Zentrum Geesthacht Outstation at DESY

DATE	Thursday, 28 January 2016
VENUE	Building 25f, Seminar Room 456

13:30	Welcome and status of GEMS	**Martin Müller** *HZG*
13:45	Structure analysis of chocolate/food materials with tomography	**Svenja Reinke** *TU Hamburg-Harburg*
14:05	Towards an advanced environment for synergistic analysis of tomographic data	**Andreas Kopmann** *KIT*
14:25	Water transport and microstructure evolution in cement-based materials: improving our understanding by multi-contrast X-ray imaging for more sustainable buildings	**Rolf Kaufmann** *EMPA*
14.45	***Coffee Break***	
15:15	Mapping strain fields induced in bulk metallic glasses during *in situ* nanoindentation by X-ray nanodiffraction	**Jana Gamcová** *University Košice*
15:35	Oxidation behaviour of arc evaporated (Ti,Cr,Al)N coatings studied by SR-XRPD	**Daniel Ostach** *HZG*
15:55	Metals studied during thermo-mechanical processing	**Andreas Stark** *HZG*
16:15	Final Discussion	

CONTACT	martin.mueller@hzg.de
CHAIR	Martin Müller

III Poster Session Topics

Instrumentation and Techniques	CFEL (Bldg. 99)
Earth and Environment	FLASH Sem. Room (Bldg. 28c)
Material Science: Soft Condensed Matter	FLASH Sem. Room (Bldg. 28c)
Material Science: Hard Condensed Matter	PETRA III North (Bldg. 46)
Biology and life sciences	PETRA III North (Bldg. 46)
Atoms, molecules, clusters, ions and plasmas	PETRA III North (Bldg. 46)
Films, surfaces and interfaces	PETRA III North (Bldg. 46)
Nano science	PETRA III North (Bldg. 46)

III Poster Session Topics

III.1 Instrumentation and techniques

1. Liquid Jets for Experiments on Complex Liquids
   J. Valerio, I. Steinke, M. Walther, F. Lehmkühler, M. A. Schroer, D. Sheyfer and G. Grübel

2. The SPB/SFX scientific instrument at the European XFEL
   S. Stern, H.N. Chapman and A.P. Mancuso

3. Photon Single Shot Spectrometer at SwissFEL
   J. Rehanek, P. Juranic, C. David, M. Makita and L. Patthey

4. X-ray Photon Diagnostics at SwissFEL
   P. Juranic, L. Patthey, J. Rehanek, I, Gorgisyan, R. Ischebeck, V. Schlott, C. David and R. Abela

5. Wavelengths effects on the spatial coherence of FLASH
   T. Mey, B. Schäfer, K. Mann, B. Keitel, M. Kuhlmann and E. Plönjes

6. Reverse undulator tapering for polarization control at XFELs
   E.A. Schneidmiller and M.V. Yurkov

7. Toward electron diffraction off controlled molecules
   N.L.M. Müller, S. Trippel, K. Długołecki and J. Küpper

8. High-resolution and stroboscopic XRPD
   A. Schökel, A. Berghäuser, M. Etter, S. Gorfman, M. Hinterstein and M. Knapp

9. Dynamic-XPS measurements by mean of Fast-XPS end-station based on Argus spectrometer at the beamline P04/PETRA III
   S.V. Babenkov, V.Y. Aristov, O.V. Molodtsova, F. Scholz, J. Seltmann, I. Shevchuk, L. Glaser and J. Viefhaus

10. X-ray Beam Diagnostic Imagers for the European XFEL, Progress on Design, Tests, and Installation
    A. Koch, W. Freund, M. Planas and J. Gruenert

11. Tomography of a Cryo-immobilized Yeast Cell Using Ptychographic Coherent X-Ray Diffractive Imaging
    K. Giewekemeyer, C. Hackenberg, A. Aquila, R.N. Wilke, M.R. Groves, R. Jordanova, V.S. Lamzin, G. Borchers, K. Saksl, A.V. Zozulya, S. Sprung and A.P. Mancuso

12. Towards 3D Single Particle Imaging using a model, non-crystalline system with weak 3D diffraction data
    K. Giewekemeyer, A. Aquila, N.D. Loh, K. Shanks, J. Weiss, M. Tate, H.T. Philipp, S. Stern, P. Vagovic, C. Yoon, M. Mehrjoo, Y. Chushkin, F. Zontone, D. Vine, R. Harder, C. Chang, R. Tiberio, A. Sakdinawat, S.M. Gruner, G. Williams and A.P. Mancuso

13. The European Cluster of Advanced Laser Light Sources
    G. Appleby, T. Tschentscher and C. Miron

14. In-kind contribution of Polish institutions to European X-ray free electron laser - status in Dec. 2015
    E. Plawski, J. Sekutowicz, W. Grabowski, K. Kosinski, J. Lorkiewicz, M. Wojciechowski, Z. Golebiewski, K. Meissner, G. Wrochna, M. Duda, E. Gornicki, M. Jezabek, K. Kasprzak, A. Kotarba, K. Krzysik, M. Sienkiewicz, M. Stodulski, J. Swierblewski, M. Więcek, M. Chorowski, E. Rusinski, J. Fydrych, A. Iluk, K. Malcher, J. Polinski, P. Duda, J. Glowinkowski, P. Wilk, M. Winkowski, P. Grzegory and G. Michalski

15. Status of the HED instrument design at XFEL
    I. Thorpe, U. Zastrau, K. Appel, M. Nakatsutsumi, S. Göde and A. Schmidt

16. Water Window Ptychography on a Fibroblast Cell
    M. Rose, D. Dzhigaev, I. Besedin, P. Skopintsev, T. Senkbeil, A. von Gundlach, S. Stuhr, C. Rumancev, J. Viefhaus, A. Rosenhahn and I. Vartaniants

17. Seeding experiment at FLASH
    S. Ackermann, Ph. Amstutz, R. Aßmann, A. Azima, J. Bödewadt, M. Drescher, N. Ekanayake, B. Faatz, G. Feng, K. Hacker, I. Hartl, R. Ivanov, S. Khan, T. Laarmann, L.L. Lazzarino, C. Lechner, Th. Maltezopoulos, V. Miltchev, R. Molo, J. Müller, T. Plath and J. Roßbach

18. Magnetic/Cryogenic Sample Environments at the Instruments MID and SCS
    J.D. Moore, C. Deiter and J. Schulz

19. SPB/SFX Sample Environment at the European XFEL
    P. Thute, R. Graceffa, K. Lorenzen and J. Schulz

20. Magnetic field integral properties and crosstalk effect on XFEL.EU undulators and phase shifters
    F. Wolff-Fabris, M. Viehweger, Y. Li and J. Pflueger

21. Fundamental Limitations of the SASE FEL Photon Beam Pointing Stability
    E.A. Schneidmiller and M.V. Yurkov

22. A von Hamos X-Ray Spectrometer concept based on two cylinder-segment HAPG mosaic crystals
    I. Holfelder, B. Beckhoff, M. Müller, C. Schlesiger and J. Weser

23. Fixed Sample Workflow for the XFEL instruments
    C. Deiter, J. Moore, M. Kitel and J. Schulz

24. Gas puff targets dedicated for experiments with high power and high intensity laser systems
    L. Wegrzynski, T. Fok, P. Wachulak, A. Bartnik and H. Fiedorowicz

25. DiProI, the coherent diffraction imaging end-station at FERMI@Elettra FEL user facility: present status and future research opportunities
    F. Capotondi, E. Pedersoli, M. Manfredda, M. Kiskinova, L. Raimondi, M. Zangrando, E. Allaria, F. Bencivenga, C. Masciovecchio, M. Danailov, D. Fausti, L. Giannessi, S. Bajt, M. Barthelmess, H. Fleckenstein, R. Kirian, C.H. Yoon, J. Schulz, H.N. Chapman, C. Gutt, L. Müller, G. Grübel, B. Pfau, C. Von Korff Schmising, S. Eisebitt, B. Vodungbo, J. Luning and J. Hajdu

26. Gas Monitor Detector (GMD) for FEL, Synchrotron and Laser Sources
    S. Klumpp, M. Braune, A.A. Sorokin and K. Tiedtke

27. AGIPD - The Adaptive Gain Integrating Pixel Detector
    A. Allahgholi, J. Becker, L. Bianco, A. Delfs, R. Dinapoli, G. Ariño-Estrada, P. Göttlicher, H. Graafsma, D. Greiffenberg, H. Hirsemann, S. Jack, R. Klanner, A. Klyuev, H. Krueger, S. Lange, A. Marras, D. Mezza, A. Mozzanica, J. Poehlsen, S. Rah, B. Schmitt, J. Schwandt, I. Sheviakov, X. Shi, U. Trunk, Q. Xia, J. Zhang and M. Zimmer

28. First beam and experiments at EXAFS beamline P65
    E. Welter, R. Rhernikov and M. Herrmann

29. The PERCIVAL soft x-ray detector
    A. Marras, C.B. Wunderer, J. Correa, P. Goettlicher, S. Lange, I. Shevyakov, S. Smoljanin, Q. Xia, M. Zimmer, D. Das, N. Guerrini, B. Marsh, I. Sedgwick, R. Turchetta, G. Cautero, D. Giuressi, A. Khromova, R. Menk, G. Pinaroli, L. Stebel, R. Fan, U. Pedersen, N. Rees, N. Tartoni, H. Yousef, H. Hyun, K. Kim, S. Rah, S. Reza and H. Graafsma

30. Status of the High Resolution Powder Diffraction Beamline P02.1 at PETRA III, DESY
    M. Etter, J. Bednarcik, A. Berghäuser, A. Ehnes, H.-P. Liermann, A. Schökel, I. Schwark and M. Wendt

31. The Materials Imaging and Dynamics (MID) Station at XFEL.EU
    U. Boesenberg, C. Kim, J. Hallmann, T. Roth, A. Schmidt, B. Kist, G. Ansaldi, W. Lu and A. Madsen

32. Status of the K-Monochromator system for the European XFEL
W. Freund, J. Grünert and A. Koch

33. Statistical properties of Free Electron Laser FLASH measured by Hanbury Brown and Twiss interferometry
O. Yu. Gorobtsov, G. Brenner, G. Mercurio, F. Hieke, U. Lorenz, N. Gerasimova, A. Singer, F. Sorgenfrei, R.P. Kurta, A. Shabalin, I. Zaluzhnyy, S. Lazarev, D. Dzhigaev, M. Rose, W. Wurth and I. A. Vartanyants

34. FLASH2 Photon Beamlines
M. Kuhlman and E. Plönjes

35. Development of a compact laser produced plasma source soft X-ray source for high resolution contact imaging of biological specimens
M. Ayele, D. Adjei, P. Wachulak, J. Czwartos, A. Bartnik, Ł. Wegrzynski, M. Szczurek, R. Jarocki, H. Fiedorowicz, M. Lekka and K. P. and J. Gostek

36. LUX - towards laser-driven soft- X-ray user beamline
N. Delbos, I. Dornmair, H. Groth, S. Jalas, S. Jolly, V. Leroux, M. Kirchen, D. Kocoň, A. R. Maier, V. Martin, P. Messner, A. Molodozhentsev, L. Pribyl, M. Schnepp, M. Trunk, P. A. Walker, C. Werle and P. Winkler

37. GINIX upgrade - the nano-holo-tomo endstation at P10
M. Osterhoff, B. Hartmann, M. Krenkel, T. Salditt and M. Sprung

38. Beam Characterization at the GINIX-setup@P10
J. Hagemann, A. Robisch and T. Salditt

39. Theoretical analysis of the strain mapping in a single core-shell nanowire by X-ray Bragg ptychography
D. Dzhigaev, T. Stankevič, I. Besedin, S. Lazarev, A. Shabalin, M. Strikhanov, R. Feidenhans'l and I. Vartanyants

40. THz streaking based pulse length monitor (TPLM) at European XFEL
J. Liu, M. Meyer and J. Gruenent

41. The Swedish High Energy Materials Science Beamline
U. Lienert, S. Gutschmidt, S. Haas and T. Bäcker

42. DESC: A multilayer based delay stage permanently installed at the CAMP end-station at FLASH
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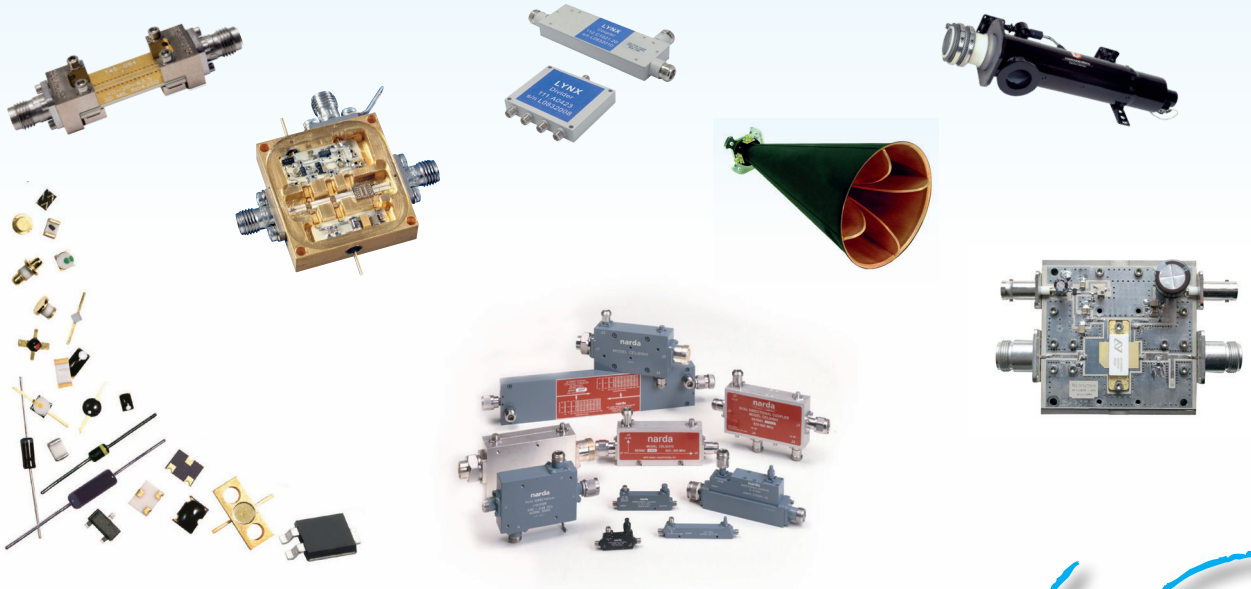

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151. Order of Nanoparticles via Block Copolymer Assembly
A. Horechyy, P. Formanek, D. Pospiech, B. Nandan, D. Jehnichen and M. Stamm

152. Morphological investigation of photoactive polymer films
F.C. Löhrer, V. Körstgens, P. Zhang, S.V. Roth and P. Müller-Buschbaum

153. Temperature-induced evolution of particle shape and strains in colloidal crystals
A.V. Zozulya, I. Zaluzhnyy, S. Lazarev, N. Mukharamova, E.A. Sulyanova, A. Shabalin, J.-M. Meijer, I. Besedin, D. Dzhigaev, O. Gorobtsov, R.P. Kurta, A.V. Petukhov, M. Sprung and I.A. Vartanyants

154. Structural Information Beyond the Ensemble Average From Colloidal Crystals Using X-Ray Cross-Correlation Analysis
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155. Electron dynamics in graphene by ultrafast Tr-ARPES
C. Cacho, R.T. Chapman, I. Gierz, A. Cavalleri, J.C. Johannsen, S. Ulstrup, P. Hofmann and E. Springate

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156. Vacancy ordering in epitaxial GeSbTe films on transition between cubic to hexagonal phase
K. Perumal, P. Zalden, U. Rütt and O.H. Seeck

157. Studying a bifunctional Cu,Zn-zeolite catalyst for direct production of dimethylether with in situ ptychography and ETEM
S. Baier, C. D. Damsgaard, J. Reinhard, F. Benzi, M. Scholz, T. Sheppard, C. G. Schroer and J.-D. Grunwaldt

158. Ultrafast melting of polystyrene colloidal crystals investigated in pump-probe experiments at FEL
S. Lazareva, J.-M. Meijer, M. Chollet, A. Singer, R. P. Kurta, D. Dzhigaev, O. Gorobtsov, G. Williams, D. Zhu, Y. Feng, M. Sikorski, S. Song, O. Yefanov, A. Shabalin, I. Zaluzhnyy, I. Besedin, E. A. Sulyanova, A. V. Petukhov and I. A. Vartanyants

159. Domain Dynamics of Ferroelectric Materials Studied by XPCS Experiments
M. Reiser, S. Gorfman, H. Choe, C. Gutt and A. Ricci

160. Crystallization dynamics of phase-change materials resolved by ultrafast x-ray scattering
P. Zalden, F. Quirin, J. Siegel, M. Shu, F. Lange, M. Wuttig, C. Bressler and K. Sokolowski-Tinten

161. Development of X-ray acoustic method of investigation of crystal defect structure under ultrasonic loading
A. Blagov, Yu. Pisarevsky, P. Prosekov, Y. Eliovich, A. Targonskiy and M. Kovalchuk

162. In-situ Microscopy with X-ray Nanodiffraction
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163. Magnonic control of nuclear quantum beats
L. Bocklage, J. Gollwitzer, C. Swoboda, C. Strohm, H.-C. Wille, G. Meier and R. Röhlsberger

164. Ultrafast magnetisation dynamics of FeRh
R. Carley, M. Izquierdo, A. Yaroslavtsev, R. Kurta, L. Le Guyader, S. Günther, P. Granitzka, E. Jal, T. Chase, G. Dakovski, S. Carron, A. Mitra, M. Minitti, A. Reid, W. Schlotter, D. Higley, E. Fullerton, V. Uhlir, S. Molodtsov, Ch. Back, H. Dürr, J. Stöhr and A. Scherz

165. Structural and Thermodynamic Properties Multiferroic $Y_{0.3}Gd_{0.7}MnO_3$
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166. Phase of the transmitted wave in the dynamical theory and quasi-kinematical approximation
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167. Time-resolved high-energy XRD during thermo-mechanical processing of TiAl
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168. Dynamics of colloidal crystals studied with pump-probe experiments at LCLS
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169. Ultrafast magnetism in reflection geometry
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170. Conceptual Design of the DAC setup for dsDAC and dDAC Experiments at the HED Instrument of the European XFEL
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171. High-energy SAXS for the in situ study of precipitation kinetics in an Al-Mg-Zn alloy under friction stir welding thermal cycles
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172. First-Principles Studies of the Properties of $BaNbO_3$
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173. Light induced excited spin states in iron(II) spin crossover compounds
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174. Local Structure of V Dopants in TiO_2 Nanoparticles: X-Ray Absorption Spectroscopy, Including Ab-Initio and Full Potential Simulations
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175. In-situ study of diffusion brazing of a γ-TiAl alloy with different brazing solders
K. Hauschildt, A. Stark, N. Schell, U. Tietze, F. Pyczak and M. Müller

176. Photoluminescence and electronic transitions in cubic silicon nitride
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177. Strength measurements of shock compressed polycrystalline diamond using time-resolved x-ray diffraction
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178. Exploring magnetic transitions in $Rfe_3(BO_3)_4$ by magnetic-field XMCD measurements
M. Platunov, N. Kazak, V. Dudnikov, A. Rogalev, V. Temerov and S. Ovchinnikov

179. Thermal decomposition of $Ca(BH_4)_2$: Hydrogen release pathways analyzed by x-ray Raman scattering spectroscopy
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180. Texture and lattice strain development during tensile testing of a ZE20 magnesium alloy plate
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181. In-situ XRD with fast compression using dynamic DAC
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182. In- situ investigation on texture evolution of Mg-Gd alloys during uniaxial tensile and compressive deformation
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183. Textures on a Mg-Gd alloy by In-situ tensile and compression deformation
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184. In situ investigation of texture and line broadening evolution of magnesium alloy ZE21 under tensile load
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185. Through-thickness texture gradient in an extruded Al60-Mg40 composite
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186. Phase and texture evolution during annealing of an Al60-Mg40 composite
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187. X-ray photon correlation spectroscopy of liquid water and amorphous ice
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188. Pressure-induced phase transitions in transition metal oxychlorides studied by single-crystal synchrotron X-ray diffraction
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189. Spin-flop transition in Ni_3TeO_6 compound induced by high magnetic field
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190. Localization of strain in LCF-loaded Al/Al_2O_3 MMCs analyzed by phase contrast tomography
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191. In situ investigation of the microstructure in friction stir welded steels using high-energy X-ray diffraction
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192. Development of a reactor cell for analysis of crystallisation processes under solvothermal conditions
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193. Pump-Probe Holography at FERMI
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194. Quenching of the Resonant Magnetic Scattering Signal by Ultra-Short Free-Electron Laser Light Pulses
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195. Demonstration of thin film pair distribution function analysis (tfPDF) for the study of local structure in amorphous and crystalline thin films
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196. First in situ experiments on heterogeneous catalysts at the new PETRA III beamline P65
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197. In-situ XRD studies of fast kinetics of Fe-based metallic glass
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198. Non invasive strain analysis on the Neolithic bronze Axe of Ahneby
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199. Ultrafast transient absorption spectroscopy of Photoelectrochemical cells
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200. Stabilization of Helical Spin Structures in Magnetic Layer Systems
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201. Element-selective magnetometry in ferrimagnetic erbium iron garnet at high magnetic fields
C. Strohm, T. Roth, C. Detlefs, P. van der Linden, O. Mathon and S. Pascarelli

202. FeMnSi Shape Memory Alloy studied by In-Situ Tensile Tests and EBSD
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203. Whole Image Plate Analysis for Microstructure and Texture Determination on Deformed Materials
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204. Propagation-based phase-contrast tomography of neuronal tissue
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205. Molecular Dynamics Simulation of biological complexes
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206. A novel method of DNA sequencing: translocation of DNA polymer in solid-state conical nanopore and X-ray detection of fluorescent signal due to the ionization by pulsed radiation of XFEL
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207. Novel Sample Delivery System for Serial Crystallography at XFELs
M. Wiedorn, J. Knoska, A. Tolstikova, D. Oberthuer, K. Beyerlein, S. Awel, V. Mariani, A. Barty, O. Yefanov, L. Adriano, M. Barthelmess, D. Bushnell, A. Aquila, S. Boutet, L. Pollack, J. C. Spence, R. A. Kirian, S. Bajt and H. N. Chapman

208. Combination of X-Ray Phase Contrast Imaging (XRPCI) and Synchrotron X-Ray Fluorescence Waveguide Imaging (SR-XRF) to get rid of the mass thickness effect - a case study on the human substantia nigra tissue
A.D. Surowka, M. Töpperwien, M. Bernhardt, J.-D. Nicolas, M. Osterhoff, D. Adamek, T. Salditt and M. Szczerbowska-Boruchowska

209. Application of synchrotron radiaton for chemical elemental analysis of brain tumor tissue
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210. X-ray waveguide imaging for the observation of single cells in the whole organ
M. Krenkel, M. Toepperwien, C. Dullin, A. Markus, F. Alves and T. Salditt

211. X-ray Spectroscopic Studies on [2Fe-2S] Clusters - Relevance to the Electronic Structure of Nitrogenase Enzyme
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212. Iron Oxidation State Distribution in Structural Models of Nitrogenase Enzyme - XAS and XMCD studies
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213. Heterotrimeric g-protein (?) Alpha subunit from a. Thaliana forms trimeric structures in solution
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214. Liquid sample delivery for XFEL: simulations of a protein solution nanodroplet evaporation
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215. Acoustic Injectors in Serial Crystallography
A. Orville, F. Fuller, C. Roessler, J. Kern, B. Andi, S. Gul, M. Cowan, A. Heroux, J. Yano, V. Yachandra, H. Lemke, R. Alonso-Mori, S. Nelson, C. Saracini, C. Stan, S. Burgie, J. Clinger, G. Phillips, R. Vierstra, M. Allaire, A. Soares, A. Brewster, N. Sauter, T. Michels-Clark and I. Young

216. Convergent-nozzle aerosol injector for single-particle diffractive imaging with X-ray free-electron lasers
S. Awel, R.A. Kirian, M. Wiedorn, D.A. Horke, N. Roth, A.V. Rode, J. Küpper and H.N. Chapman

217. Optical focusing of isolated particles for diffractive imaging experiments
S. Awel, R.A. Kirian, N. Eckerskorn, M. Wiedorn, D.A. Horke, A.V. Rode, J. Küpper and H.N. Chapman

218. Serial Fiber Diffraction of Amyloids at Free-Electron Lasers
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219. Biological Solution SAXS at the EMBL P12 Beam line PETRA III, DESY
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220. In vivo and in situ X-ray imaging of keratin intermediate filaments
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221. SAXS reveals antibiotic induced morphological alterations in E. coli
A. von Gundlach, V.M. Garamus, T.M. Willey, C. Rumancev, T. Gorniak, R. Mikut, M. Reischl, K. Hilpert and A. Rosenhahn

222. Understanding Photosynthetic Water Splitting - Towards Mn L-edge Spectroscopy on Photosystem II
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223. A Concentric Electrokinetic Injector Shows Different Binding of Antibiotic to Ribosome
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224. Stratum Corneuem Lipid Organisation in an Epidermal Cell Culture Model as Seen by SAXS
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225. Vimentin assembly and aggregation: investigation with microfluidics, X-ray and light scattering techniques
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226. Utilization of 3,3-diaminobenzidine oxidation for the generation of specific contrast in X-Ray Zernike phase contrast microscopy
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227. Applications in Cryo-X-Ray Tomography of Biological Tissue and In Situ Element Mapping at P06, PETRA III, DESY
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228. Investigation of a SNARE-mediated membrane fusion intermediate using small-angle X-ray scattering
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229. Evaluation of biochemical biomarkers in ovarian cancers
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230. Protein - Protein Interactions under High Hydrostatic Pressures
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231. Low Multiplicity Cadmium SAD phasing of Lysozyme at 12 keV
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232. XRF microprobe studies of biofouling organisms
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233. Synchrotron X-ray scattering investigation of recombinant and native influenza A matrix protein M1 self-assembly
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234. In-situ- , serial- and large complex crystallography on EMBL beamline P14@PETRA III
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235. Post-crystallisation treatments: detergent manipulation meets dehydration
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236. Scanning Transmission X-Ray Microscopy with X-Ray Fluorescence Detection at P04
K. Andrianov, T. Nisius, L. Lühl, B. Kangießer and T. Wilhein

237. Structural polymorphism of phospholipids and lipopolysaccharides (LPS) in the presence of synthetic anti-LPS peptides (SALP)
W. Correa, L. Heinbockel, P. Garidel and K. Brandenburg

238. Development and applications of synchrotron X-ray scattering for structural bio- and nanodiagnostics (The Russian-German BioSCAT initiative).
C.M. Jeffries, E.V. Shtykova, A. Tuukkanen, J. Klingbeil, L.F. Redecke, M.V. Avdeev, V.L. Aksenov, L.B. Baratova and D.I. Svergun

239. Nicking activity of parvovirus H-1 nonstructural protein 1 depends on conformational changes induced by manganese (II) binding
M. Klinge, S. Weingart, S. M. Malathy Sony, G. Grüber, J. Nuesch, J. Rommelaere and L. Redecke

240. InCellCryst - An automated pipeline for serial crystallography in living insect cells
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241. Phasing of biological macromolecules with softer X-rays and \ or heavy atomderivatives at EMBL beamline P13@PETRA III
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242. Investigation of complex solutions under shear and pressure
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243. Whole model organism imaging with submicron resolution using Bragg Magnifier Microscope
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244. Serial synchrotron crystallography of metal organic frameworks
A. Burkhardt, P. Roedig, K. Beyerlein, J. Meyer, P. Fischer, P.D.C. Dietzel and A. Meents

245. DNA strand breaks induced by soft X-ray pulses from a laser plasma source
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246. Macromolecular Imaging using Disordered Crystals
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247. Structural framework for metal incorporation during molybdenum cofactor biosynthesis
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248. Stepwise contraction of the nf Rydberg shells in the 3d photoionization of multiply-charged xenon ions
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249. Hydrodynamics model for the dynamics of XFEL-excited multi-component nanoplasmas
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250. Free-electron X-ray laser measurements in isochorically heated warm dense matter
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251. Investigation of Superconductivity in the Body Centered Tetragonal $LiCu_2P_2$
E. Karaca, H.M. Tütüncü, G.P. Srivastava and Ş. Uğur

252. Investigation of Pigmy Dipol Resonance in 112,114,116Sn
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253. Simulations of XFEL Interaction with solids on fs-time scales
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254. Start-to-End Simulation of Experiments at European Advanced Laser Light Sources
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255. Ab-Initio investigation of noncentrosymmetric Superconductor $SrAuSi_3$
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256. Radiative transitions in $H\text{-}H^-$ quasimolecules
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257. K-Shell Photoionization Isonuclear Sequence Comparison of C, N and O Ions Charge States
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258. Inner shell excitation in EUV induced, non-LTE photoionized plasmas
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259. Ionic and molecular spectra in EUV induced, non-LTE photoionized plasmas
A. Bartnik, P. Wachulak, H. Fiedorowicz, W. Skrzeczanowski, T. Fok, Ł. Węgrzyński, R. Jarocki, J. Kostecki, A. Szczurek and M. Szczurek

260. The influence of argon multi-jet gas puff target parameters to high order harmonic generation
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261. Cross sections of iodine-containing molecular ions after inner-shell excitation
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262. Inner shell excitation of Mn with short intense x-ray pulses
S. Klumpp, K. Mertens, N. Gerken, B. Sonntag, M. Richter, A.A. Sorokin, M. Braune, K. Tiedtke, P. Zimmermann and M. Martins

263. The Investigation of The New Generation of Reactors Working Principle
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264. Experimental and theoretical emission spectra of atomic and molecular gases in the UV-Vis region excited by intense EUV pulse
I. Saber, A. Bartnik, H. Fiedorowicz and W. Skrzeczanowski

265. Photochemistry of interstellar ice mimics induced by femtosecond XUV pulses at FLASH
T. Suhasaria, J.D. Thrower, R. Frigge, S. Roling and H. Zacharias

266. X-ray study of thr phosphopantetheine adenylyltransferase from Mycobacterium tuberculosis in apo-form and its complexes with functional ligands.
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267. Hard x-ray irradiated atomic clusters
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268. Measuring femtosecond collisional ionisation rates in hot, dense Mg plasmas
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269. Evaluation the probabilities of photoionization of helium and lithium atoms in strong ultra-short x-ray laser field by trajectory method
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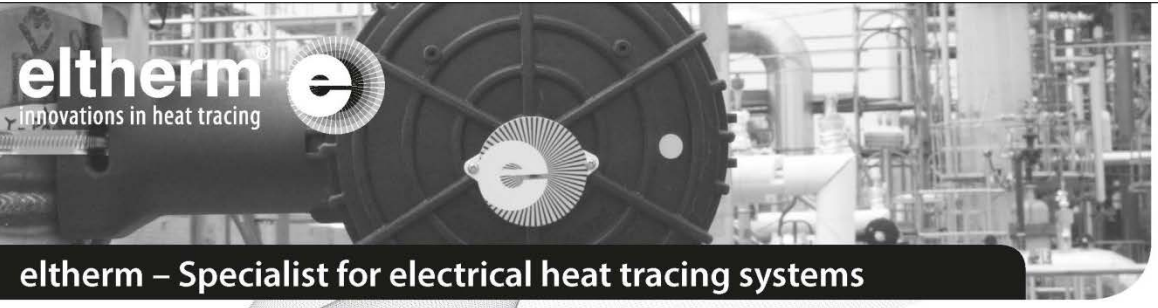

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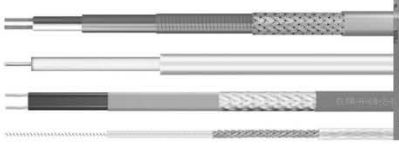

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343. Effect of magnetic nanoparticles on the liquid crystalline ordering of amyloid fibrils
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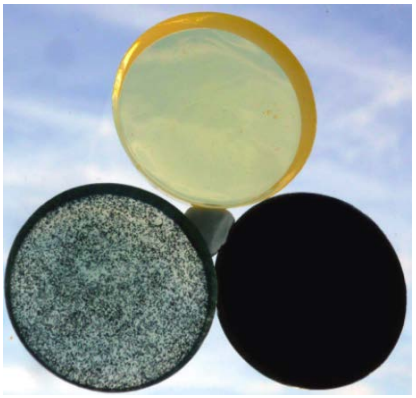

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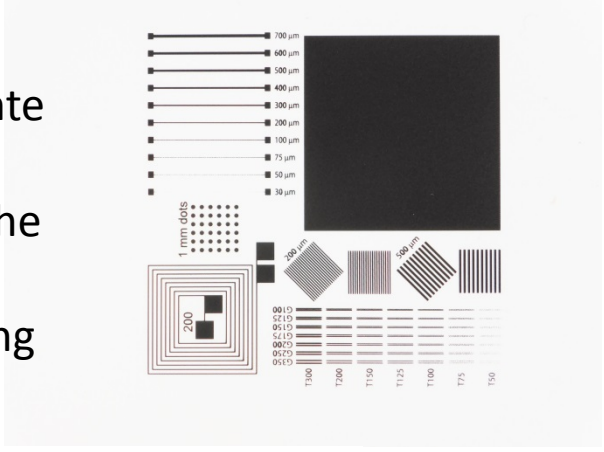

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29 Jan. 2016
13.00- 18.00

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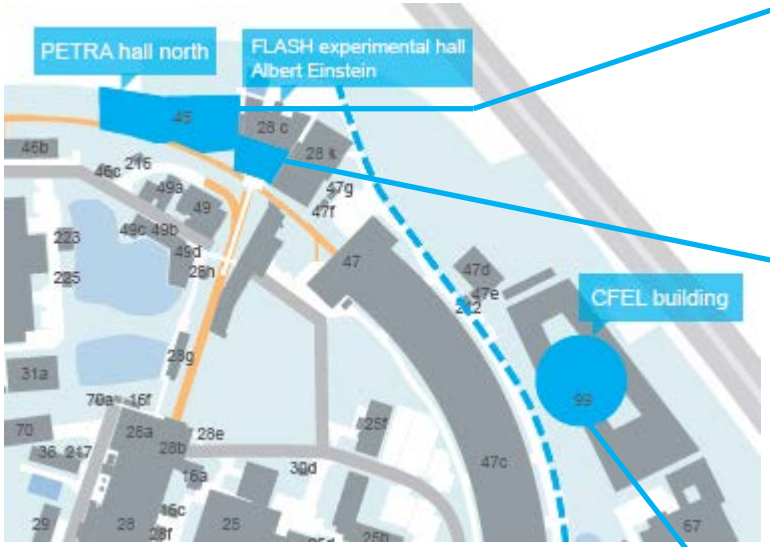
54	Swagelok Hamburg / Best Fluidsysteme GmbH
55	VACOM Vakuum Komponenten & Co. KG
56	vaqtec-scientific
57	Beckhoff Automation GmbH
58	Budzylek GbR Cryoandmore
	X-Spectrum GmbH
	Cycle GmbH
	suna-precision

29. Jan. 2016

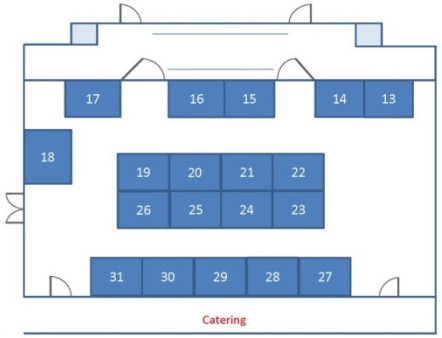
Poster session 14:00 – 17:00h

Vendor exhibition 13:00 – 18:00h

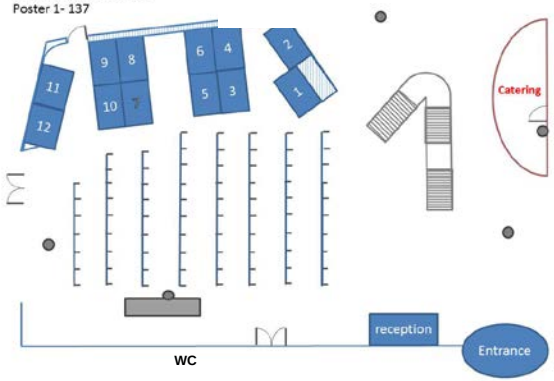


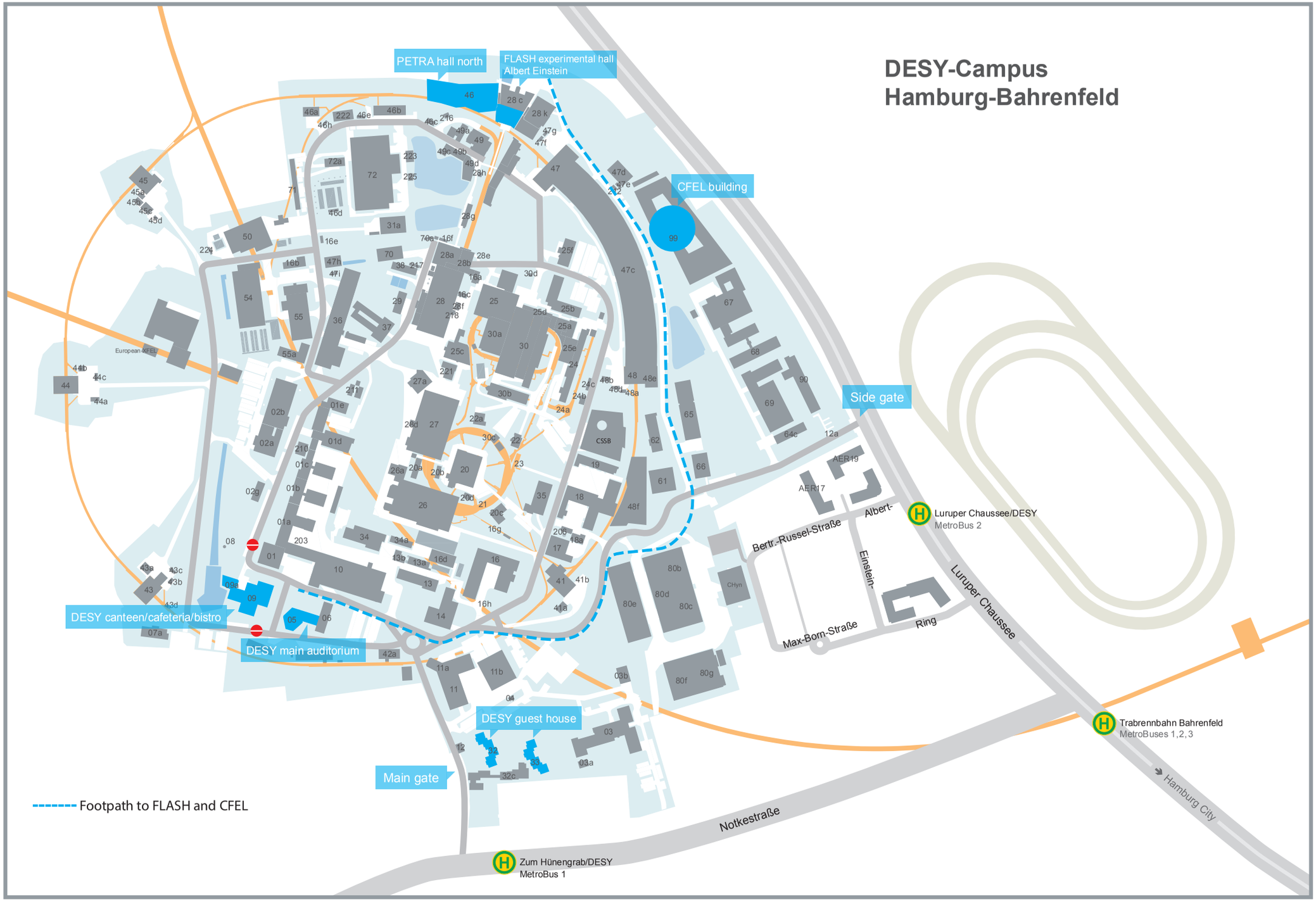
Petra III hall „North“, Bldg. 46

FLASH Seminar room (upper floor)
Industry exhibition



CFEL Foyer, Bldg. 99
Industry exhibition and
Poster 1- 137




DESY-Campus
Hamburg-Bahrenfeld
PETRA hall north
FLASH experimental hall
Albert Einstein
CFEL building
Side gate
DESY canteen/cafeteria/bistro
DESY main auditorium
DESY guest house
Main gate
Footpath to FLASH and CFEL
Luruper Chaussee/DESY
MetroBus 2
Trabrennbahn Bahrenfeld
MetroBuses 1,2,3
Zum Hünengrab/DESY
MetroBus 1
Notkestraße
Hamburg City
Luruper Chaussee
Albert-Einstein-Ring
Bertr.-Russel-Straße
Max-Born-Straße
European XFEL
CSSB
CHyn
AER17
AER19