SATELLITE WORKSHOP - Photon Science

Static Pressure Experiments at XFEL

27– 28 Jan.2020 **DESY, FLASH Sem.R., Bldg. 28c**

In October 2019 more than 70 scientist of the high pressure community from 7 nations collaborated in a community-assisted commissioning beamtime to develop a platform for high pressure experiments in the Diamond Anvil Cell at the High Energy Density (HED) Instrument of the European XFEL. The group benchmarked the capability of generating and probing extreme states using Diamond Anvil Cells, safely studying samples to pressures exceeding 1 Mbar. During the beamtime the group commissioned and tested the DAC setup in the 2nd interaction chamber (IC2) of the HED instrument in conjunction with a VAREX flat panel detectors in order to collect time-integrated diffraction images from samples exposed to femtosecond X-ray pulses at MHz repetition rates, to experimentally explore some crucial aspects of XFEL DAC science such as e.g. diamond stability and X-ray heating using 17.8 keV XFEL. In this workshop we will discuss not only the our findings from the October experiment but also give an overview of all DAC at XFEL experiments as well as the plans for the near future for DAC work at HED in IC2 and IC1.

Organisers: H. P. Liermann and Z. Konopkova

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PROGRAM (27 Jan. 2020)

13:00	Welcome	C. Strohm	DESY
	Session 1: Introducing DAC at XFELs Experiments		Chair: Z. Konopkova
13:05	DAC Diffraction Experiments at XFELs: New Opportunities	H. P. Liermann	DESY
13:30	First DAC Experiments at PAL	A. Coleman	LLNL
13:55	Probing the electronic spin crossover in Fe-compounds at HED: new frontiers for high pressure science using the EuXFEL	V. Cerantola	XFEL
	Session 2: DAC Setup at IC2 of the HED Instrument		Chair: C. Strohm
14:20	DAC Alignment and X-ray Diffraction Capabilities of the IC2 at HED (EuXFEL)	C. Prescher	DESY
14:45	SOP Temperature Measurements in IC2	Z. Konopkova	XFEL
	Session 2: Diffraction and X-ray Heating of Metal Foils using 17.8 keV X-ray of the EuXFEL		Chair: E. McBride
15:15	Metal Foil Array Measurements at very low Pressures	M. McMahon	Uni. of Edinburgh
15:15-16:00	***Coffee break and Posters (45 Min.)***		
16:00	Fe and Fe alloys Experiments	G. Fiquet	IMPMC
16:25	Ta Experiments	Z. Jenei	LLNL
16:50	Melting of Mo at high pressures induced by intense X-ray pulses	C. Prescher	DESY
17:15	Au Experiments from PAL and at EuXFEL	R. Husband	DESY
17:40	Thermally-induced, quenchable bcc Zr using the European XFEL	B. Sturtevant	LANL
18:05	Reaction of W with H evidenced by Eu-XFEL	J. Kim	Hanyang Uni.
18:30	Comparison of T estimates from X-ray data (EOS) and SOP	St. McWilliams	Uni. of Edinburgh
19:00	***End of the 1st day (self-payed dinner) TBD***		

PROGRAM (28 Jan. 2020)

9:00	Announcements		Institution
	Session 3: Future Proposed Experiments at the HED instrument		Chair: St. McWilliams
9:10	Single shot heating experiments, using pulsed laser or X-ray, in the DAC for MHz diffraction.	G. Morard	IsTerre
9:20	X-ray Heating of low-Z Materials at High Static Pressures	M. McMahon	Uni. of Edinburgh
9:30	Kinetics of structural phase transition in the dynamic-diamond anvil cell (dDAC): bridging static and shock compression	H. P. Liermann	DESY
9:40	Spin states of FeS and (Mg,Fe)O by X-ray emission at HED	Ch. Sternemann	TU Dortmund
9:50-10:30	***Coffee break and Posters (40 Min.)***		
10:30	Getting Ready for Proposed Experiments	C. Strohm, K. Appel	DESY
11:00	Close Out Discussion	St. McWilliams	Uni. of Edinburgh
11:30	Travel to EuXFEL for HED Satellite Meeting		