

Workshop on high-pressure time-resolved synchrotron techniques

September 25-27, 2014, Advanced Photon Source

Comprehensive Program

Wednesday, September 24, 2014

17:00 Registration and Reception (cash bar + finger food; concludes at 19:30) – Argonne Guest House

Thursday, September 25, 2014

7:30 Poster setup – in the Gallery, lower level APS Conference Center (Building 402)

7:30 Registration, Continental Breakfast – APS Auditorium (Building 402)

Note: All talks will be held in APS Auditorium

Session 1: Introduction

Chair: Guoyin Shen

8:30 Welcome, Stas Sinogeikin (HPCAT)

8:40 Overview of HPCAT and future perspectives for time-resolved experiments, Ho-Kwang (Dave) Mao (HPCAT, CIW)

9:10 MBA upgrade and effect on time-resolved experiments, Dennis Mills (APS)

9:40 Coffee break

Session 2: Time-resolved high-pressure x-ray imaging

Chair: Nenad Velisavljevic

10:00 High-pressure x-ray imaging experiments at HPCAT, Yoshio Kono (HPCAT)

10:25 Study of liquid-liquid immiscibility (silicate melt-water) by x-ray imaging in large volume press, Kenji Mibe (U. Tokyo)

10:50 X-ray fast tomography and its applications in dynamical phenomena studies in geoscience at APS, Xianghui Xiao (APS)

11:15 High-pressure and high-speed liquid jets: shock waves, cavitations and dynamics, Jin Wang (APS)

11:40 Discussion

11:50 Group photo - Front steps

12:00 Lunch - Gallery, lower level APS Conference Center (Building 402)

Session 3: X-ray micro-diffraction with fast compression and decompression

Chairs: Choong-Shik Yoo and Jesse Smith

- 1:00 **Fast (de)compression capabilities and first experimental results at HPCAT, Jesse Smith (HPCAT)**
- 1:25 **Time-resolved X-ray diffraction and electrical resistance measurements on metals at high pressure, Nenad Velisavljevic (LANL)**
- 1:50 **Rate dependent pathways for the high pressure synthesis of novel metastable phases in Group IV elements, Bianca Haberl (ANU/ORNL)**
- 2:15 **Dynamic response of materials by oscillatory deformation experiment + X-ray imaging, Don Weidner (Stony Brook)**
- 2:40 **Discussion**
- 2:50 **Coffee break**
- 3:10 **Modeling phase transition kinetics under dynamic compression, Carl Greeff (LANL)**
- 3:35 **Kinetics of structural phase transitions and fast x-ray diffraction, John Tse (USASK)**
- 4:00 **X-ray transient absorption spectroscopy for solar energy research, Lin Chen (NU/ANL)**
- 4:25 **Challenges and opportunities in analysis of massive data from time resolved experiments, Przemek Dera (UH)**
- 4:50 **Discussion**
- 5:00 **Poster session – in the Gallery, lower level APS Conference Center (Building 402)**
Chair: Stanislav Sinogeikin
- 6:30 **Workshop Dinner – Gallery, lower level APS Conference Center (Building 402)**

Friday, September 26, 2014

- 7:30 **Continental Breakfast – APS Conference Center (Building 402)**

Session 4: Pulsed/ramped laser heating and x-ray micro-diffraction

Chairs: Tom Duffy and Yue Meng

- 8:30 **High PT experiments with pulsed laser heating: capabilities at HPCAT, Yue Meng (HPCAT)**
- 8:55 **Technical developments on high-pressure melting of metals using pulsed laser heating, Ross Hrubyak (HPCAT)**
- 9:20 **Time-resolved x-ray diffraction of solids under dynamic loadings, Choong-Shik Yoo (WSU)**

- 9:45** **Melting measurements using XAS at megabar pressures, Reini Boehler (CIW)**
- 10:10** **Discussion**
- 10:20** **Coffee break**
- 10:40** **Time-domain experiments at extreme conditions at GSECARS, Vitali Prakapenka (GSECARS)**
- 11:05** **Single-pulse laser heating in diamond anvil cells: Probing material under planetary interior conditions, Alex Goncharov (CIW)**
- 11:30** **Fast temperature readout spectrometer for atomic dynamics measurement, Dongzhou Zhang (APS/Caltech)**
- 11:55** **Time-resolved X-ray diffraction at APS beamline 7ID, Don Walko (APS)**
- 12:20** **Discussion**
- 12:30** **Lunch - Gallery, lower level APS Conference Center (Building 402)**

Session 5: New time-resolved high-pressure X-ray techniques and directions and related topics

Chairs: John Tse and Yuming Xiao

- 1:30** **Laue capabilities at HPCAT - towards time-resolved studies, Dmitry Popov (HPCAT)**
- 1:55** **Dynamic Laue diffraction: A probe for understanding the kinetics of strength and phase transitions, Joel Bernier (LLNL)**
- 2:20** **100 ps time-resolved white beam diffraction at BioCARS, Keith Moffat (UC)**
- 2:45** **Time-resolved XES, Tsu-Chien Weng (SSRL)**
- 3:10** **Discussion**
- 3:20** **Coffee break**
- 3:40** **Fast detectors for time resolved studies – current status and new developments, Robert Bradford (APS)**
- 4:05** **Laser-based dynamic compression of solids, Tom Duffy (Princeton)**
- 4:30** **Ultrafast x-ray scattering measurements from dynamically compressed solids, Siegfried Glenzer (LCLS)**
- 4:55** **A first laser shock experiment at the ESRF to probe Warm Dense Iron, Florent Occelli (DPTA/SPMC)**
- 5:20** **Discussion**
- 5:30** **Posters / free time (take down posters between 6-6:30)**
- 6:30** **Workshop Dinner – Gallery, lower level APS Conference Center (Building 402)**

Saturday, September 27, 2014

8:00 Continental Breakfast – HPCAT / Building 434C

Parallel hands-on / demonstration sessions

NOTE: Four parallel hands-on / demonstrations sessions will be held simultaneously at four different stations. Attendees can sign up for groups (A, B, C, or D) during registration.

	Fast de/compression and cyclic pressure generation and control in DAC, <i>Stas Sinogeikin and Chuanlong Lin</i>	Pulsed and ramped laser heating in DAC, <i>Yue Meng and Ross Hrubciak</i>	Fast imaging, <i>Yoshio Kono and Curtis Kenny-Benson</i>	Large-volume data reduction and analysis, <i>Przemek Dera, Jesse Smith and Clemens Prescher</i>
	16-IDB area	16-IDB	16-BMB	434C Conf. room
9:00	A	B	C	D
9:35	D	A	B	C
10:10	C	D	A	B
10:45	B	C	D	A

11:20 Tour of HPCAT facilities (same 4 groups)

12:00 Lunch – HPCAT / Building 434C

13:00 Adjourn