

NSLS2 2017 Users' Meeting: Prospects in imaging materials and their dynamics by coherent X-ray scattering Workshop (W7) report

Organizers: X. Huang, C. Mazzoli, G. Williams
Committee: A. Barbour, Y. Chu, W. Hu, S. Wilkins

Invited speakers: I. Robinson (BNL), E. Takeguchi (BNL, Stony Brooks), Y. Takahashi (Japan), P. Fuoss (US), C. Jacobsen (US), V. Chamard (France), R. Harder (US)
Contributing speakers: Y. Chu, W. Hu, G. Williams

Participants: >70 registered (> 50 signed in), from at least 14 institutions

The workshop was organized as an informal meeting to discuss recent results achieved by active groups from various scientific fields and organizations, both domestic and international. Its aims were to foster discussion on the science and, concomitantly, to present the current status of NSLS-II beamlines dedicated to the use of X-ray coherence and, in particular, phase retrieval techniques; to identify current experimental limitations and theoretical challenges; and to propose evolution of existing facilities and possible improvements. With the occasion, an overview on the future CDI (coherent diffraction imaging) beamline at NSLS-II was also introduced.

The invited speakers covered a variety of different topics, ranging from overviews on the current use of x-ray beam coherence for the investigation of structure and dynamics of nanoscopic objects to studies on the macroscopic scale in advanced materials, batteries, and biominerals. A constant attention to technical details on how to exploit the spectacular potential of modern sources in terms of coherent flux, collection techniques and reconstruction algorithms was a consistent underlying theme. In particular, advancements in tracking the distribution and configuration of strain in ordered materials, crystallization and recrystallization processes and the growth and physio-chemical properties of biologically-relevant inorganic structures were presented and discussed.

One of the afternoon sessions was dedicated to NSLS-II beamlines (Instruments at 03ID, 23ID1 and the future CDI instrument were the focus.), highlighting their

capabilities in comparison to available experimental stations at other facilities around the world.

The closing session featured a wide-ranging discussion on the progress achieved in recent years, exciting challenges for the near future, and interesting potential capabilities to be developed. With the occasion, the organizers of the international conference Coherence 2018 announced its official dates and encouraged interested parties to attend.

Overall, the workshop attendance, the level of the presentations offered and the vivid interaction with the audience in the form of questions and answers at the end of the talks and discussions during breaks were all extremely positive. We believe that similar workshops should be hosted in the future, possibly on a regular basis. We note that the relevant international conferences tend to occur during the same calendar years, providing an opportunity during the “off-year” for future meetings. All present agreed that this would allow us to closely follow the rapid evolution of the technique and the users’ needs on a targeted scale relevant to our user community and to realize successful forefront experiments exploiting the coherence of the beam and the reconstruction techniques developed at or used with the renowned expertise at BNL and NSLS-II.