Future Opportunities for XPCS of Atomic-Scale Dynamics at Interfaces

G. B. Stephenson

Argonne National Laboratory, Lemont IL 60439 USA, **stephenson@anl.gov**

The greatly increased coherent X-ray flux available from MBA storage rings will enable X-ray photon correlation spectroscopy (XPCS) studies of a much wider variety of systems and phenomena than currently possible. These include more weakly scattering systems, such as surfaces and 2-d materials, and observations of short-length-scale dynamics at higher wavenumber and at the associated higher speeds. In addition, the increased coherent flux at higher X-ray energies will allow better optimization of the trade-off between higher signal level and undesired interaction of the X-ray beam with the sample dynamics. In this talk I will discuss some of the scientific opportunities for studies of atomic-scale dynamics at interfaces. These will be illustrated by examples of recent state-of-the-art experiments (e.g. [1]) as well as simulations of surface phenomena and XPCS.

References

[1] - "Coherent X-ray spectroscopy reveals the persistence of island arrangements during layer-by-layer growth," Guangxu Ju, Dongwei Xu, Matthew J. Highland, Carol Thompson, Hua Zhou, Jeffrey A. Eastman, Paul H. Fuoss, Peter Zapol, Hyunjung Kim, and G. Brian Stephenson, Nature Physics **15**, 589-594 (2019) https://doi.org/10.1038/s41567-019-0448-1.