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A 2nd Generation Interfacial X-ray Microscope NOUAMANE LAANAIT, ZHAN ZHANG, PAUL FENTER, Argonne National Laboratory — Understanding and controlling the physical and chemical processes occurring at the interface of materials is a central theme in many of today's scientific inquiries and technological advancements. Experimental investigations of interfaces has benefited from a large set of imaging techniques such as Probe microscopy, and Electron microscopy. Yet, numerous systems comprised of buried interfaces that are of immense significance, remain out of the reach of these methods because of their lack of depth penetration capabilities or inoperability in extreme conditions of pressure and/or temperature. Such systems can benefit from the development of complementary x-ray based imaging techniques that can operate in the above cited conditions. Combining the surface sensitivity of x-ray scattering and well-established methodology and instrumentation of transmission x-ray microscopy, a second generation interfacial x-ray microscope (IXM) is currently under development at Argonne's advanced photon source with the aim of achieving a lateral resolution of 50 nm and collection times on the order of seconds. The IXM has been used to image surface topography of solid/gas, solid/liquid with sub-nanometer height sensitivity. These scientific results as well as the instrumentation will be presented.

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