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Ptychographic coherent x-ray surface scattering imaging[1] JONG WOO KIM, ZHANG JIANG, TAO SUN, JIN WANG, Argonne National Lab — Lensless x-ray coherent diffraction imaging enables the determination of nano-scaled structures in physical and biological sciences. Several coherent diffractive imaging (CDI) methods have been developed in both transmission and reflection modes such as Bragg CDI, plane-wave CDI, Fresnel CDI, coherent surface scattering imaging (CSSI) and so on. The grazing-incidence coherent surface scattering (CSSI) technique, which is recently developed by T. Sun et al., takes advantage of enhanced x-ray surface scattering and interference near total external reflection, and thereby overcomes some limitations that the transmission mode have. However, the sample size can be investigated is limited by x-ray beam size because the sample is supposed to be isolated. We incorporated ptychographic algorithm with coherent surface scattering imaging to overcome this limitation and make it more useful and applicable. The ptychographic coherent surface scattering imaging technique enables us to measure 2D roughness of the flat surface such as thin film and silicon wafer regardless of the surface area.

[1]LDRD

Jong Woo Kim
Argonne National Lab

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