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Kinoform Optics Applied to X-ray Photon Correlation Spectroscopy[1] A.R. SANDY, S. NARAYANAN, Argonne National Laboratory, M. SPRUNG, DESY, J.-D. SU, Argonne National Laboratory, K. EVANS-LUTTERODT, A. ISAKOVIC, A. STEIN, Brookhaven National Laboratory — Moderate de-magnification, higher order silicon kinoform focusing lenses have been fabricated via e-beam lithography and deep etching to facilitate small-angle hard-x-ray photon correlation spectroscopy (XPCS) experiments. Typical lenses have focal lengths of one meter, focus in the vertical direction to within 80% of the diffraction limit and have vertical acceptance apertures of 400 microns. The acceptance in the orthogonal (etch) direction is 50 microns. The measured efficiency of the lenses is 35% and the flux gain at the focal line is 50. We discuss the effect of focusing on the resulting x-ray speckles. We conclude that one-dimensional vertical x-ray focusing via present-generation silicon kinoform lenses increases the usable coherent flux from third-generation storage-ring light sources for small-angle XPCS experiments by a factor of 3. We also discuss the prospects for further improvements in efficiency via diamond or lower order silicon kinoform lenses.

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