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Performance of bent-crystal x-ray microscopes for high energy density physics research M. SCHOLLMEIER, M. GEISSEL, J.E. SHORES, I.C. SMITH, J.L. PORTER, Sandia National Laboratories — We present calculations for the field of view (FOV), image fluence, image monochromaticity, spectral acceptance, and image aberrations for spherical crystal microscopes, which are used as self-emission imaging or backlighter systems at large-scale high energy density physics facilities. Our analytic results are benchmarked with ray-tracing calculations as well as with experimental measurements from the 6.151 keV backlighter system at Sandia National Laboratories. The analytic expressions can be used for x-ray source positions anywhere between the Rowland circle and object plane. This enables quick optimization of the performance of proposed but untested, bent-crystal microscope systems to find the best compromise between FOV, image fluence, and spatial resolution for a particular application.

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