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Design of the high energy microscopy beamline at Korea-4GSR

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The High Energy Microscopy (HEM) beamline is being developed for X-ray projection imaging and computed tomography at the Korea 4th Generation Storage Ring (Korea-4GSR) currently under construction in Ochang, South Korea. The HEM beamline will deliver a fan beam with a horizontal size of 200 mm and a vertical size of 28 mm at the sample position located 100 meters from the 2-Tesla bending magnet source, with a critical energy of 21 keV. Projection imaging will be performed in two modes: a monochromatic mode using a double-multilayer monochromator and a filter array, covering the energy range of 5–40 keV, and a white beam mode with energies up to 100 keV. The end-station is positioned at 95 meters and will be equipped with a high-load air-bearing rotation stage to enable operando and in-situ experiments. For phase-contrast imaging, the sample-to-detector distance can be extended up to 20 meters, benefiting from the extremely small source divergence of approximately $0.1 \mu\text{rad}$ at the sample location. Large field-of-view images will be captured using a high-aspect-ratio detector composed of a high-resolution camera array.

Footnotes

Funding Agency

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