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High resolution beam defining slits for Korea-4GSR beamlines

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The beamlines of 4GSR use an undulator as the light source and consist of a DCM (Double Crystal Monochromator), beam focusing devices, and slit devices. The Beam Defining Slit, installed after the DCM, processes an X-ray beam of several tens of micrometers with sub-micron precision. This device minimizes parasitic scattering and maximizes X-ray beam intensity at the sample location. Materials resistant to the heat load from the synchrotron light source were chosen. The slit edges are designed with a knife-edge shape, and the surface roughness is polished to several hundred nanometers or less, optimizing fuzziness. The device achieves geometric stability and sub-micron precision for more accurate beam processing. The schematic structure includes four slit blades, four blade transport mechanisms, a vacuum chamber, and support structures. Additionally, the design includes a BPM function by receiving electrical signals from the slit blades. This presentation will describe the configuration and mechanical design of the Beam Defining Slit for the 4GSR beamlines, along with the detailed structure of the devices for beam processing.

Footnotes

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