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Upgrade of crystal positioners for ESRF Double Crystal Monochromator

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The ESRF Double Crystal Monochromator (ESRF-DCM) was designed and developed in-house to enable spectroscopy beamlines to fully exploit the ESRF-EBS upgrade. While such key components always demand high beam positioning accuracy and stability, the EBS source requires even more stringent performance, such as a fast and continuous energy scanning crucial for modern spectroscopy. Meeting the challenging ESRF-DCM specifications involved high-precision mechanical design coupled with a mechatronic system for active correction of the crystal parallelism based on an online metrology. As part of ongoing optimization efforts, we recently focused on upgrading the actuators for crystal positioning to further enhance performance. These new actuators were integrated onto an ESRF-DCM during Spring 2025. This presentation will provide a brief overview of the DCM design principles, then focus on the design, integration, and commissioning results of these upgraded actuators. Finally, key performance characterizations of the DCM using X-rays, demonstrating the impact of the upgrade, will be presented.

Footnotes

Funding Agency

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