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Design of a stable Double Crystal Monochromator for synchrotron beamlines

Wednesday 17 September 2025 17:00 (1 hour)

Pohang Accelerator Laboratory (PAL) has developed various double crystal monochromators (DCMs) using domestic technologies and is currently pursuing a new design focused on enhanced performance and mechanical stability. This study introduces the design and fabrication of a next-generation DCM optimized to minimize thermal deformation under high heat loads and suppress mechanical vibrations for improved beam stability. High thermal conductivity materials and an efficient cooling system were integrated to mitigate thermal effects, while a structurally reinforced design was employed to reduce vibration. The system was validated through thermal and structural simulations, vibration testing, and performance evaluation under actual beamline conditions. The developed DCM demonstrates improved energy stability and positional accuracy, contributing to high-precision synchrotron radiation experiments.

Footnotes

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