

Fast and auto-alignment X-ray mirrors with speckle based at-wavelength metrology

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For modern synchrotron radiation sources, X-ray mirrors are mostly used for focusing or collimating X-ray beam with high efficiency. While pursuing aberration-free optics with highly accurate fabrication process, in situ alignment plays an important role in order to realize the best possible performance of the X-ray mirrors. Here, we present a simple and fast alignment method based on X-ray near-field speckle, with demonstration of the best focus performance for a pair of KB mirrors at Diamond Light Source. In contrast to the conventional alignment methods, e.g., knife-edge or wire scan, the proposed method shows advantages of more accuracy and less time-consuming. It loosens the stringent demand on high resolution scanning stages and hence can be applied to the nano-focusing X-ray mirrors. The flexibility and easy implementation will allow it to be widely applied to synchrotron facilities and laboratory systems.

References

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