

硬X線ミラーの現状とその応用

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Current status of hard X-ray mirror fabrication and X-ray nanobeam application

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<Synopsis>

We developed a surface-figuring method to realize atomic-level smoothness and 0.1nm (RMS)-level figure accuracy over the large area of 100mm scale, and applied the method to fabricate total-reflection optics for hard X-ray nanofocusing [1]-[3]. A nearly diffraction-limited focusing with the spot size of 25nm x 30nm was obtained at the X-ray of 15keV. In my presentation, the fabrication methods, the performances of the focusing optics, and the application examples will be introduced.

We are now trying to realize sub-10nm X-ray nanobeam in which wavefront error smaller than 0.01nm is required. To evaluate such small phase error, we developed a novel at-wavelength interferometry using a phase retrieval technique [4,5]. A compensation method of the phase error was also proposed. The latest results on the research will be also presented here.

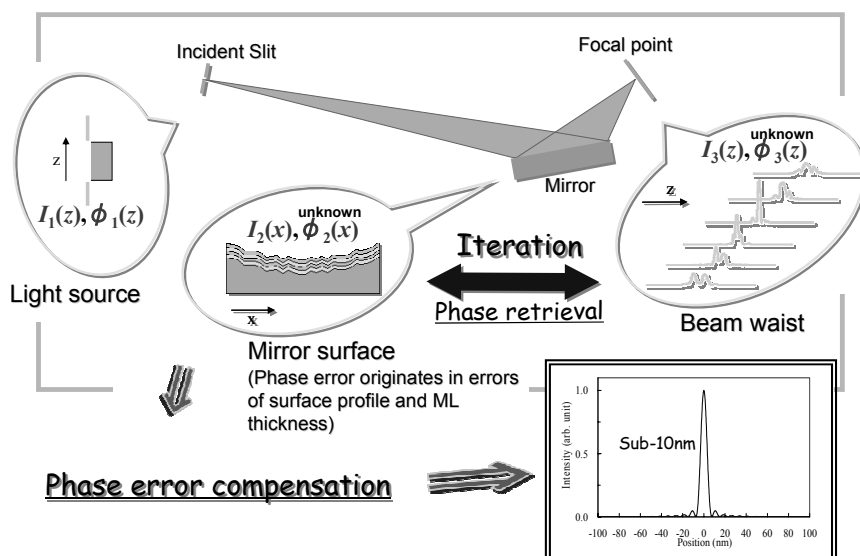


Fig. A strategy to realize sub-10nm focusing by KB mirrors

- [1] Y. Mori et al., Rev. Sci. Instrum., 71 (2000), 4627-4632.
- [2] K. Yamauchi et al., Rev. Sci. Instrum., 73 (2002), 4028-4033.
- [3] H. Mimura et al., Applied Physics Letters 90, 051903 (2007)
- [4] H. Yumoto et al., Rev. Sci. Instrum., 77, 063712 (2006).
- [5] H. Mimura et al., Phys Rev A 77, 015812 (2008)