X-ray phase scanner using Talbot-Lau interferometry for non-destructive testing – IV

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The X-ray Talbot [1] and Talbot-Lau [2] interferometers which are composed of transmission gratings and measure the differential X-ray phase shifts and scattering by objects have gained popularity because they operate with conventional X-ray generators in hospitals and factories. Recently, we have reported successful demonstration of application of X-ray Talbot-Lau interferometer scanning setup to non-destructive testing for industrial production [3-5]. In this demonstration, a phase scanner apparatus consisting of three transmission gratings, a laboratory-based X-ray source that emits X-rays vertically, and an image detector on the top has been developed for the application of X-ray phase imaging with which continuously moving objects across the field of view as that of belt-conveyor system can be imaged.

Presently, we have upgraded the apparatus with imaging detector and gratings. A new imaging detector which has improved energy sensitivity suitable for high-energy X-rays used for non-destructive testing would allow us to increase the sample scanning speed while the new high-aspect-ratio gratings enable the use of higher energy X-rays. The imaging performance and evaluation of upgraded apparatus in terms of sample scanning speed and spatial resolution will be reported.

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REFERENCES