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# Influence of Technical and Material Uncertainties on Optimized Parameters in X-ray Differential Phase Contrast Imaging System Based on Talbot Effect

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Seems to be small any technical parameter deviations or uncertainties in the systems forming the scanning radiation (for example, diffraction gratings) may produce significant distortions of the wave phase that can lead to the wrong interpretation of the results of scanning (such as the incorrect location of the patient tumor). Due to this reason, the tomography systems based on Talbot effect are of high need to be considered in the view of the stability regarding to the small fluctuations of input parameters.

The parameters of geometrical and material characteristics of interferometers' components are assumed to be Gaussian-like distributed over the corresponding range of values that results in the change of the design working flow to reach the high-performance grating-based interferometer [1]. In particular, the optimal values of geometrical parameters determined in [1, 2] are shifted by more than 10% as compared to the deterministic approach.

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[2] W Yashiro, Y Takeda, and A Momose. Efficiency of capturing a phase image using cone-beam x-ray Talbot interferometry. *Journal of the Optical Society of America. A, Optics, image science, and vision*, 25(8):2025–2039, 2008

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