

# Oriented Gaussian beams for high-accuracy computation with accuracy control of X-ray propagation through a multi-lens system

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A high-accurate method for calculating X-ray propagation is developed. The method uses a superposition of oriented Gaussian beams to represent the X-ray propagation. The direction of wave propagation in each Gaussian beam agrees with the local propagation direction of the X-ray wavefront. The approximation of a thin lens is used to calculate the propagation of X-ray waves through the lenses. As the wave passes through the lens, the wave parameters change discontinuously; relevant formulas are derived. The theory is used to calculate the X-ray focus using a system of many beryllium lenses. A fine structure of the electric wave field on the focal plane is revealed and examined.

The method allows to control the accuracy of calculations. The analysis of changes in parameters, the amplitude of the electric field on the focal plane, the focal length width, the position of the best focus, allow to evaluate the calculation error. The efficiency of each of these parameters, when assessing the error, has been discussed.

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