Conversion of computation density field to optical thicknesses in numerical simulation of experiments using synchrotron radiation

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The paper shows the predictive capabilities of the LEGAK technique [1, 2] for numerical estimation of synchrotron radiation intensity. Several algorithms for converting the calculated density field to optical thicknesses are considered. For two-dimensional axisymmetric problems, an algorithm based on the Abel transformation is used [3]. To demonstrate his work, numerical modeling of experiments on the investigation of the detonation propagation process in cylindrical explosive samples based on TATB was carried out [4]. For three-dimensional problems, an algorithm has been developed and implemented that allows varying the direction of the rays. The example of a test problem with a cube shows patterns of optical thicknesses in different directions of the rays. The implemented functionality makes it possible to describe in detail the transient processes during the initiation and propagation of detonation in explosives and can be used for the numerical study of fast-flowing gas dynamic processes.

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[2] Bakhrakh S M and et al 2006 *AIP Conference Proceedings* **849** 453–459

[3] Kozlovsky V 2006 *Information in pulsed radiography* (Snezhinsk: Publishing house of RFNC-VNIITF)

[4] Titov V M and et al 2011 *Combustion, explosion, and shock waves* **47** 615–626