

FLUCTUATIONS OF THE INDUCED CHARGE CAUSED BY FLUCTUATIONS OF THE X-RAY QUANTUM ABSORPTION POINT IN A PLANE-PARALLEL SEMICONDUCTOR DETECTOR

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The book [1] provides a formula for fluctuations of the induced charge caused by the trapping of electrons and holes in the volume of a plane-parallel semiconductor detector, obtained in [2]. However, this formula was obtained for the case of a homogeneous distribution of X-ray quantum absorption points in the volume of the detector, and does not take into account the attenuation of the X-ray quantum flux as it penetrates into the detector. In [3], an attempt was made to take into account the attenuation of the X-ray quantum flux, but the formula published by the authors contains errors.

In this paper, formulae are obtained for the fluctuations of the induced charge on the detector electrodes caused by fluctuations in the absorption point of the X-ray quantum, taking into account the law of attenuation of the X-ray quantum flux. The obtained formulae demonstrate the role of covariance of induced charge on the detector electrodes caused by random processes occurring in the detector at the registration of X-rays.

1. A. Owens Compound Semiconductor Radiation Detectors, CRC Press (2012).
2. J. S. Iwaczyk, W. F. Schnepfle, M. J. Masterson, Nucl. Instr. Meth. in Phys. Res. A. 322, 421 (1992). 3 A. Ruzin, Y. Nemirovsky, J. Appl. Phys. 82, 2754 (1997).

The speaker is a student or young scientist

No

Section

1. Applications of nuclear methods in science and technology

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