

Computer simulation of the operational characteristics of a microstrip silicon detector

Ha Dinh Dao (Foreign) ¹,

Ivan Lovshenko ²,

Polina Roshchenko ³,

Veranika Shandarovich ⁴,

Viktor Stempitsky ⁵,

Tuan Trung Tran (Foreign) ⁴

2021

^{1, 6} Foreign

^{2, 3, 4, 5} R&D Lab 4.4 «Computer-aided design of micro- and nanoelectronic systems», Department of Micro- and Nanoelectronics, Belarusian State University of Informatics and Radioelectronics, Minsk, Belarus

⁵ Vice-Rector for Research and Development, Head of R&D Department, Scientific Supervisor of R&D Lab. "Computer-aided design of micro- and nanoelectronic systems", Belarusian State University of Informatics and Radioelectronics, Minsk, Belarus

Keywords: Linear energy transfer; Microstrip detector; Radiation; Single event upset; Technological and device simulation

Abstract: This paper presents the results of preliminary device and technological simulation and optimization of the operational characteristics of semiconductor microstrip detectors. We investigated the influence of heavy charged particles with linear energy transfers of $1.81 \text{ MeV cm}^2 \text{ mg}^{-1}$, $18.8 \text{ MeV cm}^2 \text{ mg}^{-1}$ and $55.0 \text{ MeV cm}^2 \text{ mg}^{-1}$, corresponding to nitrogen $^{15}\text{N}^{+4}$ ions with an energy $E = 1.87 \text{ MeV}$, iron $^{56}\text{Fe}^{+15}$ ions with an energy $E = 523 \text{ MeV}$ and xenon $^{131}\text{Xe}^{+35}$ ions with an energy $E = 1217 \text{ MeV}$, as well as the angle of incidence of the particles and the temperature and voltage on the substrate, on the characteristics of the detector. To improve the characteristics of the detector, a screening experiment was carried out and a series of optimization calculations were performed. The results will be used for the manufacture and testing of design parameters for an experimental batch of the investigated devices.

This article published in:

Computer simulation of the operational characteristics of a microstrip silicon detector / Ha Dinh Dao [et al.] // Semiconductor Science and Technology. – 2021. – Vol. 36. – № 9. – P. 1. – DOI : 10.1088/1361-6641/ac09cf.

Internet-link for the article:

<https://iopscience.iop.org/article/10.1088/1361-6641/ac09cf>.