MEASUREMENT AND SIMULATION OF CURRENT-VOLTAGE CHARACTERISTICS OF HIGH-ENERGY ELECTRON SENSORS BASED ON GALLIUM ARSENIDE COMPENSATED WITH CHROMIUM[1]

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The work presents the results of measurements and simulation of the current-voltage characteristics of pixel sensors based on high-resistive gallium arsenide compensated with chromium. It has been established that the experimental current-voltage characteristics are symmetrical with respect to the polarity of the applied voltage and have three sections with different dependence current on bias voltage: linear (section I), sublinear (section II) and superlinear (section III). It has been shown by calculation that the transition from linear (section I) to sublinear (section II) dependence of current on voltage is due to the saturation of the electronic component of total current, which is a consequence of the extraction of electrons from the sensor volume and the absence of an influx of electrons from the reverse biased barrier on "metal contact – semiconductor" interface.

The current-voltage characteristics were simulated and compared with experimental ones. It is shown that taking into account the concentration of thermal acceptors allows achieving of good agreement between the simulated and experimental current-voltage characteristics.

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