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The influence of contact material and its fabrication on X-ray GaAs:Cr sensor noise characteristics

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In the report the investigation results of GaAs:Cr sensors noise characteristics by means of amplitude spectrum analysis are presented. Test sensors were $3 \times 3 \text{ mm}^2$ "Me-GaAs:Cr-Me" structures and thickness was $500 \mu\text{m}$. Metal contacts were made by means of electron beam deposition, magnetron sputtering and electrochemical deposition of various metals such as Ni, Ni/Au, Cr, Cr/Ni, Cr/Al, NiV/Au, NiV/Al.

Noise characteristics dependencies on applied bias in the range from 0 to 500 V were investigated at different shaping times (50-500 ns). Energy resolution (FWHM) of the sensors was studied during electron-hole pairs generation using IR (830 nm) laser with the pulse width less than 1 ns. For these measurements sensors with mesh contact were fabricated.

The nature of dominant noise, optimal shaping time and extreme energy resolution are determined by analyzing obtained results. The conclusion of contacts fabrication method characterized with lowest noise is drawn. The research was supported by The Tomsk State University competitiveness improvement programme.

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