

Primary converts of ionizing radiation fluxes of high energy density based on diamond

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The report provides an overview of the current state of diamond detector technology for recording high energy densities of ionizing radiation.

The results of the development of VNIIA means of specialpurpose measurements – diamond dosimeters (maximum measured exposure dose rate is up to 10^{11} R/s with a time resolution of at least 0.5 ns) and diamond dosimeters (maximum measured exposure dose rate is up to 10^{12} R/s with a time resolution of at least 0.2 ns). The nearest perspectives for the development of diamond instrumentation are shown as the latest achievements of the developers of the institute's division.

In the interests of radiation monitoring-optical measuring channel based on diamond scintillation primary converter with possibility of recording pulsed braking radiation with the maximum absorbed dose rate from 10^{-7} to 10^4 Gr/h: a small-sized radiation-resistant neutron detector with a time resolution of at least 1 ns and a sensitivity of at least 10^{-17} C*cm⁴.

In the interests of developers of controlled thermonuclear fusion (TCF) installations: CDWW-type soft X-ray detector (coaxial diamond without window) – a calorimeter with subnanosecond time resolution; measuring channel for measuring burning kinetics on TCF installations; hybrid small-sized radiation-resistant X-ray and neutron detector. In the interests of the Ministry of health and social promotion: small-sized tissue equivalent absorbed dose dosimeter to accompany radiotherapy procedures.