

## **REGISTRATION AND ANALYSIS OF GAMMA RADIATION PARAMETERS IN THE SYSTEM OF DETECTION AND EVALUATION OF NUCLEAR SITUATION**

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The work examines the methodological apparatus for classifying a type of nuclear munition by recording and analyzing the gamma radiation parameters of the penetrating radiation of a nuclear explosion. The existing dependences are analyzed that determine the characteristics of the dose rate of instant and secondary gamma radiation, changes in the temporal and spectral characteristics of the gamma radiation pulse of various types of nuclear munitions. The possibility of classifying the type of ammunition based on fixing the spectral distribution of instant gamma rays of the penetrating radiation of a nuclear explosion, as well as the pulse duration according to the obtained pulse shape of the dose rate of instant and secondary gamma radiation are substantiated. The analysis of the spectra of instant gamma rays shows the possibility of classifying the type of ammunition by recording and analyzing the number of pulses in the energy range from 4 to 8 MeV. For nuclear weapons, 4.4%, for thermonuclear 3.6%, for neutron 10.3%. An estimate of the duration of the resulting pulse shows that at a distance of 1000 m from the center of a nuclear explosion, the pulse duration at the level of 0.1 from the maximum value can be on the order of 0.1  $\mu\text{s}$  for atomic and thermonuclear munitions, and 0.01  $\mu\text{s}$  for a neutron. The pulse duration of instant gamma radiation for an atomic explosion can be 30-100 ns; for thermonuclear 10-30 ns; for neutron 3-5 ns, which can also serve as a marker for classifying the type of nuclear munition. The possibility of registering CdTe detectors in a spherical absorber from the Fe spectrum of instant gamma quanta (connecting detectors in the current mode) and the pulse shape of the dose rate of instant and secondary gamma radiation (connecting detectors in pulsed mode) was tested on a VarianClinac 600C simulator that provides the necessary spectrally - time characteristics of nuclear gamma radiation. The time resolution of the used ADC(Analog to digital converter) allows you to register all the pulses that come from the accelerator. Confirmed the ability to measure the pulse duration at the level of 0.1 of the maximum dose rate.

Classification of the type of nuclear munitions used should contribute more to the operational and reliable assessment of the current situation in the nuclear lesion focus, sufficient for the correct assessment of the specifics of the damage and further development of the situation.