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Investigation of the capabilities of a xenon gamma-ray spectrometer to assess the activity of an isotope 60Co

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The possibilities of a xenon gamma-ray spectrometer [1] for the evaluation and detection of radioactive isotopes and 60Co in particular were studied in this paper. The methods of the most accurate restoration of the activity of the alleged source were also tested in order to reduce the discrepancies of the actual values of the source activity. The detector used in the experiments is an ionization chamber with a volume of 2 liters filled with highly purified xenon. The longest measurements of spectrometric characteristics of previous version of the spectrometer called "XENIA"were performed at the "MIR"orbital station [2].
The activity of the source and the number of registered particles were selected as the main characteristics for consideration. This choice is due to the fact that, knowing the particle flow and knowing the activity, you can quickly estimate the distance to the source. Having info about source activity it becomes possible quickly estimate other dosimetric characteristics.

[1] High Pressure Xenon Gamma-Spectrometers with High Energy Resolution / V.V. Dmitrenko, V.M. Gratchev, S.E. Ulin et al.// Nuclear Science Symposium, 1996. Conference Record. –1996. –Vol. 1. –P. 393 –397. DOI:10.1109/NSSMIC.1996.591006
[2] S. E. Ulin, K. F. Vlasik, A. M. Galper, et al., In: Proc. SPIE 3114, 499 (2017). DOI: 10.25283/2587-9707-2022-2-56-67

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