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The IPPE experience on the use of digital radiation spectrometers in neutron experiments.

At the IPPE over the past 20 years, digital methods are widely used to register neutrons and products of nuclear reactions caused by neutrons. This method is based on the fact that the signals taken from radiation detectors are converted to digital form. Further processing of these signals is performed using DSP methods. Using the example of ionization chambers with Frisch grid, organic scintillators, inorganic scintillators, proportional and corona neutron counters, it was shown that digital processing gives a much better result than analog one. This result is obtained because the digital approach allows studying all available information contained in the waveform. Digital signal processing methods were successfully implemented to study the yields of fission fragments of heavy nuclei, to study ternary nuclear fission, to study the (n, a) cross section of the reaction on solid and gaseous targets, for neutron spectrometry by the time-of-flight method.

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