# Digital two-parametric spectrometric system for characterization of mixed neutron-gamma field in experimental devices

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This presentation discusses a novel digital spectrometric system and its application in measuring neutron and gamma mixed fields across various experimental reactors (LR-0, LVR-15, VR-1), cyclotrons, and neutron generators. Traditionally, these measurements employed an analog system using output signals from a scintillation stilbene detector. Despite its widespread use, the analog system had significant drawbacks including its size, heavy weight, and a limitation of processing approximately 1000 impulses per second. This rate limitation extended experimental durations to tens of hours, particularly problematic in high gamma radiation environments, such as near activated fuel, where conducting experiments became nearly untenable.

The newly developed digital spectrometric system addresses these issues by processing detector outputs at a rate at least ten times higher, thereby drastically reducing experiment times and enhancing measurement feasibility in high radiation backgrounds. Key to this system is high-speed digitizers offering a resolution of 12 bits and a sampling rate of 500 MS/s (1 GS/s). Data digitization is followed by FPGA processing, allowing for both immediate online analysis using rapid dual-parameter evaluation algorithms and detailed offline processing utilizing charge comparison methods.