

Modern Gamma Ray Spectrometers for the Nuclear Structure Research

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It is expected that the recent progress in gamma-ray spectrometry, especially detector systems developed in the last decade, will shortly cause a breakthrough in studies of the structure of very exotic, unstable nuclei. Use of these state-of-the-art detectors can be also advantageous in investigations of processes occurring in fusion reactors, that result in excitation of nuclei.

In the talk, I will give a historical overview of the gamma-ray spectrometers and will summarize the cutting-edge techniques, that have been applied in order to build the newest multidetector systems: AGATA and PARIS. AGATA is an array of segmented HPGe detectors, in which a considerable increase in sensitivity for gamma rays in the energy range 100 keV to 10 MeV was achieved thanks to the complete reconstruction of the trajectory of the scattered photons (gamma tracking). On the other hand the high-energy photon spectrometer PARIS, based on the newest scintillation crystals- LaBr_3 , allows for detection of gamma rays of energy up to 50 MeV with a resolution of 1%, even at high count rate.

I will provide a few examples of recent nuclear structure studies making use of these devices.