

Spectral and temporal response of scintillators exposed to femtosecond laser radiation

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The determination of the temporal and spectral properties of high-rate multicomponent plastic scintillators without exposure to pulsed γ -rays has been demonstrated. Excitation of the dye in the scintillators was achieved through multiphoton absorption of high-intensity femtosecond laser pulse at a wavelength of 800 nm. The laser pulse energy was 5 mJ and the laser pulse duration was $\simeq 50$ fs (FWHM). Luminescence was recorded using a photodetector with a time response of 200 ps through the side face of the sample that prevents the detector from a laser pulse influence. Studies were carried out for a number of scintillator samples with different time responses and dye luminescence spectra. The obtained data are shown to correspond with measurements carried out when exposed to a source of picosecond γ -rays, which confirms the possibility of using a femtosecond laser setup as a safe tool for studying the parameters of scintillation converters of γ -rays.