DIRECT TWO-PHOTON EXCITATION OF ISOMERIC TRANSITION IN THORIUM-229 NUCLEUS

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S u m m a r y

A possibility of the two-photon excitation of an isomeric state in a nucleus of thorium-229 has been discussed. The fluorescence intensity of the excitation is demonstrated to be identical for the irradiation of nuclei with either monochromatic light or polychromatic radiation consisting of a sequence of short light pulses of the same intensity. The two-photon excitation of Th^{3+} ion in an electromagnetic trap with a focused laser beam with a wavelength of about 320 nm and power of 100 mW can lead to the absorption saturation, at which the fluorescence emission with the frequency of the transition in a nucleus is maximal. In crystals doped with Th^{4+} to a concentration of about 10^{18} cm^{-3} and irradiated with a laser radiation 10 W in power, the emission of several photons per second with a wavelength of about 160 nm becomes possible.