FORMATION OF THE GROUND STATE OF ^{8}Be NUCLEUS IN ^{12}C(γ ,n)^{3}He2α AND ^{12}C(γ,p)^{3}H2α REACTIONS

S.N. Afanas'ev, E.S. Gorbenko, A.F. Khodyachikh

National Science Center
"Kharkiv Institute of Physics and Technology"
(*1, Akademichna Str., Kharkiv 61108, Ukraine;*
e-mail: afanserg@kipt.kharkov.ua)

S u m m a r y

By exposing a diffusion chamber in a magnetic field to bremsstrahlung γ-quanta with a maximum energy of 150 MeV, the partial channel of formation of a ^{8}Be nucleus excited up to an energy of 1.5 MeV in the ^{12}C(γ,n)^{3}He2α and ^{12}C(γ,p)^{3}H2α reactions has been studied. On the excitation curve for a system of two α-particles, a resonance structure with a maximum located at $E_0 \approx 0.72$ MeV, possessing the width $\Gamma = 0.75$ MeV, and identified as a ghost anomaly (GA) was revealed between the ground state and the first excited state of the ^{8}Be nucleus. The reactions were demonstrated to be of the sequential type of decay. After removal of a nucleon from the s-shell of a ^{12}C nucleus, the excited states of ^{11}C and ^{11}B nuclei are formed; the decay of those nuclei gives rise to the formation of a ^{8}Be nucleus, which decays afterwards into two α-particles. Possible mechanisms of γ-quantum absorption by the carbon nucleus have been discussed.