

The induced activities were examined by detecting and analyzing  $\gamma$ -rays with help of a 63 cm<sup>3</sup> Ge(Li) semiconductor spectrometer equipped with a 4096 channel pulse height analyzer. The counting system had a resolution of  $\sim 3,5$  keV for the 1332 keV  $\gamma$ -line of <sup>60</sup>Co.

The yields of the metastable state decay were evaluated by using the 271 keV (<sup>44m</sup>Sc, J $\pi$ =6<sup>+</sup>, T<sub>1/2</sub>=2,44 d)  $\gamma$ -rays. The yields of the ground state decay were evaluated by using the 1157 keV (<sup>44g</sup>Sc, J $\pi$ =2<sup>+</sup>, T<sub>1/2</sub>= 3,92 h)  $\gamma$ -rays.

From the yield curves, cross section of reaction was calculated. They were one-humped with maximum attached to energy of  $\sim 18$  MeV. Experimental data was approximated by Lorenz carvers. Having total photo neutron cross section /1/ with E $\gamma$ =18 MeV we were able to get experimental isomeric ratios of cross section  $r=\sigma_m/\sigma_{tot}$ . The results are compared with the calculations made in the statistical Fermi-gas theory/2/.

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## <sup>159</sup>Ho LEVELS EXCITED BY <sup>159</sup>Er EC/ $\beta^+$ DECAY

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The present study of the EC/ $\beta^+$  decay of <sup>159</sup>Er to the levels in <sup>159</sup>Ho was completed at the ISOL complex of YASNAPP-2 at JINR, Dubna. Single  $\gamma$ -ray and  $\gamma$ - $\gamma$ -coincidence spectra were recorded with HPGe-detectors. Conversion electron spectra were measured by using magnetic spectrometer "mini-orange" with Si(Li) detector.

Results of  $\gamma$ -ray and ICE measurements previously reported by Boutet [1] and in our laboratory [2] have been investigated very accurately. It was shown, that a number of weak  $\gamma$ -transitions does not belong to the isotope <sup>159</sup>Er. The special attention was given to high-energy part of a  $\gamma$ -spectrum where in ref. [3] 50  $\gamma$ -transitions were attributed to the decay of <sup>159</sup>Er with E $\gamma$   $\geq$  1838.5 keV. We shall point out, that some of them were attributed to this nuclide unreasonably, as their energies E $\gamma$  exceed the energy of  $\beta$ -decay of <sup>159</sup>Er (2768.5 keV).

The most of transitions which have been listed in [3] according to our analysis belong to impurities. In addition to the results [1,2] multipolarities of several  $\gamma$ -transitions with E $\gamma$  > 500 keV were determined, that allowed to establish quantum characteristics of separate levels in <sup>159</sup>Ho. The existence of transition with admixture of E0-component indicates that  $\beta$ -vibrational states in daughter nucleus are excited.

We observed this E0-component in the  $\gamma$ -transition (939.5 keV) in the case of <sup>159</sup>Er decay to the levels in <sup>159</sup>Ho. As in the case of <sup>161</sup>Er decay, it was not possible for us to find out three-quasiparticle states in <sup>159</sup>Ho, predicted by superfluid model at excitation energies E $\gamma$   $\geq$  1.5 MeV by observation of the fast au-  $\beta$ -transitions.

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## EC/ $\beta^+$ DECAY OF $^{161}\text{Er}$

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The study of odd-proton nuclei in rare-earth region has been performed to get more information on the nuclear structure of these nuclei. In the framework of a program at the ISOL complex of YASNAPP-2 at JINR to study the decay of odd-nuclei,  $^{161}\text{Er}$  has been investigated. The experiments have been focused on the  $^{161}\text{Ho}$  level scheme populated in the EC/ $\beta^+$  decay of  $^{161}\text{Er}$  for which a few results have been previously reported [1,2]. Spectra of single  $\gamma$ -ray,  $\gamma$ - $\gamma$  coincidence and internal conversion electrons were measured.

There are appreciable disagreements between results of some  $\gamma$ -ray intensities obtained by us and in [2]. The greatest difference was for relative  $\gamma$ -ray intensity of the 11.28 keV, which has reported value  $I_\gamma \sim 10$  ( $I_{\gamma 211}=1000$ ) in [2], but this leads to an overpopulation of the 211 keV level by 14% of the decay [3]. The relative intensities of transitions with  $E_\gamma < 400$  keV were measured by the planar detector and the large-volume HPGe detector, the relative intensity of  $\gamma$ -transition 11.28 keV was found equal to  $\sim 3.9 \pm 0.7$  ( $I_{\gamma 211}=1000$ ). Inaccuracy of  $I_\gamma$  in [2] is probably due to a sudden change in the efficiency curve of their Ge(Li) detector in the low energy region while our HPGe detector feature a much smoother variation in the efficiency curve in this  $\gamma$ -ray energy region.

Besides, the levels earlier introduced by us in [4], three new levels in  $^{161}\text{Ho}$  were proposed from  $\gamma$ - $\gamma$  coincidences at energies 693.2 keV, 859.6 keV, and 957.97 keV. Spins, parities and Nilsson quantum characteristics of some  $^{161}\text{Ho}$  levels were established.

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