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Investigation of energy dependence of light charged particles emission from (p,x) reaction with 120Sn nucleus

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Investigation of energy dependence of light charged particles emission from (p,x) reaction with 120Sn nucleus
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The double-differential and integral cross sections of the reactions initiated by nucleons play a key role in development of the theory of nuclear reactions, verification of computer codes based on them. From another hand such data are necessary for the design of safety systems for power reactors, development of advanced nuclear technologies, in particular, hybrid nuclear energy systems (ADS-Accelerator Driven System) [1,2]. The experiment with protons accelerated to energy of 30 MeV was performed on an isochronous cyclotron U-150M of the Institute of Nuclear Physics. The double-differential cross sections of the reactions with light particles in exit channels were measured in the angular range 30-135o with angle increments of 15°. Theoretical analysis of the obtained experimental results was performed within the framework of the TALYS and PRECO calculation code, which is widely used in interpreting many experimental results. To describe the complete inclusive spectra of scattered particles, all possible mechanisms of nuclear reactions were taken into account. A satisfactory agreement between experimental and calculated values has been achieved. A distinction between direct nuclear reactions, pre-equilibrium decay and equilibrium emission at different incident protons energy for 120Sn(p,x) reaction was established.

[1] Y. Ikeda et al., Journal of Nuclear Science and Technology,suppl.2, (2002) 13.

[2] A. Ignatyuk et al., Atomic Energy 116 (2014) 209.

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