

Production of p-nuclides in photonuclear reactions

Friday, 6 December 2013 12:10 (25 minutes)

A number of naturally present nuclei from ^{74}Se to ^{196}Hg lie far from the stellar s- and r-process' trajectories and their abundances can not be explained by nucleosynthesis in neutron capture reactions. These nuclei are known as p-nuclei and photonuclear reactions are believed to be one of the channels of their production [1]. Existing calculation models can not accurately describe p-nuclei abundances and the lack of experimental measurements on these nuclei is a major limiting factor [2].

Measurements of yields of photonuclear reactions in which the ^{102}Pd , $^{112,114}\text{Sn}$, $^{106,108}\text{Cd}$, and $^{92,94}\text{Mo}$ nuclei are produced have been performed at the Skobeltsyn Institute of Nuclear Physics of the Moscow State University in the bremsstrahlung energy range of up to 55 MeV using the activation technique. Experimental results are compared with Hauser-Feshbach statistical model calculations and a significant disagreement is found.

Additional studies with photon energy range from reaction threshold to 10 MeV are currently being performed.

[1] M. Arnould and S. Goriely, Physics Reports 384, 1 (2003).

[2] I. Dillmann et al., Phys. Rev. C 81, 015801 (2010).

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Session Classification: Resonances Session