Striking Behaviour of Photoneutron Cross Sections for ^{90}Zr near Threshold*

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A photon difference technique was employed to examine a minute behaviour of photoneutron cross sections for ^{90}Zr near neutron threshold with laser Compton scattering (LCS) γ-ray beams at the National Institute of Advanced Industrial Science and Technology. The maximum energy of the LCS γ-ray beam was changed in 50 - 200 keV steps from 12135 to 12890 keV near threshold at 11970 keV. Figure 1 shows the present data of photoneutron cross sections for ^{90}Zr in comparison with the previous data [1,2]. The cross sections above 12300 keV are in good agreement with the data of Ref. [1], while the data of Ref. [2] do not show such a rapid fall. A striking feature is that there is a significant strength just above the neutron threshold, suggesting the presence of resonance states. They are possibly $3P_{3/2}$ wave neutron resonances that predominantly manifest themselves around A = 90, as predicted by the valence model [3].

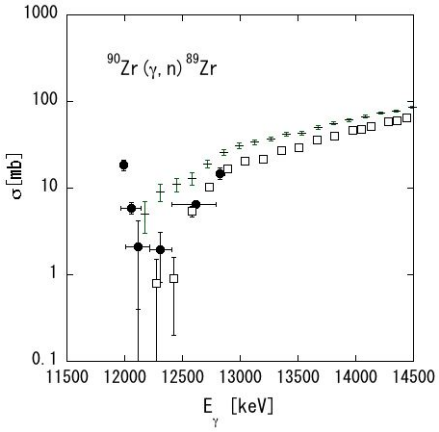

Figure 1: Photoneutron cross sections for ^{90}Zr

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