Analysis of Continuum Spectra for Proton induced Reactions on ^{27}Al, ^{58}Ni, ^{90}Zr ^{197}Au and ^{209}Bi at 42 and 68 MeV—Direct Reaction Model Analysis.

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Theoretical analyses of the double differential cross sections for proton induced deuteron pickup reactions are described in this paper. The differential cross sections have been measured for various nuclei with mass number from 27 to 209 at incident energies of 42 and 68 MeV (for ^{197}Au only at 68 MeV, and for ^{209}Bi only at 42 MeV), using an approach based on the DWBA and an asymmetry Lorentzian function having energy-dependent spreading width. This method has been described briefly by Hirowatari et al. [1] and Syafarudin et al. [2] for the proton induced reactions and then applied to both for proton and neutron induced reactions by Sultana et al. [3,4]. The values of the calculated double differential cross sections have been compared with the experimental ones.

Figure 1 shows the double differential cross sections at 25^0 laboratory angle, with solid lines represent the theoretical cross sections, and circles the experimental ones. The experiments were carried out at the TIARA facility of JAERI. Potentials due to Koning et al. [5], which have symmetric term for both neutron and proton optical model potentials, have been used here in the DWUCK calculations. From the figure it is found that the shapes of continuum spectra are well reproduced by the theoretical calculation. It is interesting and also obviously desired to examine the applicability of the present analysis method in wide mass and incident energy regions.

References

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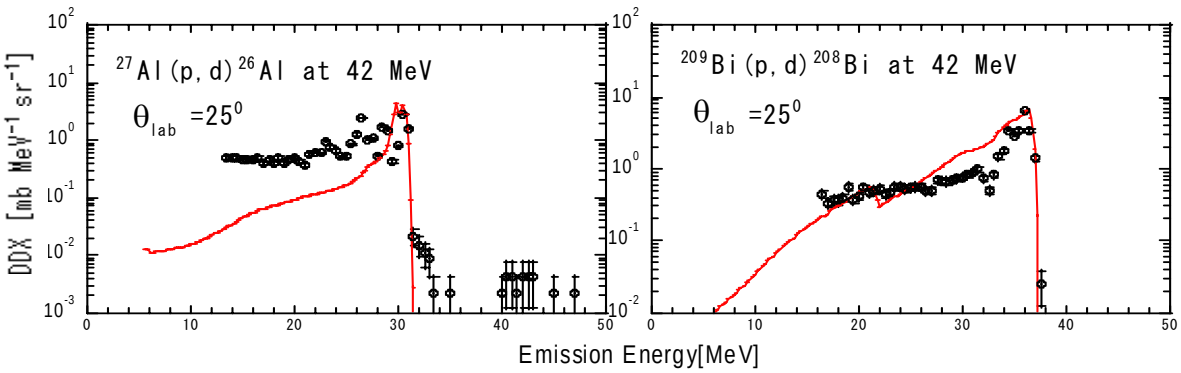

Fig 1. (p,d) DDX data of ^{27}Al (left) and ^{209}Bi (right) for 42 MeV proton at 25^0 laboratory angle.