Continuum Spectra Analysis of (p, d) and (n, d) Reactions on Bi in Several Tens of MeV Energy Region

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Double differential cross sections of the ^{209}Bi(n,d) and ^{209}Bi(p,d) reactions at around 25-65 MeV incident energy region have been analyzed using an approach based on the DWBA and an asymmetry Lorentzian form strength function having energy- dependent spreading width. This method has been described briefly by Hirowatari et al. [1] and Syafarudin et al. [2] and applied to the (n,d) reaction on ^{nat}Fe and the (p,d) reaction on ^{58}Ni [3]. The main objective of the series of work is to establish a model which can be valid for investigating the reactions on nuclei in a wide range of mass numbers with wide incident energy region. From this point of view, in this paper, we adopted a heavy nucleus ^{209}Bi for investigation.

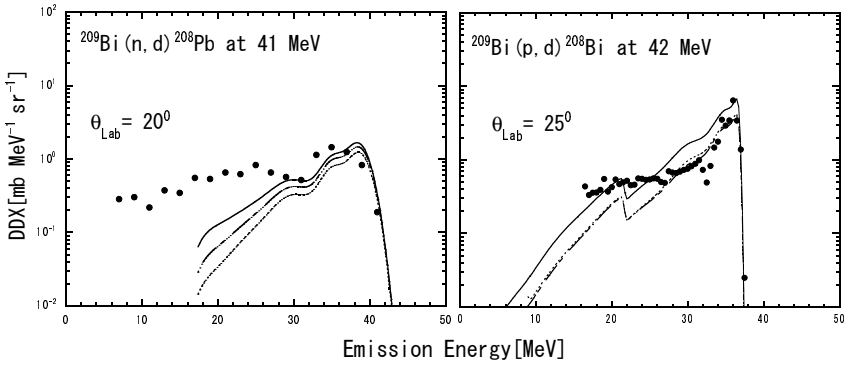

Fig. 1 ^{209}Bi(n, d) DDX data (left) and ^{209}Bi(p, d) DDX data (right) at 41 MeV and 42 MeV respectively. The filled circles show the result of experimental data and the solid, dot-dashed and dotted curves refer to the prediction due to present work for Koning, Menet and Becchetti potentials respectively.

Figure 1 shows double differential cross sections at 20^0 and 25^0 laboratory angles for ^{209}Bi(n,d) and ^{209}Bi(p,d) reactions, measured with cyclotrons at the Louvain-la-Neuve and TIARA facility of JAERI, respectively. Theoretical results are in fair agreement with the experimental data above 30 MeV in emission energy region. Finally, there is an increasing interest for investigation of how far this model can cover a range of mass numbers for nucleus as well as incident energy.

References

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