ential cross sections for Bi target materials and incident proton kinetic energies between 800 MeV and 3 GeV, using validated GEANT4 and FLUKA simulation codes. The overall agreement of Geant4 results with Fluka results had been obtained. As shown in Figs. 1 and 2.

There were no available experimental data of neutron production double differential cross sections for Bi target materials and incident proton kinetic energies between 800 MeV and 3 GeV. However, the present results provide very important nuclear data for the design of liquid Pb-Bi target of the ADS project.

References

[1] C. M. Herbach, et al., Nuclear Physics, A765(2006)426.
[2] Yujiro IKEDA, et al., Journal of Nuclear Science and Technology, 2(2002)13.
[3] Ding Dazhao, et al., Modern Physics, 13(2001)20.
[4] Wan Junsheng, et al., Chinese Journal of Computational Physics, 20(2003).
[5] Pan Sheng, et al., Nuclear Physics Review, 19(2002).
[6] Geant4 Reference Manual, available from http://cern.ch/geant4.
[7] Fluka Reference Manual, available from http://www.fluka/org/.
[8] Zhang Suyalatu, et al., IMP & HIRFL Annual Report, (2011)57.

2 - 27 Primary Fragments Reconstruction

Lin Weiping, Liu Xingquan, Zhang Suyalatu, Huang Meirong, Liu Jianli, Shi Fudong, Han Rui
Jin Zengxue, Ren Peipei, Jia Baolu, Zhao Minghui, Chen Zhiqiang and R. Wada

In order to reconstruct the primary fragment distribution experimentally, a fragment-particle correlation technique based upona kinematical focusing method was used to detecting the light particles (LPs) associated with intermediate mass trigger fragments (IMFs). The experiment was performed at the K-500 superconducting cyclotron facility at Texas A&M University. ^{64,70}Zn and ^{64}Ni beams were used to irradiate ^{58,64}Ni, ^{112,124}Sn, ^{197}Au, and ^{232}Th targets at 40 *A*MeV. The detector setup is same asthat in references[1-7].

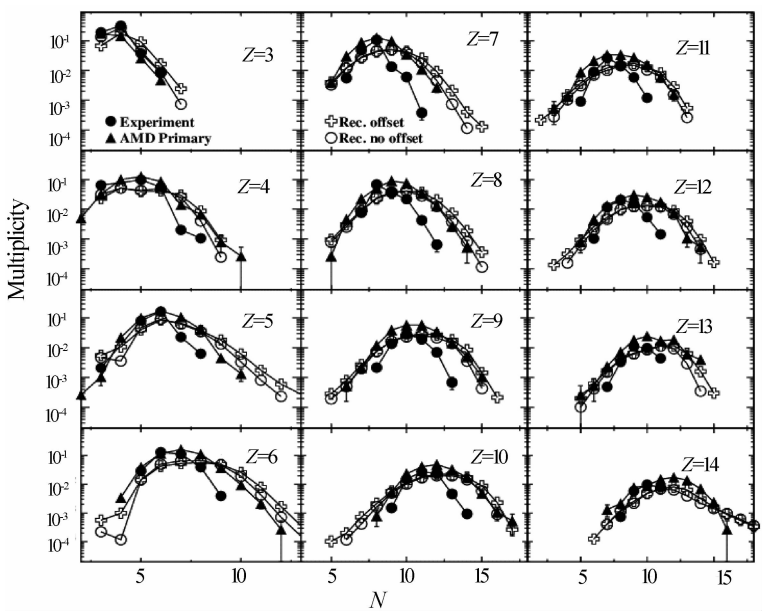

Fig. 1 The isotopic distribution of reconstructed primary with(✣) and without(○) AMD offset, experimental (●) as well as the AMD primary (▲) fragments as a function of fragments mass number *N*.

By kinematical focusing, the LPs associated with the triggered IMF are observed as an excess in their velocity or energy spectra above the yields of uncorrelated LPs. To determine the multiplicities of LPs asso-

ciated with IMF, a moving source parameterization was used[2-3]. A Monte-Carlo method was applied to reconstruct the primary fragment distribution, employing the experimentally observed mean multiplicities and decay widths from GEMINI simulations, combined with the experimental (secondary) fragment yield distributions[4]. Fig. 1 shows the isotopic distributions of the reconstructed primary fragments as well as those of the AMD primary fragments as a function of fragment mass number, N. As seen in Fig. 1, the open symbols are the reconstructed fragments with and without offset from Li isotopes of AMD. The reconstructed primary distributions are well reproduced by those of the AMD simulation.

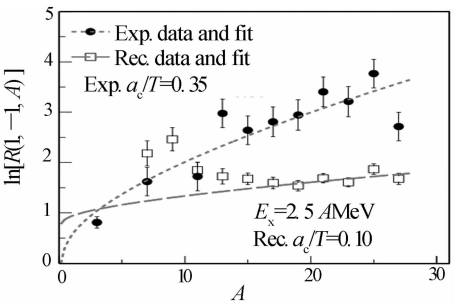

Fig. 2 ln[$R(I+2, I, A)$] for $I=-1$ for the experimental and reconstructed fragments are plotted as a function of A.

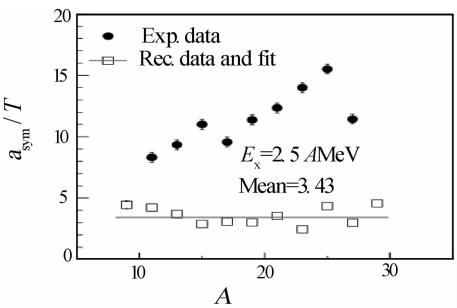

Fig. 3 Experimental and reconstructed values of a_{sym}/T as a function of fragment mass number A. The line is the constant fit.

The Modified Fisher Model (MFM) of Ref.[5-6] is used to study the symmetry energy contribution to the fragment production. The detailed method can be found in Ref. [7]. In Fig. 2 the values of ln[$R(I+2, I, A)$] for $I=-1$ are plotted for the detected and reconstructed fragments as a function of A. The short dashed, and dashed lines show the fits for the experiments and reconstructed fragments, respectively. The extracted $a_c/T=0.35$ and 0.10 for the detected and reconstructed data, respectively. In Fig. 3 the values of a_{sym}/T, calculated using the previously extracted value $a_c/T=0.10$, are plotted as a function of A and compared to the values from the detected fragments. The extracted values from the reconstructed data show a flat distribution as A increases. A mean value of $a_{sym}/T=3.43$ is extracted from the reconstructed fragments. This observation is also consistent with the results derived from the primary fragments of the AMD simulation[7-8].

References

[1] M. R. D. Rodrigues, et al., J. Phys.: Conf. Ser., 312(2011)082009.
[2] K. Hagel, et al., Phys. Rev., C62(2000)034607.
[3] R. Wada, et al., Phys. Rev., C69(2004)044610.
[4] S. Kowalski, Cyclotron Institute Annual Reports, (2005).
[5] R. W. Minich, et al., Phys. Lett., B118(1982)458.
[6] A. S. Hirsch, et al., Nucl. Phys., A418(1984)267c.
[7] M. Huang, et al., Phys. Rev., C81(2010)044620.
[8] Z. Chen, et al., Phys. Rev., C81(2010)064613.