Systematic Analyses on Super Neutron-Rich Nuclei, $^{4-7}$H

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^{7}H is the most neutron-rich nucleus observed so far. It was reported as an enhancement of the cross section above the t+n+n+n+n threshold [1]. The neutron ratio to the proton (N/Z) is the largest value of six, which corresponds to the neutron star surface. In the typical neutron-rich nuclei such as ^{6}He and ^{11}Li, the importance of the di-neutron correlation has been pointed out. In the ^{7}H case, there are three di-neutrons around a proton seed (See Figure 1). Thus, it is very interesting to investigate the di-neutron correlation in such the super neutron-rich nuclei in addition to the shell model-like state as t+n+n+n+n.

Recently, we propose a new extended AMD approach [2]. In this approach, AMD combined with the generator coordinate method is extended with the idea of the stochastic variational method (SVM). We call this new approach AMD triple-S (Superposition of Selected Snapshots) [2]. By using the AMD triple-S, we calculated the binding energy (See Figure 2) and discussed for H-isotopes with the core-nucleus plus the valence neutrons model. We found the important effect of the di-neutron correlation in the super neutron-rich nuclei, $^{4-7}$H.

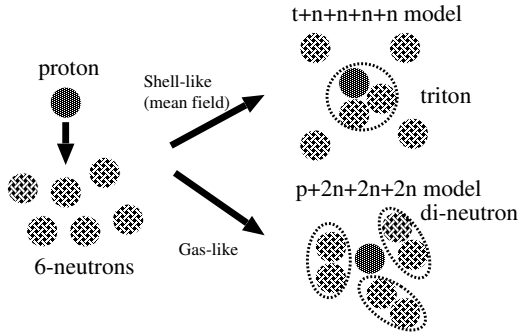

Figure 1: What does it happen if one proton is added in the six neutron system?

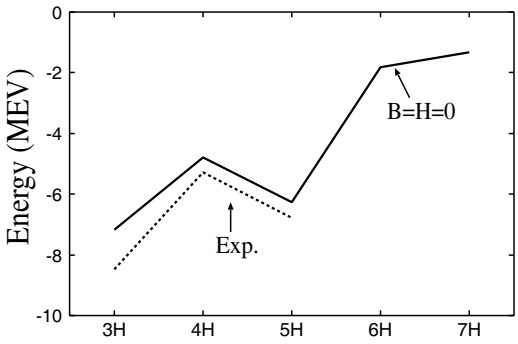

Figure 2: The calculated systematic binding energies for H-isotopes, and the dotted line is that for experiments.

1. A.A. Korsheninnikov *et al.*, Phys. Rev. Lett. **90**, (2003) 082501.
2. N. Itagaki, A. Kobayakawa and S. Aoyama, Phys. Rev. **C68**, (2003) 054302.