Questions and Discussions

Koshiroh Tsukiyama

(Dated: October 27, 2008)

1. GHF with V_{lowk} has a large cutoff (Λ) dependence, do you think those values in the tables (in *report.pdf*) is unnatural?

2. I have computed low-lying states in oxygen isotopes by Gamow Shell Model (GSM) with the filling configuration. The results also have a strong cutoff dependences. This can be partly caused by the filling configuration in GSM, meaning that no configuration mixing is too poor even though one includes a lot of degrees of freedom in continuum. I think these cutoff dependences are inherited from the single-particle energies of GHF, because when one calculates the low-lying states by GSM where s.p. states are generated by Woods-Saxon potential, then there is little cutoff dependence.

3. When including core-poralization, pp-ladder and hh-ladder diagrams, the original two-body matrix elements (TBME's) are modified to be more repulsive. This is typically shown in Fig.3 in (*report.pdf*). I'm not sure whether this change can be reasonably understood or not.
   If not, I should check more carefully the new $\hat{Q}$-box code which is written with complex variables.

4. As for the starting energy of $\hat{Q}$-box. In the case of harmonic oscillator (HO) basis, the starting energy s of $\hat{Q}(s)$ is always real and set to be the sum of incoming valence particles, in *sd*-shell for instance, s=$-$10 MeV or something. In the case of Gamow basis, however, some single-particle energies are negative and some are positive and complex. Can the natural extension of the original $\hat{Q}$-box expansion possible? This is actually what I have to consider.

5. In the codes, unfolded non-hermitian two-body interaction in the second order is the sum of the second order $\hat{Q}$-box, $\hat{Q}^{(2)}(s)$, and $\hat{S}$-box. I'm sorry but I don't really understand the definition of the $\hat{S}$-box. Formally , it seems to be a two-body contribution constructed from one-body insertions. Each value of $\hat{S}$-box is relatively large value. I

would be happy if you can give me any reference or a brief explanation.