Discussions

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April 16, 2009

1 On SRG codes

I think the second last line in the subroutine "derivative"

$$\frac{dV}{d\lambda} = -2\lambda^{-3}\frac{dV}{ds} \tag{1}$$

should be

$$\frac{dV}{d\lambda} = -4\lambda^{-5}M^2\frac{dV}{ds} \tag{2}$$

where M is the nucleon mass. Since the parameter λ of SRG is determined by the driving term. In Scott's code, since he calculate in the unit where $\hbar^2/N = 1$, the driving term becomes

$$\frac{dV(k,k')}{ds} \sim (k^2 - k'^2)^2 V(k,k') \tag{3}$$

$$V(k,k') = V(k,k';s=0)\exp^{-(k^2-k'^2)^2 s} \tag{4}$$

therefore one can define λ by

$$\lambda^4 s = 1 \tag{5}$$

In your code, the unit where $\hbar = c = 1$, is used. So the driving term is

$$\frac{dV(k,k')}{ds} \sim \frac{1}{M^2}(k^2 - k'^2)^2 V(k,k') \tag{6}$$

$$V(k,k') = V(k,k';s=0)\exp^{-(k^2-k'^2)^2 s/M^2} \tag{7}$$

Then λ is defined by

$$\frac{\lambda^4}{M^2} s = 1 \tag{8}$$

I just modified this point, then I got the ground state energy of ^{4}He which is very close to the result of NCSM when the same NN is used.

2 On Lee-Suzuki

I would like to clarify the definiion of P space in Lee-Suzuki (nocore option). I seems to me that the LS trans. is done in relative and center of mass system, while we define the P space in Lab frame quantum number $l_{\max}$ and $n_{\max}$ in the input file.

3 On Oxygen papeper

I will tell you the current status of our paper.