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A new approach for large-scale shell-model calculations and large-scale complex scaling calculations

In my presentation, I will present a new approach to numerically solve shell model calculations and complex scaling calculations, which have real energy eigenvalues and complex energy eigenvalues, respectively. For shell model calculations, I have already published in Ref.1 and this new approach works as well as the well-known Lanczos method. In an application concerning to isospin breaking [2], it is superior to the Lanczos method. I will show this new approach in detail.

In the latter part of my presentation, I will show an extension of this work [3] to complex scaling calculations which is useful to describe resonance states. This approach will be able to open large-scale complex scaling calculations.

This work is a result of collaboration with Prof. K. Kaneko, M. Honma, T. Sakurai, Y. Sun, S. Tazaki, G. de Angelis, T. Myo and K. Kato.

Reference

- [1] T. Mizusaki, K. Kaneko, M. Honma, T. Sakurai, Phys. Rev. C82 024310 (2010).
- [2] T. Mizusaki, K. Kaneko, M. Honma, K. Sakurai, Acta Physica Polonica B 42, 447 (2011). K. Kaneko, T. Mizusaki, Y. Sun, S. Tazaki, G. de Angelis, Phys. Rev. Lett. 109, 092504 (2012).
- [3] T. Mizusaki, T. Myo, K. Kato, to be submitted.

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