Contribution ID: **12** Type: **not specified**

Finite amplitude method for triaxially deformed superfluid nuclei

Monday, 19 June 2017 17:00 (15 minutes)

Our goal is to construct a microscopic quadrupole collective Hamiltonian model to treat large-amplitude shape fluctuation and shape mixing in nuclei. This model consists of the constrained density functional theory (Hartree-Fock-Bogoliubov) and local quasiparticle random phase approximation (LQRPA) based on DFT with Skyrme functionals. Since QRPA calculations for deformed nuclei require large resources of computations, QRPA for triaxially deformed nuclei is currently not available. The finite amplitude method (FAM) was proposed [1], and then has been applied to wide range of nuclei [2-5]. Main advantages of FAM are that functional derivative of Hamiltonian as the residual interactions, which requires large computations, is replaced with a finite-difference form, and construction and diagonalization of huge QRPA matrices are avoided by using an iterative method. These two advantages considerably reduce the computational cost for performing QRPA calculations, especially for deformed nuclei.
As a first step to construct the microscopic collective Hamiltonian mentioned above, we develop a computer code of FAM QRPA for triaxial nuclei with the full Skyrme energy density functionals. In this contribution, we will present results of multipole strength functions and sum rules of triaxial nuclei such as 110Ru.

[1] T. Nakatsukasa, T. Inakura, and K. Yabana, Phys. Rev. C 76, 024318 (2007).
[2] P. Avogadro and T. Nakatsukasa, Phys. Rev. C 84, 014314 (2011).
[3] M. Stoitsov et al., Phys. Rev. C 84, 041305 (2011).
[4] H. Liang, T. Nakatsukasa, Z. Niu, and J. Meng, Phys. Rev. C 87, 054310 (2013).
[5] T. Niksic et al., Phys. Rev. C 88, 044327 (2013).

Primary author: Dr WASHIYAMA, Kouhei (Center for Computational Sciences, University of Tsukuba)

Co-author: Prof. NAKATSUKASA, Takashi (Center for Computational Sciences, University of Tsukuba)

Presenter: Dr WASHIYAMA, Kouhei (Center for Computational Sciences, University of Tsukuba)