

TALENT Course 7: Theory for exploring nuclear structure experiments

Outline project proposal

Project name: Influence of continuum in the giant pairing vibration

Researcher(s): Yoshihiko Kobayashi

Affiliation: Graduate School of Science and Technology, Niigata University, Japan

Supervisor(s): Augusto O. Macchiavelli, Richard F. Casten

Project outline and aims:

Giant pairing vibration is a collective mode associated with the coherent superposition of nucleon pairs in the shell which is far from threshold. We explore the continuum effects on the giant pairing vibration based on the mixing of the bound and unbound levels. We start to describe a two levels mixing with the analytic model [P. von Brentano et al. Phys. Lett. B **534**, (2002) 63-68]. Next, we extend this model to the case of more than two levels. Finally, we try to discuss the difficulty in the observation of giant pairing vibration.

Methodology:

We discuss the mixing of levels based on the analytic model[1]. We write the coupled channel equation between bound and unbound levels. Then we solve that equation by diagonalization. We use the Mathematica to diagonalize the Hamiltonian.

Key references:

1. P. von Brentano, R.V. Jolos, H.A. Weidenmüller, Phys. Lett. B **534**, (2002) 63-68