Contribution ID: **3** Type: **not specified**

Nature of proton and neutron motions in neutron-rich Te isotopes

Friday, 12 April 2019 09:00 (15 minutes)

The understanding of the few-nucleon pair motions in an atomic nucleus is one of the ever-evolving topics for the many-body quantum system within a finite potential space. The Te nuclide with $N > 82$ is the best laboratory to investigate the motion and interaction of a single proton pair in the neutron-rich environment like helium over the robustly closed core of ^{132}Sn. The neutron-rich ^{136}Te isotope with two proton and neutron pairs over the inert core has been studied for a long time. From several experiments, the collective motion of ^{136}Te is revealed to be dominated by a neutron pair rather than a proton pair or equal footing of both pairs. However, the only interactions of two proton and neutron pairs in ^{136}Te have been investigated due to the limitation of the experimental instruments. Consequently, the future experiments on the Coulomb excitations of ground band levels in ^{138,140,142}Te with more neutrons will play essential roles on the nucleon interactions and motions with the extreme neutron-to-proton ratios.

The symmetric feature of the collective motions based on the neutron shell closure at $N = 82$ in the Te isotopic chain is one of striking questions as reaching to the neutron drip line. The unique pattern of the nuclear structure evolution may be one of nature's riddle to be solved to understand behaviors of valence nucleons over the doubly closed shell structure. The in-depth investigation with the help of state-of-art theoretical models will answer this arising question by comparing with the experimental results on the level energies and reduced transition probabilities.

From the proposal, behaviors of valence nucleon pairs in the neutron-rich circumstance will be deeply studied with the following questions. Do neutron pairs still lead the entire motion of the nucleus with more neutrons? How many neutron pairs lead the entire motion and deformation? How much a proton pair contribute to the collective motion? This proposal will provide the way how the neutron pairs dominate the quantum system over the stable core and the actions of a pair of protons.

Primary author: Dr MOON, Byul (Center for Extreme Nuclear Matters, Korea University)

Presenter: Dr MOON, Byul (Center for Extreme Nuclear Matters, Korea University)

Session Classification: Proposals