

New telescope for cluster-knockout reaction and cluster formation in neutron rich Ca isotopes

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The Structure of nuclear and nuclear matter is explained as shell structure based on mean field theory. However new picture that the light cluster such as d , t , ^3He and ^4He form spontaneously in the low-density region ($\sim 1/10$ of saturation density) is predicted. This phenomenon can be a clue to search mechanism which stabilizes nuclear via cluster formation and various phenomena of astrophysics such as neutrino response of low-density nuclear matter and pasta phase in the nuclear star.

But mechanism of such as clustering is not understood well. So, our group launched "ONOKORO project" to search mechanism of cluster formation by acquire systematical experimental data of clustering in clear. We use cluster-knockout reaction at 250 MeV/u energy which satisfies quasi-free condition to measure the ratio of cluster formation and information of cluster in nuclear such as momentum distribution and separation spectra. To extend the measurement to unstable nuclear, we plan measurements with inverse kinematics and develop new detector array named "TOGAXSI" which consisting of liquid hydrogen target, Si strip detector for measurement of scatter angle and GAGG(Ce) calorimeter for measurement of energy.

In this presentation, we report development of TOGAXSI array and plan of the experiment with the neutron rich nuclei Ca isotopes at RIBF as the first measurement of neutron rich nuclei.

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