NUCLEAR STRUCTURE OF ^{15,16}C VIA REACTION CROSS SECTION MEASUREMENTS

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Radius or nucleon density is one of the fundamental properties of nuclei. Such attributes of unstable nuclei can be significantly different from ones of stable nuclei. In unstable region, unique nuclear structures such as halo and skin structure are observed. Since the number of unstable nuclei is exceedingly large, it is important and intriguing to probe and quantitatively discuss their nucleon density distributions.

^{15}C is an unstable neutron rich isotope of carbon. It has a small neutron separation energy, and the measurement of parallel momentum distribution of out coming fragment in its one-neutron removal reaction suggests a possibility of neutron halo[1]. The measured magnetic moment of ^{15}C is close to the value of a pure $2s_{1/2}$ neutron[2] surrounding a ^{14}C core, instead of $1d_{5/2}$ neutron configuration that the normal shell model would suggest. The reaction cross sections for ^{15}C on ^{12}C targets is measured at different energies in the previous studies[3][4], however not yet adequate enough to assert the orbit of valence neutron.

In this research, the reaction cross sections for ^{15,16}C on stable nuclei targets (Be, C, Al) are systematically measured in the intermediate energy range. ^{15,16}C beams were produced in the projectile fragmentations of accelerated ^{18}O on Be target, using the accelarator HIMAC in National Institute of Radiological Sciences, Chiba, Japan. In the same experiment, reactions on CH_2 target are also measured in order to quantify the reaction cross section for ^{15,16}C on proton target.

The nucleon density distributions of ^{15,16}C were deduced from the analyses of present data with existing data using the Glauber type calculation. Proton and neutron density distributions were also deduced separately by including the proton target data. For valence neutron structure of ^{15}C, present data shows strong agreement with $2s_{1/2}$ neutron configuration. The nucleon density of ^{16}C also shows a tail, which is not as developed as ^{15}C. In this presentation, the results will be closely compared between ^{15}C and ^{16}C, including quantitative values of rms radii .

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