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Cluster aspect in C isotopes YOSHIKO KANADA-EN'YO , YITP, Kyoto University

We discuss structure of ground and excited states of C isotopes, while paying attention to cluster aspect. In the neutron-rich nuclei near the drip line, there exist loosely bound three-body systems called as Borromean systems. Also in stable nuclei, we can regard ¹²C as a Borromean system when we consider the 3α system, where no bound system consists of two of the three clusters. Recently, the properties of the second 0⁺ state of ¹²C has been successfully described by a gas-like 3α structure. It leads us to expect that loosely bound three-body states may appear in other C isotopes. We propose that the third $3/2^-$ state of ¹¹C is a candidate of such a gas-like state. It is supported by the recent observation of small Gamov-Teller transition strength, $B(GT;^{11}B \rightarrow^{11} C^*)$, measured by charge exchange reactions. We give a discussion of cluster aspect in ¹¹C. In contrast to the development of three-body clustering in the highly excited states, the clusters are considered to be tightly bound in the low- lying states of C isotopes. In the neutron-rich C isotopes, it is suggested that spatial development of 3α may not appear, instead, compact proton structure is favored. This feature may lead to decoupling of core and valence neutrons in neutron- rich C and has a good contrast to low-lying states of neutron-rich Be which has the strong coupling nature of 2α core and valence neutrons. We study structure of neutron-rich C isotopes and discuss the decoupling of proton and neutron deformations.