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Study of the cluster structure in light unstable nuclei using knock-out reactions

Correlated nucleons can form various clusters such as α cluster, which can further give rise to intriguing cluster structures in light nuclei, taking the Hoyle state of ^{12}C with a 3- α cluster structure as an example. In recent years, important progress has been made in studying the cluster structure of excited states of light neutron-rich nuclei, such as the molecular resonant state of ^{12}Be [1] and the 3-linear-chain states of carbon isotopes [2]. Formation of clusters in the ground state of light nuclei has been theoretically predicted, but has been barely studied, particularly in unstable nuclei.

The cluster knockout reaction such as (p, p) has been shown to be a sensitive probe for clusters in the ground state of nuclei [3,4]. We have measured the α -cluster knockout reaction on ^{10}C and ^{10}Be at the HIRFL-RIBLL beam line (IMP, Lanzhou, China) to study their dumbbell-like 2- cluster structure. Some preliminary results of the experiment will be presented.

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Primary authors: DU, Zeyu (Peking University); YANG, Zaihong (Peking University)

Presenter: DU, Zeyu (Peking University)

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