Abstract Submitted
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Search for the alpha-cluster 2_2^+ state in ^{12}C[1] NAOKI YOKOTA, Faculty of Science, Kyoto University — Alpha particle clustering is an important concept in nuclear physics. Many works were devoted to examine the alpha-cluster structure in atomic nuclei. The ^{12}C nucleus is one of the well-investigated nuclei, and its energy level is successfully explained by the alpha-cluster-model (ACM) calculations except for the 2_2^+ state. The ACM calculation strongly suggests the 2^+ state should be observed at $E_x \sim 10$ MeV. Recently, Itoh et al suggested both the 0^+ and 2^+ states exist in a broad bump at $E_x \sim 10$ MeV in ^{12}C, but Fynbo et al claimed they observed no 2^+ states in the bump. Thus the existence of the 2_2^+ state is still controversial. We propose to measure the cross sections for the ^{16}O(d,^{6}Li) reaction at $E_d = 45$ MeV to search for the 2_2^+ state in ^{12}C. We will perform the multipole-decomposition analysis on the basis of the DWBA calculation and pin down the 2^+ strengths in the broad bump at $E_x \sim 10$ MeV. We will use a ΔE-E Si counter to detect reaction products. This counter consists of two Si strip detectors with the thicknesses of 65 μm and 500 μm. We performed a test experiment and confirmed the performance of the ΔE-E Si counter is good enough to carry out the proposed measurement.

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