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Study of ^{19}C by one-neutron knockout from ^{20}C

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The recent improvements in the experimental sensitivity have opened new avenues to study very neutron-rich isotopes of Carbon and Oxygen, allowing for an improved understanding of the structure of them. The present work aims at exploration of neutron-unbound states of ^{19}C via a one-neutron knockout reaction. A study of ^{19}C utilizing in-beam γ -ray spectroscopy measurement reported that the $3/2+1$ and $5/2+1$ states are bound. On the other hand, in a study of inclusive one-neutron knockout cross section, argued that the experimental inclusive knockout cross section from ^{20}C to ^{19}C did not support the existence of the $5/2+1$ state below the threshold.

In this work, the invariant mass measurement in inverse kinematics was carried out in order to clarify the issue of bound/unbound nature of the $5/2+1$ state. The experiment was performed at the RIBF facility in RIKEN. A ^{20}C secondary beam produced by BigRIPS with an energy of 280 MeV/nucleon impinged on a carbon target placed before the SAMURAI spectrometer. By taking full advantage of the analyzer system comprised of a large-acceptance super-conducting dipole magnet, associated tracking detectors, and a large volume neutron detector system, an invariant mass spectrum for the system of $^{18}\text{C}+n$ was reconstructed. Details of the measurement and analysis along with new results on the low-lying states of ^{19}C will be presented.

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