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Study of 16C by neutron knockout reaction

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The neutron-rich isotope, 16C has been investigated by neutron knockout reaction of 17C on liquid hydrogen target. Applying the invariant mass method in inverse kinematics and gamma-ray spectroscopy, the energy spectrum was reconstructed, in which neutrons, charged fragments, and gamma-rays originated from the decay of the reaction residue (16C*) were detected in coincidence. A peak at about 0.46 MeV was observed in the invariant mass spectrum in coincidence with a peak at 0.74 MeV in the gamma-ray spectrum, which indicates the presence of an unbound state with an excitation energy of 5.45 MeV. A simple shell model calculation has shown a strong evidence that the spin-parity of the state is likely to be 2-. Derivation of the experimental cross-section and comparison with the theoretical cross-section will be presented.

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