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Study of unbound excited states in ¹⁷C

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A study of unbound excited states in 17 C through one-neutron knockout of 18 C at the energy of 245 MeV/nucleon on a carbon target was performed using the SAMURAI spectrometer. Relative energy spectrum of unbound 17 C was reconstructed from momentum vectors of 16 C fragments and neutrons. The relative energy spectrum was characterized by six resonances at $E_{\rm rel} = 0.54$, 0.81, 1.41, 1.92, 2.30, and 3.22 MeV. Three of them at $E_{\rm rel} = 0.54$, 1.41, and 2.30 MeV were identified to be in coincidence with 16 C(2⁺₁), while others have no coincidence with that.

Orbital angular momenta of two resonances at $E_{\rm rel} = 1.92$ and 3.22 MeV were determined as 1 by momentum distributions. The resonance at $E_{\rm rel} = 0.81$ MeV, assigned as $5/2^+_2$, was newly observed in the present work. With regard to the resonances having the coincidence with ${}^{16}C(2^+_1)$, decay properties of candidate states were examined by branching ratio and shell-model calculations, and spin-parities of them were tentatively assigned. From the present study, it turned out that the YSOX shell-model interaction, involving tensor force for *p*-*sd* cross-shell part, provides a good account of the observation. In the presentation, the results and detailed interpretation will be shown.

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