Invariant-Mass Spectroscopy of $^{14}$Be with a Carbon Target at 68.1 AMeV

T. SUGIMOTO, T. NAKAMURA, M. MIURA, Y. KONDO, Tokyo Tech, N. FUKUDA, RIKEN, R301N COLLABORATION — We have studied the nuclear structure of $^{14}$Be using nuclear-breakup reaction with a carbon target at 68.1 AMeV. In the neighboring beryllium isotope $^{12}$Be, the disappearance of $N = 8$ magic number was suggested, which was shown by observations of the low-lying first $2^+$ and the intruder $1^-$ state. On the other hand, no excited state has been observed for $^{14}$Be. It is thus interesting to study such low excited state in $^{14}$Be, in discussing the change of shell structure and the effect of neutron halo. The experiment was performed at the RIKEN Accelerator Research Facility. The secondary $^{14}$Be beam was produced and identified using RIPS beam line. The $^{14}$Be was broken up into $^{12}$Be and two neutrons by the carbon target. These decay particles were measured and identified using magnetic spectrometer and neutron detectors. The relative-energy spectrum of $^{12}$Be + 2n system was extracted using invariant-mass method. In the spectrum we found a narrow peak in the unbound region of $^{14}$Be. We also show the angular distribution of this transition in order to determine the spin/parity of the state.

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