HALO STRUCTURE OF ^{17}B STUDIED VIA ITS REACTION CROSS SECTION MEASUREMENT

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The investigation of unstable nuclei has been extended with rapid progress involving a radioactive ion–beam technique during the last few decades. After the neutron halo structure in ^{11}Li was discovered for the first time, [1][2] the existence of a neutron halo structure in some neutron–rich light nuclei was confirmed or suggested up to now. Recently, the neutron–rich nucleus ^{17}B has been recognized to be a two–neutron halo nucleus due to its weak binding energy of the valence two–neutron ($S_{2n} = 1.39 \pm 0.14$ MeV) [3], the large $r.m.s.$ matter radius ($\tilde{r}_m = 2.90 \pm 0.06$ fm) [4], and the narrow momentum distribution of ^{15}B fragments ($\Gamma = 80 \pm 10$ MeV/c) [5] from the breakup of ^{17}B.

Motivated by the measurements mentioned above, we studied the density distribution of ^{17}B, which is one of the most important issue so as to argue a halo structure. We measured the reaction cross section (σ_R) for ^{17}B on a carbon target (377 mg/cm^2) at an energy of 77 AMeV by a transmission method, in order to deduce the density distribution. We did find a large enhancement of σ_R for ^{17}B, compared with that predicted by a phenomenological formula, proposed by Kox *et al*. The enhancement of σ_R measured at present energy is much larger than that at high–energy (880 AMeV). This fact suggests the existence of a low–density tail at a large distance from the center of the nucleus, since lower the beam energy, thus the larger the elementary NN cross section, is the smaller overlapped density is probed.

The density distribution of ^{17}B was deduced through the energy dependence of σ_R together with high–energy data using a finite–range Glauber–model calculation under an optical–limit approximation and a few–body treatment. [6] The existence of the neutron–tail structure in ^{17}B as well as the amplitude of the tail and the s–wave spectroscopic factor will be discussed.

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