

Interaction cross section measurements of neutron-rich nuclei $^{17,19}\text{B}$

Tuesday, 12 July 2016 16:10 (15 minutes)

We measured the interaction cross sections of ^{17}B and ^{19}B on a carbon target by the transmission method at 270 MeV/nucleon and 220 MeV/nucleon, respectively, using SAMURAI facility commissioned in 2012 at RIKEN RI beam factory (RIBF).

The drip-line nucleus ^{19}B has attracted much attention because of its small two neutron separation energy ($S_{2n}=0.14(39)$ MeV [1]) and the large matter radius ($r_m=3.11(11)$ fm) deduced from the measured interaction cross section ($\sigma_I=1219(81)$ mb) at an incident energy of 740 MeV/nucleon [2]. These results suggest a neutron halo structure, however its microscopic structure has not yet been well understood. For ^{17}B , the narrow longitudinal momentum distribution of ^{15}B from the breakup of ^{17}B suggested a halo structure of ^{17}B [3].

Aiming at clarifying the detailed nuclear structures of ^{17}B and ^{19}B , we measured the interaction cross sections of these nuclei at different incident energies from the previous experiment. Owing to the high secondary beam intensity at the RIBF, interaction cross sections of these nuclei with a higher accuracy, compared with the previous measurement was obtained. The experimental cross sections are compared with the Glauber model theory using a density distribution obtained from a Hartree-Fock calculation. In the presentation, valence neutron configurations and neutron separation energies of these nuclei will be discussed.

[1] L. Gaudefroy et al.: Phys. Rev. Lett. 109 (2012) 202503

[2] T. Suzuki et al.: Nucl. Phys. A 658 (1999) 313-326

[3] T.Suzuki et al.: Phys. Rev. Lett. 89 (2002) 12501

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Track Classification: Exotic structures through direct reactions