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

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We measured the interaction cross sections of ¹⁷B and ¹⁹B on a carbon target by the transmission method at 270MeV/nucleon and 220 MeV/nucleon, respectively, using SAMURAI facility commissioned in 2012 at RIKEN RI beam factory (RIBF).
The drip-line nucleus ¹⁹B 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 (σ_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 ¹⁷B, the narrow longitudinal momentum distribution of ¹⁵B from the breakup of ¹⁷B suggested a halo structure of ¹⁷B [3].
Aiming at clarifying the detailed nuclear structures of ¹⁷B and ¹⁹B, 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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