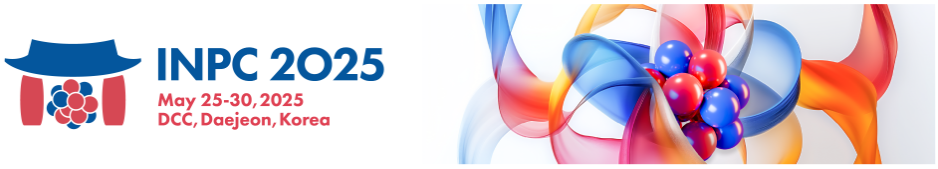

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Systematic Study on Interaction Cross Sections and Neutron Skin Thickness for Ni Isotopes

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Since nuclear matter is composed of two Fermi particles, protons and neutrons, the equation of state(EOS) of nuclear matter has a term that depends on the density difference between the two, which is called the symmetry energy. From previous studies, it is known that the first-order density dependence of the symmetry energy L is closely related to the thickness of the neutron skin r_{np} [1].

In this study, interaction cross sections σ_{I} for $^{58-77}$Ni on a carbon target at 250 MeV/nucleon have been measured to derive matter radii. Recently, the charge radii of Ni isotopes up to mass number 70 were measured by isotope shift method [2]. So, we can derive the neutron skin thickness r_{np} in the region of A = 58 to 70. The experiment was performed at the Radioactive Isotope Beam Factory(RIBF) at RIKEN by using the BigRIPS fragment separator.

In this presentation, we'll report the matter radii derived from the experimental cross sections using Glauber calculations, and neutron skin thickness obtained by combining the matter radii derived in the present study with the charge radii already known from previous research. Using several methods, the L parameter of the equation of state (EOS) was derived from the slope of the neutron skin thickness with respect to $\delta = (N-Z)/A$. As a result, when using mean-field calculations[3,4], L = 81(63) MeV, and when using the droplet model[5,6], L = 151(27) MeV. These values are somewhat larger than the previous averaged value, while these are consistent within the error range with L = 106(37) MeV obtained from PREX[7].

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